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A Search for Students' Interest in Learning English as a General Subject Through Core Reflection of the Teacher Practice

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Abstract

With the rapid emergence and growth of AI-assisted deep learning tools such as ChatGPT, teaching methodologies for the English language face the need for a drastically different approach. This is because language is fundamentally linked with what people value in thinking and expressing it through different languages. In such a process, not only what learners produce but also the idea behind such expressions must be evaluated based on trust between learners and teachers with the lurking doubt of AI creation. Given the above background, the author believes it is vitally important to cultivate learners' genuine pride in their creations, for which interest has become more crucial than ever before. To materialise this goal, the author sets a classroom environment where learners openly share their ideas and appreciate peers' input as learning materials. The author has been designing her classroom activities based on the principle of Exploratory Practice, which values the quality of life (QoL) within a classroom. In this study, the author analyses the questionnaire data obtained from the voluntary participants among the course takers asking the evaluation of the author's classroom design against her syllabus outlines. Overall results indicated a positive reaction to the author's intended learning outcomes. However, the author also reflected the results more deeply by the theory of core reflection proposed by Korthagen and Vasalos for her continuous growth as an educator. The study proposes a chain of such practices in the field of language education to further enhance the quality of language classrooms.

Keywords: English language classroom design, AI assisted deep learning tools, learning community, exploratory practice, core reflection

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Introduction

With the rapid progress of globalisation, the Japanese government recognised the urgent need for the reformulation of English education for the nation's future. Under the initiative of the Ministry of Education, Culture, Sports, Science and Technology (MEXT), the English education reform plan was announced in 2014 and gradually implemented with a target of full adoption by 2020. The plan included some key steps such as introducing compulsory English classes for 5th and 6th graders in elementary schools from 2011; expanding English activities for 3rd and 4th graders from 2020; preparing for the introduction of four-skill assessments in high school and university entrance exams; and enhancing teacher training programs to improve English teaching skills (MEXT, 2013, 2014).

While there have been some improvements in the areas of basic knowledge and skills, as well as the ability to use these skills to solve problems, the lack of progress in Japanese students' face-to-face communication skills remains a serious concern (MEXT, 2014). Notably, the older the students are the less willing they are to use and present their ideas in English. One of the key factors behind this problem is the reported lack of exposure to communicative practice, especially among junior and high school classrooms (MEXT, 2014). One of the problems associated with this issue is the fact that cognitive activities become more abstract as students mature mentally as well as physically. Therefore, the content that they want to express becomes more complex and exceeds their second-language ability. The report also illustrates that the language ability among English teachers requires significant improvement, therefore more robust teacher training schemes need to be established (MEXT, 2014). Considering these problems, it can be hypothesised that the current Japanese English language classrooms in schools may lack the ability to provide learners authenticity that inspires their genuine motivation for learning English language.

The same report also identifies a further issue with regards to the ineffectiveness of the transition between school grades, which leads to the situation where students cannot put what they have learnt previously in to practice in a meaningful way when they progress (MEXT, 2014). This would seem to be a fundamental failure in the structure of English education and all educators must take it seriously to improve their professional practice.

On another note, it is recognised that the development of thinking, decision-making and expressive skills is necessary to achieve the goal of enhancing Japanese students' English proficiency level. With the rise of online learning, it seems to be a widespread tendency among students they overly rely on digital technology and are less intrigued. Most students tend to accept information without much questioning and become more impatient to know answers. The reality that information technology perpetuates the majority of people's everyday lives alerts us that the ability to 'think' seems to be taken away from us. Given the situation, MEXT also includes in its report that the importance of digital literacy needs to be discussed in educational settings, as well as the skills of teachers to effectively incorporate AI tools in classroom practices.

Most of the literature on education generally acknowledges that motivation for learning is the key success factor for any classroom (e.g. Deci & Ryan, 1985; Dweck, 2006; Eccles & Wigfield, 2002; Pintrich & De Groot, 1990; Schunk, Pintrich & Meece, 2014; Suzuki, 2019). For this reason, it has been the top priority in the syllabus design for the author to think about how to motivate students in a classroom. As overviewed in the previous section, there has been a structural failure in incrementally furthering students' skills in Japanese English

education. Hence, it is unsurprising that university students feel uninspired and disengaged in English classrooms when required to review familiar material. Before the emergence of AI-assisted tools, the author endeavored to change the classroom design from a place of knowledge transfer to an active learning platform to overcome the issues of disconnection between the educational institutions and create more authentic learning contexts. However, a new trend in language classrooms has emerged that many students can generally produce any tasks with good standards without much struggle with the aid of AI-assisted tools such as ChatGPT (Sakai, 2024). This means that a further paradigm shift in the educational approach is required and it challenges the author to search more deeply for the meaning of learning for individual students.

In the constantly changing social environment, this study focuses on the classroom environment to identify the characteristics needed for future language education. In particular, the study attempts to extract the signs that learners found passion and the meaning of learning in their effort to attain language ability. In the process, the possibility of co-existing with AI technology is discussed. More importantly, the study outlines the effectiveness of the classroom design concerning the philosophy of the author in the attempts to engage in a meaningful learning environment not only for the learners but for the author herself. In short, this is practitioner research that follows the principles of exploratory practice (EP).

Literature Review

Practitioner research refers to research conducted by educators, professionals, or practitioners within their own field of practice (e.g. Cochran-Smith & Lytle, 2009). It is commonly employed in educational settings, where teachers investigate their own teaching methods and classroom practice to improve learning outcomes. Some key characteristics of practitioner research are:

- Conducted by practitioners themselves, focusing on their own practice;
- Aims to improve practice, solve real-world problems, and bridge the gap between theory and practice; and
- Often combines subjective insights with systematic investigation.

Practitioner research is closely linked to Action Research (AR) which emphasises the cycles of planning, acting, observing, and reflecting (Kemmis, 1988; Schön, 1983). A similar but distinctively different research method is called Exploratory Practice (EP). AR and EP are both practitioner-based research approaches, yet they differ significantly in their purpose, approach, and outcomes (Hanks, 2017). Exploratory Practice aims for practitioners and learners to understand "why things happen the way they do." It emphasises understanding the phenomenon itself rather than solving specific problems. In other words, EP sets its primary goal to achieve a deeper understanding of the problem. Hanks (2017) explains EP as follows:

EP seeks to go beyond other forms of practitioner research. It does so by prioritising understanding over solutions, and by emphasising the importance of agency, of learners as well as teachers, in the learning/teaching enterprise. (2017, p. 3)

The concept of "puzzling" sits at the heart of EP. Every learner in a classroom has different ideas about what the "learning" really is for them. Hanks stated the importance of puzzling as follows:

Arguing that solving the problem may be successful but will not necessarily yield an explanation of why the problem happened in the first place, EP aims instead to focus on developing understanding(s). That is to say: “puzzling” or “puzzlement” or ‘being puzzled’ about an issue in the language learning lives of teachers and learners. This focus means moving away from “how (to)”, and embracing instead “why”, as the deeper rationale for research. (2017, p. 6)

The EP approach values individuals, so it has the scope to cultivate classrooms to be a place of acceptance as a united community. It was believed that the chance of classrooms being as such can be increased if the teacher genuinely tries to follow the seven principles of EP (Hanks, 2017, p. 97):

1. Focus on quality of life as the fundamental issue;
2. Work to understand it before thinking about solving problems;
3. Involve everybody as practitioners developing their own understanding;
4. Work to bring people together in a common enterprise;
5. Work cooperatively for mutual development;
6. Make it a continuous enterprise; and
7. Minimise the burden by integrating the work for understanding into normal pedagogic practice.

The implementation of the classroom design is, however, only a part of practitioner research. The key element of the design lies in reflection. Given the characteristics of the intended outcomes to be found in this research potentially touch on the deeply rooted belief and philosophy of the practitioner, it was thought to be necessary to adopt the Core Reflection model that Korthagen and Vasalos (2005) introduced. This method is intended to promote deep reflection of practitioners’ educational and professional development. It emphasises aligning one’s actions with inner strengths, values, and ideals. The process involves guiding individuals through a structured reflection cycle that addresses both personal and professional growth. There are six steps in the process, which emphasise positive psychology by building on individuals’ strengths rather than focusing solely on problems. Also, it encourages the integration of head (thinking), heart (feeling), and hands (action) in personal and professional development. Core Reflection can be thought as promoting authentic self-expression and encouraging individuals to embrace their inner potential. The key steps in Core Reflection are as follows:

1. Describing the Situation: the individual reflects on a concrete experience, describing what happened and identifying any challenges or concerns they faced;
2. Identifying Thoughts and Feelings: the individual explores their thoughts, emotions, and bodily sensations about the situation;
3. Recognizing Inner Qualities (Core Qualities): the focus shifts to discovering the person’s inner strengths, values, and ideals that can help address the situation;
4. Exploring Obstacles: the individual identifies internal or external obstacles that may hinder them from effectively utilizing their core qualities;
5. Aligning with the Core Self: through guided reflection, the individual reconnects with their core qualities and envisions how they can use these strengths to overcome the identified obstacles; and
6. Taking Action: the individual applies insights gained from the reflection process to modify their behaviour or mindset in future situations.

This research is a combination of the EP approaches and principles in its design of the classroom setups and the evaluation of the outcomes in light of the Core Reflection process.

Research Method

1) Syllabus

This research was conducted in two classes in the spring semester (April to September) of 2023. It was conducted in an established public university located in Osaka, Japan and the majority of the students had achieved a high level of standards in the exam upon entrance. The course was for first-year university students and the majority of them majored in subjects in the scientific field. The course objectives were set as follows:

In this class, students will increase their awareness of various social issues necessary for the future. For this purpose, they will watch and read many authentic materials. Students must go beyond simply receiving and accepting input, moving to learn how to develop and express their own ideas to help them understand complex social issues. Moreover, students are expected to show empathy towards different viewpoints. (The author's syllabus for Integrated English. [Liberal Arts & Sciences] / Engineering [Science and Electrical] 2024 Spring)

The course objectives illustrate the belief of the author as a practitioner for this course; that is to nurture ownership of learning, cultivate a genuine interest in society, and increase willingness to embrace diverse viewpoints to form individual perspectives. To achieve this goal, the class activities were designed mainly based on group work. A textbook with authentic news videos was adopted (Takeuchi et al., 2023). The topic titles include “Artificial Intelligence Helps Make Movies Speak Many Languages” (Takeuchi et al., 2023, p. 1-8); “Mongolian Youth Seek to Preserve Reindeer-Based Tradition” (Takeuchi et al., 2023, p. 9-16); “Climate-Driven Heat Waves Increasing Inequality” (Takeuchi et al., 2023, p. 17-24); “Panda Boom Gives New Hope for Its Survival” (Takeuchi et al., 2023, p. 25-30); “Lantos Human Rights Prize Winners Vow to Work for Women in Afghanistan” (Takeuchi et al., 2023, p. 31-36). Two-lesson time consisted of a round and the former part overviewed the contents to extract the key concept worth furthering by group discussion. For example, the students identified the role of languages and AI in society as a crucially important phenomenon to be properly understood. The students took this concept home, carried out research and wrote up an individual discussion paper to bring back in the latter session. They then formed groups to share their opinion with other group members before all members worked together to prepare and write a discussion paper.

2) Participants and Research Procedures

There were 32 students in Class 1 and 40 students in Class 2. The questionnaire survey was conducted voluntarily, and 38 responses were received (58.2% effective responses). The purpose of the research was explained to the two student groups along with the research ethics such as anonymity of the obtained information and voluntary participation were made clear. The survey was conducted via Google Forms and the link was made available for all students between the 24th of July and 31st of August 2023. The research consent was collected as one of the questions.

3) Questionnaire Survey

The questionnaire comprised 24 items in total. The first 9 questions were designed to assess participants' perceived achievement of the learning goals outlined in the syllabus, using a 5-

point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The following 10 questions asked the participants about the effectiveness of the tasks they engaged in during the semester, such as individual discussion papers, group discussions and final group presentations. Furthermore, there were 4 specific questions about the perceived change in their approach towards learning. Finally, there was a request for feedback on the lesson design (complete questions, see Appendix).

4) Methodology

The data obtained was simply summarised by the percentage of the responses and the feedback was checked against the results. The study initially intended to do the text mining analysis, but the sample size was too small to gain any meaningful results from such a quantitative method.

Results

Firstly, the percentage of the students who checked the syllabus before the registration was 58% (22 responses). The main reasons for taking the course were: for evaluation structure (32%/7 responses); for writing skills (23%/5 responses); for group discussions (23%/5 responses); and for speaking skills (14%/2 responses).

In terms of individual skills set in the syllabus, questions No3 to No9 asked the perceived achievement level of the learning goals: Q3 on listening skills, Q4 on vocabulary, Q5 on reading skills, Q6 on writing, Q7 on knowledge base, Q8 on critical thinking and Q9 on intercultural skills (for details, see Appendix). The questionnaire results are shown in Table 1 below.

Table 1: Students' Perceived Achievement Level of the Learning Goals

	Q3	Q4	Q5	Q6	Q7	Q8	Q9
5. Strongly agree	5%	13%	18%	42%	55%	47%	29%
4. Agree	66%	50%	50%	45%	39%	42%	50%
3. Can't say either	26%	29%	24%	5%	5%	8%	16%
2. Rather disagree	3%	8%	8%	8%	0%	3%	5%

The following section of the questionnaire asked about the effectiveness of the tasks that were designed to incorporate EP principles in the syllabus. Q10 and Q12 referred to discussion papers written individually and in groups; Q14 was related to the group presentations; and Q16 was concerned with the final report at the end of the semester. Lastly, Q18 was related to the group discussion that formed the foundation of the classroom activity. The questionnaire responses are summarised in Table 2 below. Each question in this section was paired with the feedback for the scoring, which will be discussed later.

Table 2: Students' Perceived Effectiveness of the Syllabus Design

	Q10	Q12	Q14	Q16	Q18
5. Strongly agree	21%	34%	39%	37%	32%
4. Agree	58%	50%	39%	42%	55%
3. Can't say either	21%	13%	21%	13%	11%
2. Rather disagree	0%	3%	0%	8%	3%

In the following section, Q20 and Q22 asked students about the noticing of their perspectives towards future learning. Q20 asked students to consider the possibility of their viewpoints being diversified, and Q22 focused on the change in proactive mindset for learning. Again, these questions were paired with further opinion feedback that is discussed in the following section. The questionnaire responses are displayed in Table 3 below.

Table 3: The Change in Perspectives Towards Future Learning

	Q20	Q22
5. Strongly agree	29%	37%
4. Agree	58%	53%
3. Can't say either	5%	8%
2. Rather disagree	5%	3%
1: Disagree	3%	0%

Finally, Q24 asked for free feedback on the overall experience during the term. The comments were evaluated in the discussion section.

Discussion

The final step of this study is to consider what the results mean, firstly to the learners but more importantly, to the practitioner of this study. For this purpose, the author applied the core reflection process in light of the results. This process is crucial for the practitioner because it allows every possible “good” intention to make the education better can go into a cycle of positive action. Therefore, the author believes that just looking at the result and deciding whether the syllabus was effective will not produce any productive suggestions.

Firstly, it was rather difficult to come to terms with the result that only 58% of the course takers utilised the syllabus when they enrolled in the classes. There was an inevitable force that a communication subject must be taken as a graduation criterion, therefore, most first-year students, often unwillingly, take up one English course. Given this situation, more than half of the class-takers examined the contents of the syllabus before the registration was a promising sign that the syllabus included certain appealing elements to the learners. Also, the respondents among the syllabus users answered that they decided to take the class because they were to be assessed by their performance rather than the exams.

Regarding the learners' self-evaluation about the improvement in their English language skills, similar reactions were observed for listening, vocabulary and reading skills. Among the respondents, half of them felt the goal was achieved but about 30% of them could say anything decisively. However, the result was more clearly positive for the writing skill where 87% of respondents felt improvements. These results seem to suggest that the students inexplicitly recognised the main objective among others could be achieved by developing their writing skills. Indeed, the method employed to streamline their thoughts was in the form of discussion papers and final reports. The students evaluated writing activity overall positively, however, it has to be noted that some respondents also exhibited mixed feelings. The feedback from the students who marked Q10, Q12 and Q16 (all relating to writing tasks) at 3 (can't say either) or 2 (disagree) suggested some interesting views, a selection of which are shown below:

- Because working alone didn't give me a chance to expand the idea;
- I ended up just listing what I picked up from the research;

- Allocated time was too short;
- Because I used translation tools; and
- Although it was a good opportunity to think about global social issues on my own, I thought that the task of how to contribute “from my future position” would narrow down the ideas too much. It would have been better if the free ideas of each person were allowed.

From these opinions, the author realised how passionately students wanted to express their authenticity in writing. In particular, the student who confessed to having used the translation tool seemed to express frustration and even some painful regret for the action. This discovery reminded the author that the task should not be treated as just a task but as a valuable time and effort which the learners should consume.

In the case of more holistic skills (Q7, Q8 and Q9), they were regarded as satisfactory improvements with over 80% of the respondents rated positively. This result was well understood with the combination of discussion being valued as effective (Q18 at 87% positive). However, once again there were 11% of respondents who were not sure about the group work. Therefore, their feedback was checked, and it transpired that most of them selected a rating of 3 (can't say either) and described the group work as good in the comments. However, it could mean that the students did not feel strongly enough to rate their experience positively. Of course, there were some negative comments, and they were as follows:

- I didn't have enough time for in-depth discussions.
- Because there were times when I just followed the person who was leading the discussion, and I couldn't think of anything on my own.
- Because I could only express my thoughts in Japanese.
- Because it often ended up with similar opinions to be combined in the group as a conclusion.

Once again, these opinions display mostly regrets, frustrations and limitations in their ability. The author feels that the group discussion was valuable in providing the adolescent learners with the opportunity to face such emotions.

Finally, the key objectives in the syllabus were investigated in Q20 and Q22, which asked about the noticing in course takers' perspectives towards future learning. Nearly 90% of the students agreed that they had broadened their perspectives and would act more proactively towards future learning. Some of the students' comments are shown below:

- I want to acquire the ability to live in society by learning about and thinking about society.
- I wanted to think about social issues in relation to my field of study.
- I have more opportunities to think about various issues through the classes.
- I hope there will be more opportunities like this in the future, as listening to other people's ideas will broaden my perspective.
- I thought it was important to think about how to solve the problems happening in the world after taking the class.

Conclusion

Although it is acknowledged that this study has some shortcomings, such as the sample size and associated methodology, analysing the student survey results and reflecting on the

practice in the classroom has underscored the fundamental reasoning behind the author's lesson goals. The syllabus was created based on the principles of EP because the author believes that there is no one answer for learning in the classroom where many lives are involved. The feedback from the students revealed that the tasks challenged their limits, so they had to use translation tools. Others expressed that the group work didn't produce anything new or meaningful. Also, the writing tasks didn't improve their thinking skills because they just listed the information. All the feedback was valuable to the author because it has yielded a starting point to build on when developing more effective lessons. Instead of focusing on what students are capable of in terms of their English level, the author felt it was beneficial to challenge them to be proud of what they want to express and share with others, even with the aid of AI tools. After all, the syllabus design tried to embody what the author cares about and wants the learners of the future to confront in the real world.

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Appendix

The Questionnaire applied in this study

1. Did you refer to the syllabus when enrolling in this course?
2. If you answer yes to the above question, please tell us about the contents of the syllabus that led you to take this course.
3. How much have you achieved in developing your listening skills to understand authentic material such as news?
4. How much have you achieved in consolidating your vocabulary knowledge for writing and reading?
5. How much have you achieved in knowing the English structure, improving reading skills and becoming an efficient reader?
6. How much have you achieved in learning basic paragraph writing and being able to write well-structured English compositions?
7. How far have you achieved in gaining a broad knowledge across the humanities, social sciences and natural sciences, which may have gone beyond your familiar viewpoints?
8. How much have you achieved in thinking critically about a range of topics through discussion?
9. How much did you achieve in acquiring intercultural adaptability and communication skills to understand the opinions of others and to convey your own opinions to others?
10. How useful were the discussion papers (individual base)?
11. Please explain the reasons for the rating for No10.
12. How useful were the discussion papers (group base)?
13. Please explain the reasons for the rating for No12.
14. How useful was the group presentation?
15. Please explain the reasons for the rating for No14.
16. How useful was the assessment report?
17. Please give reasons for your evaluation of No16.
18. How useful was the group work (discussion) as an in-class activity?
19. Please give reasons for your evaluation of No18.
20. Do you think this lesson has given you a different perspective on approaching learning than you have had in the past?
21. Please tell us specifically about it.
22. Did this lesson make you want to actively broaden your knowledge of various social phenomena and think about them about yourself in the future?
23. Please tell me specifically about it.
24. Please give me any feedback on improving the lesson design.

Chinese University Students With Gritty and Not Gritty: A Preliminary Finding on Anxiety, Depression, Gratitude, and Zest for Life

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Official Conference Proceedings

Abstract

Grit has received great focus in both educational and psychological research; however, researchers have questioned the linear association between grit and various outcomes that might fail to capture those not gritty individuals. Therefore, the current study aimed to attend this perspective and identify (1) any significant group differences in students' psychological illness (anxiety and depression) and well-being (gratitude and zest for life) among gritty and not gritty students, and (2) linear associations among the variables. A total of 326 university students completed the online survey package and were categorized into four groups using the mean score as the cut-off score (low-passion and low-effort, high-passion and low-effort, low-passion and high-effort, and high-passion and high-effort). Regression analysis results showed that students' gratitude, zest, anxiety, and depression play differently in two grit facets. Further, significant group differences were found. Results indicated that students with high-passion and low-effort showed the lowest level of gratitude and zest for life, and the highest level of anxious symptoms. Students with low-passion and low-effort showed the highest level of depressive symptoms. Researchers and educators should pay more attention to those students who are passionate but insufficient in sustaining effort toward long-term goal-striving. These findings provide a hint that the imbalance between passion and effort may negatively affect students' mental health during long-term goal-striving, which may block them from striving for their long-term goals.

Keywords: anxiety, depression, gratitude, grit, zest for life

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Introduction

Grit is defined as “perseverance and passion for long-term goals” (Duckworth et al., 2007, p. 1087). Consistency of interest describes how people stay focused on working toward long-term goals while perseverance of effort describes individuals who endure obstacles and challenges while sustaining effort, and these two facets operate as lower-order subscales of the construct of grit (Duckworth et al., 2007). Empirical findings have lent support to the idea that gritty students tend to have better school and psychological outcomes, such as better school engagement and performance, better psychological health (e.g., life satisfaction and happiness) and lower psychological illness (e.g., perceived stress, anxiety, depressive symptoms, and eating disorders) (e.g., Knauff et al., 2019; Sharkey et al., 2018). However, most of the existing results were drawn from linear associations (Shin, 2020), which failed to tell differences among those students with moderate levels of grit in their associations with analyzed factors.

It is worth noting that current two-faceted grit models equate individuals with high interest and low effort with individuals with low interest and high effort (Credé, 2018). Current grit scores that measure individual grit only represent individuals with low interest and effort, as well as individuals with both high interest and effort; however, the situations or empirical results for individuals with high interest and low effort (or vice versa) have been ignored or understudied. Therefore, this study aims to identify (1) any significant group differences in students’ psychological illness (anxiety and depression) and well-being (gratitude and zest for life) among gritty and not gritty students, and (2) linear associations among the variables.

Method

Participants and Procedure

A convenience sampling method with a correlation design was used. We randomly distributed paper invitations on the campus of a public university in the Macao SAR, China. We also provided an informed consent form, which clearly stated the purpose, nature, and procedures of the study. No illegal information was collected from the participants, and they all participated in the study voluntarily. Qualtrics was used to collect survey responses. A total of 326 students (aged between 18 to 25, Mean age = 20.93, 79% female) accessed the online questionnaire and completed the questionnaire packages.

Materials

Anxiety was assessed with the Chinese version of the State-Trait Anxiety Inventory (STAI-6; Hou et al., 2015). Six items about symptoms of anxiety were asked and rated on a 4-point Likert scale (from 0 = not at all to 3 = nearly every day); higher average scores indicated higher levels of anxiety. A good internal reliability coefficient was shown (Cronbach’s alpha = 0.86).

Depressive symptoms were assessed with the Patient Health Questionnaire (Kroenke et al., 2001). The PHQ-9 includes nine items that ask participants to report the depressive symptoms they experienced during the previous two weeks, rating on a 4-point Likert scale (from 0 = not at all to 3 = nearly every day); higher average scores indicated higher levels of perceived depressive symptoms. A good internal reliability coefficient was shown (Cronbach’s alpha = 0.86).

Gratitude was assessed with the Gratitude Questionnaire (GQ-6; McCullough et al., 2002), covering 6 items to assess individuals' gratitude experiences and expressions as well as appreciation in daily life, rating on a 7-point Likert scale (1 = strongly disagree and 7 = strongly agree); higher average scores indicated higher levels of gratitude. An acceptable internal reliability coefficient was shown (Cronbach's alpha = 0.77).

Grit was assessed with the Short Grit Scale (Duckworth & Quinn, 2009), covering 8 items to assess individuals' passion and sustaining effort toward long-term goals. Four negatively worded statements described one's consistency of interest, and four positively worded statements described one's perseverance of effort, rating on a 5-point Likert scale (1 = not like me at all and 5 = very much like me); higher average scores indicated higher levels of grit. This scale showed acceptable reliability (Cronbach's alpha for passion = 0.78 and Cronbach's alpha for effort = 0.80).

Zest for life was assessed using the zest for life subscale of the Chinese version of the Values In Action Inventory of Strengths (VIA-IS; Duan et al., 2012). The original VIA-IS consisted of 24 subscales in assessing 24 different types of character strength; however, only the zest for life subscale was of interest in this study. Four items about zest for life were asked and rated on a 5-point Likert scale from 1 (*very much unlike me through*) to 5 (*very much like me*); higher average scores indicated higher levels of zest for life. A good internal reliability coefficient was shown (Cronbach's alpha = 0.84).

Statistical Analyses

IBM SPSS Statistics 24 was used to calculate the descriptive statistics and correlations of tested variables. Linear regression analysis was used to identify the associations among the variables, and one-way ANOVA was used to identify the group differences. The collected data were categorized into four groups using the mean score as the cut-off score (low-passion and low-effort, high-passion and low-effort, low-passion and high-effort, and high-passion and high-effort).

Summary of the Results

Accordingly to Table 1, effort, gratitude, zest for life, anxiety and depressive symptoms had significant correlations with each other. Passion was only significantly associated with zest for life and depressive symptoms.

Table 1: Descriptive Statistics and Bivariate Correlations Among Variables (N = 326)

	1	2	3	4	5
1. Passion	-				
2. Effort	0.034	-			
3. Gratitude	-0.003	0.352***	-		
4. Zest for life	-0.128*	0.604***	0.400***	-	
5. Anxiety	-0.074	-0.283***	-0.163**	-0.286***	-
6. Depressive symptoms	-0.173**	-0.244***	-0.322***	-0.198***	0.439***

Note: $p < 0.05$; ** $p < 0.001$; *** $p < 0.001$.

As shown in Table 2, significant group differences were found. Results indicated that students with high-passion and low-effort showed the lowest level of gratitude and zest for life, and the highest level of anxious symptoms. Students with low-passion and low-effort showed the highest level of depressive symptoms.

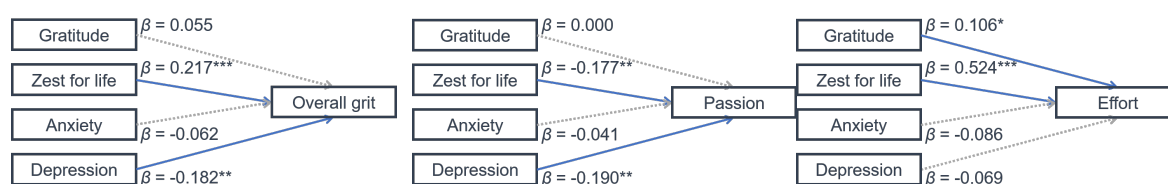
Table 2: Means (Standard Deviations) of Variables by Groups

	Low Grit (N = 68)		High Passion Low Effort (N = 83)		High Effort Low Passion (N = 100)		High Grit (N = 75)		<i>F</i>
Gratitude	5.03	(0.67)	4.53	(0.76)	5.13	(0.61)	5.32	(0.65)	20.32***
Zest for Life	3.30	(0.75)	3.01	(0.68)	3.88	(0.68)	3.89	(0.65)	33.39***
Anxiety	2.75	(0.61)	2.83	(0.56)	2.68	(0.60)	2.37	(0.69)	8.10***
Depressive symptoms	2.00	(0.49)	1.99	(0.60)	1.88	(0.56)	1.60	(0.42)	9.55***

Note: $p < 0.05$; ** $p < 0.001$; *** $p < 0.001$.

As shown in Figure 1, regression analysis results showed that students' gratitude, zest, anxiety, and depression play differently in two grit facets. Zest for life ($\beta = 0.22$, $p < 0.001$) and perceived depressive symptoms ($\beta = -0.18$, $p < 0.01$) were significantly associated with overall grit level, while gratitude and anxiety did not ($ps = n.s.$). Similar results were observed in predicting passion. However, gratitude ($\beta = 0.11$, $p < 0.05$) and zest for life ($\beta = 0.52$, $p < 0.001$) were significantly associated with effort, while anxiety and depressive symptoms did not ($ps = n.s.$).

Figure 1: The Path Models



Note. Solid lines represent significant paths and rectangles represent observed variables. The effects were reported in standardized values.

* $p < 0.05$; ** $p < 0.001$; *** $p < 0.001$.

Limitations

First, this was a cross-sectional study and could not show a causal relationship between the tested variables. Second, self-report data may induce homogeneous method variance, which may allow variables to covary and produce significant biases in the results; and involve social desirability bias. It is recommended to use multiple data resources in further research. Third, this study recruited only a sample of Chinese university students and cannot be generalized to other educational backgrounds, non-Chinese groups, or religions.

Implications and Conclusion

Researchers and educators should focus more on students who are passionate about pursuing long-term goals but lack the sustained effort. These findings suggest that an imbalance

between passion and effort may negatively impact students' mental health in the pursuit of long-term goals, thereby hindering their achievement of long-term goals. For example, educators could promote well-established interventions designed to increase mindfulness (Galla et al., 2015) and growth mindset (Nagy et al., 2023) to improve grit levels among student populations.

Furthermore, when leveraging positive strengths or emotions to foster student grit, educators need to be mindful of factors that may have opposing effects on predicting passion and effort (e.g., in this study, zest for life). Having a better zest for life may have a potential downside for passion in goal-striving. Further research is also warranted to investigate whether students develop different types of passion, such as obsessive passion or harmonious passion, during their long-term goal pursuit. From the perspective of the dualistic model of passion, harmonious passion arises when individuals control their participation time and energy and freely devote themselves to an activity, whereas passion turns into obsession when an activity develops into a controlled internalization that creates an internal pressure to participate in activities that one enjoys, making the person feel out of control and compulsive (Deci & Ryan, 2000; Vallerand et al. (2023). People with different passions show different efforts and persistence in the process of pursuing their goals: flexible persistence comes from harmonious passion, which enables people to experience positive activity results and achieve other life results while pursuing their desired activity goals; rigid persistence mainly comes from compulsive passion, which has significant emotional behaviors and negative behaviors during and after negative activities. Because current grit scales do not yet capture whether individuals have harmonious or obsessive passions, or whether these influence their persistence in pursuing goals over the long term, future research is recommended to clarify this mechanism.

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Conflicts of Interest

There is no conflict of interest.

Compliance With Ethical Standards

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent Statement

Informed consent was obtained from all individual adult participants included in the study.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

The AI-generation or AI-assistive technology were not used in writing, improving, or proofreading this paper.

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Examining the Changes in Complexity, Accuracy, and Fluency in Japanese L2 Writing Over an Academic Semester

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Abstract

This study examines the evolution of complexity, accuracy, and fluency (CAF) in the compositions of Japanese L2 university students over a semester. The study aimed to determine if any improvement in writing abilities had occurred and examine editing methods. 159 students from three different institutions participated. The research focused on determining the CAF's evolution over the previous year, identifying potential variations in editing techniques, and describing the connections between CAF dimensions. Results showed some improvement in accuracy, but a marked decline in complexity and fluency. The study also found a high correlation between clauses and word counts, mean length of T-unit (MLT), coordinate phrase of T-unit (CP/T) and clause per T-unit (C/T). Issues of syntactical complexity negatively correlated with EFCT, indicating that more syntactical complexity relates to decreased accuracy. The study also found significant differences among the three institutions, with Fujian University of Technology having the most fluency and accuracy. The findings suggest that teachers should support students in developing more complex syntactic structures, improving fluency, and using online grammar checkers more effectively.

Keywords: complexity, accuracy, fluency

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Introduction

Evaluation has become a huge business across the world. The need to sort, gauge, and promote students into the various programs has intensified for every country and region. More pressure is on students and educators to “get it right” about which students are the most “able.” Evaluating writing and oral output has also become so problematic, however, that most standardized testing institutions and companies, as well as school boards, and curriculum committees, have focused on the teaching and testing of listening, grammar, and reading. This is due to the time, money, expertise, and effort it takes to evaluate writing; moreover, oral output, which further requires audio or video recording and transcripts. With both skills, expert evaluation is needed to examine the complexity, accuracy, and fluency of the student’s performance. Evaluating oral speech is further complicated by the variation in spoken output—fluency and dysfluency issues, pausing, accent, intonation (or lack thereof), and pronunciation—with writing, there are potential differences in language structures, style, tone, referencing, and vocabulary.

Another issue for evaluation relates to global and local errors and the irritability that both present; for example, are a series of local errors more problematic for the listener/reader than one or two global errors that do interfere with meaning? In the end, the sheer cost and time of evaluating student writing and oral output makes it impossible for countries and universities to truly understand the interactive performance and the communicative competency of their students when it comes to intercultural communication. Unfortunately, all too often language educators throughout the world often have misplaced faith in their test or quiz scores as indicators of student progress, failing to realize that written or oral output is the only real marker for true acquisition.

While some traditional educators may question why the other two dimensions of *complexity* and *fluency* are important; researchers (e.g. Binder, 1996; Wolf, 2001) suggest that fluency contributes directly to three types of critical learning outcomes: (a) *retention and maintenance*: the ability to perform a skill or recall knowledge long after formal learning programs have ended, without re-teaching in school year after year, (b) *endurance*: the ability to maintain performance levels and attention to task for *extended* periods while resisting distraction, and (c) *application*: the ability to combine and apply what is learned to perform more complex and creative skills in new situations. Likewise, syntactical complexity (the extent to which a speaker can produce elaborated language) shows the ability to provide more meaningful input and the speaker’s ability to risk more complex phrasing. Furthermore, it could be easily argued that with improved fluency, students will likely have more confidence and less anxiety, which, in turn, can lead to the individual seeking out more opportunities.

Review of Literature

To understand students’ evolution of English ability is to understand how writing is a system, with the components of CAF being its subsystems. According to a 2009 hypothesis by Housen and Kuiken “CAF emerge as principal epiphenomena of the psycholinguistic mechanism and processes underlying the acquisition, representation, and processing of L2 knowledge” (p. 462). Accuracy and complexity often work together to provide a more accurate assessment of a student’s present language output level while fluency shows how well the learner can control these two abilities. How these three elements interact, evolve, and potentially affect one another is of special interest to educators.

The manner that the various parts of CAF interact with one another over time illustrates a dynamic system. Often students increased fluency might adversely impact accuracy or if students had more syntactical complexity, both fluency and accuracy might be affected. In any case, teachers can learn how these parts can be connected and how one subsystem may affect others by using dynamic systems theory (DST) (de Bot & Larsen-Freeman, 2011). One of the most crucial aspects of a dynamic system is stability, along with variability, which is thought to be the engine of growth. One type of stabilization is the phenomenon of fossilization, as noted by de Bot and Larsen-Freeman (2011) insofar that the developmental processes are thought to possess inherent properties, one of which is subsystem variability (de Bot et al., 2007; van Dijk et al., 2011). As a result, data that does not reflect linear progress may indicate that DST is evolving and changing. Hokamura's 2018 study on Japanese university students' writing revealed that educators need to be aware of developmental trajectories in language development, particularly fluency, complexity, and accuracy. Despite some improvement in fluency and accuracy after high variability, there was little evidence of a positive correlation between these constructs.

Complexity

Complexity is defined as "progressively more intricate language and a wider spectrum of syntactic patterns" (Foster & Skehan, 1996, p. 303). CAF's components are categorized in multiple ways. Few studies have explored syntactic complexity domains related to L2 writing quality, despite the impact of writing and language proficiency. Common measurements include the mean length of T-unit, sentence, and clause. Syntactical complexity, linked to lexical and syntactic elements, can expand beyond the subordination ratio. "Measures of complexity are frequently dependent on the amount to which subordination is obvious," for example, the number of clauses per T-unit or c-unit, Yuan and Ellis (2003, p. 2) agreed. Type-tokens have been employed in certain situations to measure lexical difficulty, but clausal subordination (finite), with clauses per T-unit (C/TU) as a common metric, has also attracted attention.

Givon (1991) argued complexity studies must consider subordinate clause structures' difficulty in understanding, indicating that grammatical subordinateness and embeddedness can be determined by counting linguistic signals in a story. Long's 2013 study found causal dialogues have a slightly shorter sentence length than other discourse styles, suggesting that reducing complexity through type-token ratios and clause count is ineffective. Skehan (1996) proposed that integrating semantics, pragmatics, and meaning can enhance our comprehension of the complexity problem as a whole. Norris and Ortega (2003) suggest syntactical complexity may rise through phrasal and clausal complexification, while Crossley et al. (2007) analyzed linguistic differences in adapted texts using various indices. Crossley et al. (2012) analyzed the linguistic changes made to 300 texts for different levels of learners.

Complexity, in short, is the "extent to which learners develop complicated language," according to Ellis and Barkhuizen (2005, p. 139), and is frequently connected to the syntactic and lexical components of narrative performance. In other words, highly fluent speakers put effort into organizing their phrases and sentences to convey concepts. A fluent speaker will, therefore, eventually be called into doubt by a succession of basic sentences. Ellis and Barkhuizen observed that complexity has little significance if the speaker's fluency is so subpar as to undermine meaning or the narrative's overall impact. According to Norris and Ortega (2003), complexity, as determined by the subordination ratio, can grow in ways other than linearly, such as by phrasal and clausal complexification.

Accuracy

Grammatical accuracy has long been a topic of discussion. Witty and Green (1930) discovered in their study that the most common errors were capitalization, spelling, punctuation, lax repetition or omission, apostrophe errors, pronoun agreement, verb tense agreement, and errors, grammatically incorrect sentence structure (run-ons and fragments), incorrect use of adjectives and adverbs, and incorrect conjunction and preposition usage. Using 170 timed papers as a basis, Witty and Green's list includes fragments, dangling modifiers, misplaced modifiers, pronoun agreement, erroneous connectives, unclear pronoun reference, misuse of simple past tense forms like "would," forms that are confused because they sound or have similar meanings, pronoun agreement, mistaken tense, and unclassified mistakes. J. Hodges (1941) enumerated issues with twenty thousand articles: agreement, apostrophe, comma, exactness, word omission, reasonable use, pronoun reference, spelling, extraneous commas, and wordiness.

Over the next two decades, researchers have continued to look into mistake patterns. The study "Frequency of Errors in Essays by College Freshmen and by Professional Writers" (Sloan, 1990) is arguably the most notable. It found that "[t]he distribution of errors in the students' writing is consistent with figures from previous studies... 9.52 errors per essay or 2.26 errors per 100 words were discovered by Connors and Lunsford. The corresponding figures for Lunsford and Lunsford (2008) are 9.60 and 2.04" (p. 302); however, Haswell's (1988) thorough and meticulous analysis looked into eight different types of errors: (1) end punctuation, (2) incorrect prediction, (3) orthography, (4) pronoun reference, (5) syntactic parallelism, (6) possessive construction, (7) punctuation of final free modification, and (8) compound sentences are among the patterns. In this essay, however, Haswell highlights the need to consider all the different kinds of errors he examines in as rich a context as possible because "the causality of student error is very complex" (p. 495). The "raw number of errors... seems to be growing during college," according to his findings, but amazingly, student writers "simultaneously are making measurable growth... toward mature competence" (pp. 494–495).

Haswell (1988) suggests that university-level students may not yet recognize common mistakes as indicators, suggesting a shift in writing assignments. He found that different genres yield different error rates, with spelling mistakes accounting for about 300 percent of errors. As grammatical accuracy becomes more important, implementation in Japan's EFL instructors remains unclear, requiring effective change management.

Interlanguage error correction has been a long pedagogical focus for educators, according to Wolfe-Quintero et al. (1998), with applied linguistics distinguishing between two types of errors: performance errors (made by rushed or exhausted learners) and competence errors (mistakes caused by insufficient learning). Gefen (1979) later referred to performance errors as mistakes while Selinker (1972) was the first to identify the learner's "interlanguage" and the problem of fossilization, emphasizing the influence of the learner's native language, interlanguage, and target language on the L2. Richards (1971) identified four main categories of intralingual errors: incorrect notions, overgeneralization, ignorance of rule constraints, and inadequate rule application. Richards (1974) also identified seven sources of errors, including interference, overgeneralization, performance errors, and universal difficulty hierarchy. Shumann and Stenson (1974) identified three main reasons for errors in language learning: inadequate grammar acquisition, learning/teaching context constraints, and common performance barriers like inter- and intra-lingual issues.

Fluency

Fluency in CAF involves generating diverse word combinations and sentence patterns (Chenoweth & Hayes, 2001; Friedlander, 2006; Kaufer et al., 1986). The history of fluency in L2 writing research originates from feedback and grading but has primarily been used in quantitative-process settings since the 1970s, influenced by researchers' modifications (Kaufer et al., 1986). Keystroke measurements have been used in other studies to estimate the amount of effort required to produce a text (Matsuno et al., 2007). Fluency is the ability to produce high-quality text with a significant word count in a short time, focusing on accuracy and consistency; furthermore, it is assessed using the rate/time approach (Wolfe-Quintero et al., 1998). Fluent writing is a skill that involves producing more texts in less time (Kaufer, et al., 1986), despite criticisms of the rate/time method. Fellner and Apple (2009) suggest that fluency in writing skills can be achieved by considering lexical difficulty and comprehensibility, rather than simply repeating short lines. Fluent writing involves the quantity and frequency of words written in a given time (Van Gelderen & Oostdam, 2005). Baba and Nitta's 2014 study on Japanese university students' writing fluency revealed nonlinear improvement with 10 minutes of practice, revealing super patterns of L2 writing fluency, emphasizing the complexity of process-based inquiries.

Preliminary Data

The study assesses writing skills and editing methods among Japanese L2 university students. The research involved 100 students from seven institutions. Results showed that accuracy and fluency changed most over time, with accuracy and complexity being the most important variables. The study aimed to understand the relationship between CAF dimensions. The study found no significant difference in editing methods, with fluency deteriorating over the year, while complexity remained constant. The most significant variation in CP/T was related to complexity, suggesting significant variations in accuracy, fluency, and complexity between original and edited versions.

The Study

Rationale

While the preliminary data indicated that CAF did not significantly change over an academic year, it is important to examine how it might change over an academic semester. One issue concerns the effectiveness of semester writing courses and how they might improve writing overall for EFL students; furthermore, the question of generalizability is crucial. When researching CAF-related topics, student performance can differ greatly, with some performing well on one topic while struggling with others. Japanese L2 writers might struggle with complex issues by utilizing shorter sentences to keep their writing accurate. Thus, examining the writing instruction provided by a variety of educational institutions in Japan is crucial to understanding CAF.

Research Questions

1. Do the students' English compositions change significantly in terms of complexity, accuracy, and fluency over an academic semester?

2. In what way can the three dimensions' interaction (CAF) be explained? Do potential gains in fluency have to be balanced against gains in grammatical accuracy? Does grammatical accuracy suffer with increasing complexity?
3. Did individuals who self-edited and those who used an online grammar checker at the two Japanese universities significantly differ in their error correction?
4. Are there notable variations in the first and revised drafts concerning fluency, accuracy, and complexity?
5. Do the three institutions' CAFs differ significantly from one another?

Data Collection

60 students from four universities in Kyushu, Japan, comprised the sample. Three essays collected in May, October, and January served as its foundation. The research will pinpoint particular mistakes and problems with intricacy, precision, and flow.

Rationale

Many teachers are not fully aware of the issues with CAF regarding L2 writing by students or the changes that take place with each component over time. There is a great deal of misinformation about (a) the particular problems that students in one's nation have when it comes to their writing and editing, (b) the kinds of mistakes that one's EFL students are not recognizing and fixing, (c) how these abilities change over an academic year, and (d) the suggestions made by teachers for bringing about the greatest improvements in students' output.

Participants and Permission

In addition to 39 subjects at Fujian University of Technology, two universities—Musashino University and Kyorin University—participated in the year-long study for the third year. Every student had permission obtained in accordance with the national university guidelines.

Data Analysis

Because CAF is used as the basis for this study and in understanding the variations in writing, a syntactic complexity analyzer (Lu, 2010) was utilized to examine the following 9 structures in the text and will focus on the following 14 syntactic complexity indices. Understanding how the syntactical complexity (as well as accuracy and fluency) of students' papers develop is key to understanding the impact of EFL instruction. The number of error-free clauses per 100 words will be the focus of the attention on grammatical correctness (EFCR). Word count acted as a stand-in for fluency for both drafts. Multivariate analysis was utilized to estimate relationships between dependent variables, the variation among the CAF variables and the differences among means. The correlation was also examined among the CAF variables.

Results

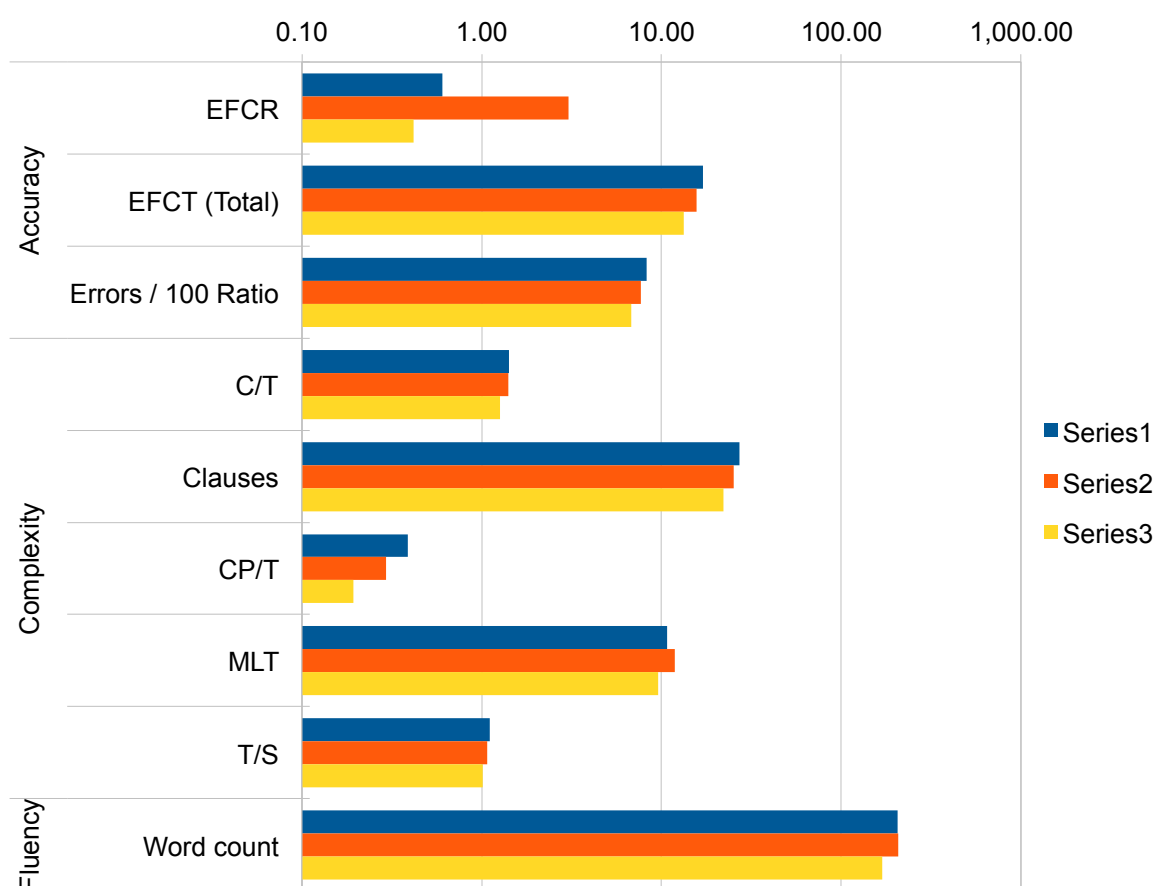
As for the results relating to the first research aim concerning if CAF changes significantly over a semester in writing, there was some improvement in accuracy (fewer errors) in all three of the measures (see Table 1 and Figure 1), whereas there was a marked decline for complexity and fluency. This data indicates that writing for many EFL students is often fluid with few EFL educators addressing syntax and fluency, so actual marked changes on these

measures remain unchanged. In short, EFCR and MLT are the only indicators making unexpected changes in the second essay.

Table 1: Results for CAF Over an Academic Semester

Average		Data		
Indicator Type	Indicator	1	2	3
Accuracy	EFCR	0.60	3.03	0.42
	EFCT (Total)	16.97	15.58	13.24
	Errors/100 Ratio	8.24	7.65	6.76
Complexity	C/T	1.42	1.40	1.26
	Clauses	27.15	2501.	22.03
	CP/T	0.39	0.29	0.19
	MLT	10.74	11.84	9.56
	T/S	1.10	1.07	1.01
Fluency	Word count	205.52	206.74	168.38

Figure 1: Graphic Display of CF Over an Academic Semester



As for the second research aim relating to the interaction among the three dimensions (CAF) and whether or not possible increases in fluency are offset by decreases in grammatical accuracy, or whether increased complexity results in decreased grammatical accuracy, results showed (see Table 2) there is the logical high correlation with clauses and word counts, and MLT and CP/T as well as MLT and C/T; furthermore, word counts, and error/100 ratio correlated highly with EFCT. Issues of syntactical complexity negatively

correlated with EFCT indicating that more syntactical complexity relates to decreased accuracy.

Table 2: Correlation Matrix

Correlation MATRIX	Clauses	MLT	C/T	T/S	CP/T	Word count	Errors / 100 Ratio	EFCT (Total)	EFCR
Clauses	1.000	-0.098	0.017	-0.048	0.190	0.817	0.023	0.340	0.070
MLT	-0.098	1.000	0.723	0.006	0.683	0.010	0.127	0.112	0.021
C/T	0.017	0.723	1.000	0.146	0.377	0.039	0.232	0.101	0.001
T/S	-0.048	0.006	0.146	1.000	0.072	0.042	0.088	0.144	0.035
CP/T	-0.190	0.683	0.377	0.072	1.000	0.089	0.038	0.149	0.003
Word count	0.817	-0.010	0.039	-0.042	0.089	1.000	0.136	0.453	0.088
Errors / 100 Ratio	0.023	0.127	0.232	-0.088	0.038	0.136	1.000	0.586	0.071
EFCT (Total)	0.340	-0.112	0.101	-0.144	0.149	0.453	0.586	1.000	0.080
EFCR	-0.070	-0.021	0.001	-0.035	0.003	0.088	0.071	0.080	1.000

Note: Green shows the greatest positive correlation brown, the greatest negative correlation. MLT = mean length of T-unit, C/T = clause per T unit, T/S = T unit per sentence, CP/T = coordinate phrase of T-unit.

As for the third research question, (relating to Japanese and Chinese universities), concerning a difference in error correction between those who self-edited and those who used an online grammar correction tool, results indicate (table 3) that errors-free clause ratios (EFCR) had the greatest difference relating to accuracy, with fewer errors noted with writers using an online grammar checker. As for complexity, CP/T had the greatest difference.

Table 3: Comparison of Japanese and Chinese Universities

<i>Japanese university</i>				
Group	Indicator	Online	Self-editing	%diff
Accuracy	EFCR	1.15	2.99	160.76%
	EFCT (Total)	12.94	12.22	-5.59%
	Errors/100 Ratio	7.53	11.14	47.80%
Complexity	C/T	1.24	1.40	12.50%
	Clauses	22.76	22.11	-2.88%
	CP/T	0.24	0.46	91.73%
	MLT	10.24	10.72	4.63%
	T/S	1.00	1.14	13.65%
Fluency	Word count	183.43	169.38	-7.65%
<i>Chinese university</i>				
Group	Indicator	Online	Self-editing	% diff
Accuracy	EFCR	0.55	0.67	22.27%
	EFCT (Total)	16.25	21.05	29.55%
	Errors/100 Ratio	7.08	5.11	-27.79%
Complexity	C/T	1.30	1.56	19.89%
	Clauses	28.25	30.51	8.01%
	CP/T	0.19	0.26	40.91%
	MLT	10.92	12.65	15.81%
	T/S	0.80	1.13	41.45%
Fluency	Word count	219.75	252.53	14.92%

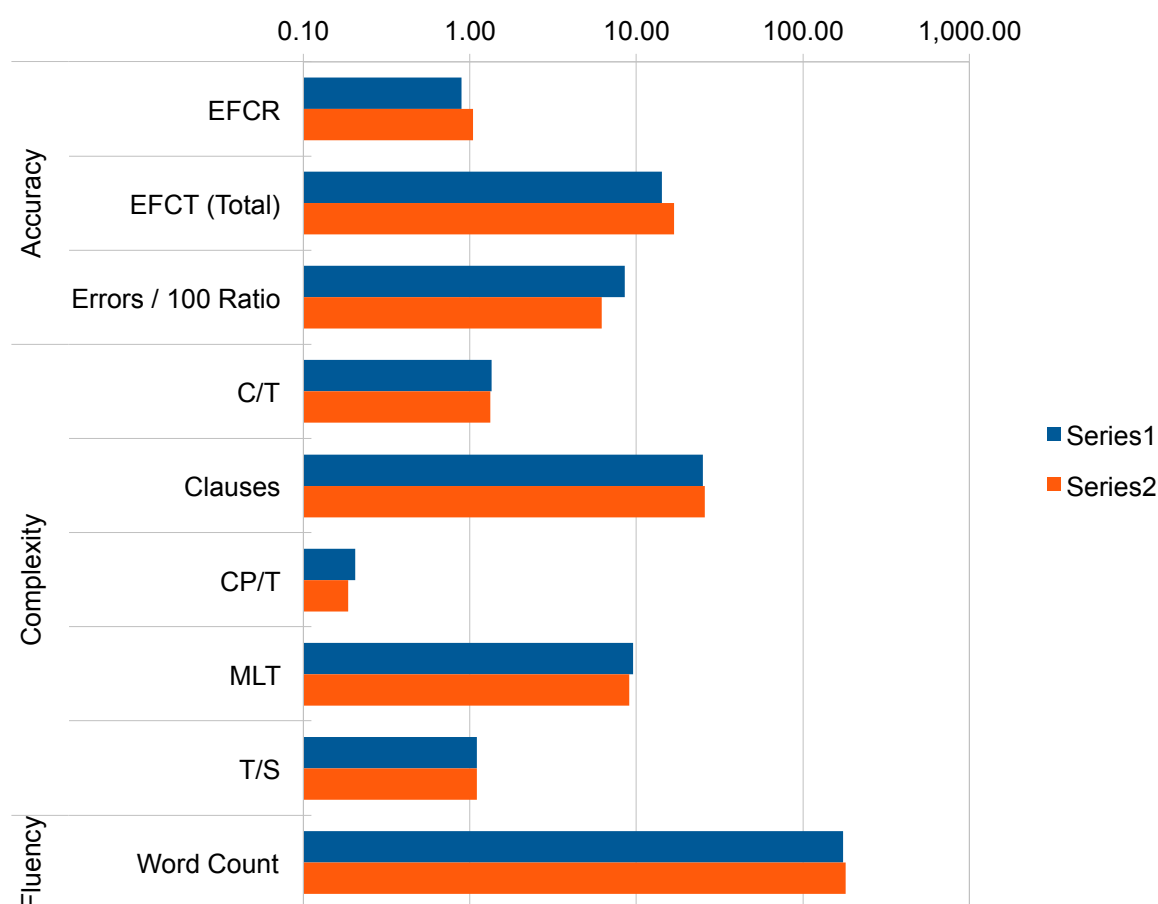
As for the research question relating possible differences between the first and second (edited) drafts regarding CAF, results indicated there were positive changes in accuracy, the most significant change seen in complexity (CP/T and MLT), while there were insignificant changes in fluency, see Table 4 and Figure 2.

Table 4: Changes Between First and Second Drafts

		First	Edited	%Change
Accuracy	EFCR	0.89	1.04	17.08%
	EFCT (Total)	14.14	16.73	18.35%
	Errors / 100 Ratio	8.50	6.15	-27.61%
Complexity	C/T	1.35	1.32	-2.36%
	Clauses	25.04	25.75	2.86%
	CP/T	0.20	0.19	-8.75%
	MLT	9.51	9.06	-4.73%
	T/S	1.10	1.10	-0.25%
Fluency	Word Count	173.75	180.12	3.67%

Note: T/S = T-unit per sentence

Figure 2: Graphic Output of CAF Between First and Second Drafts



The fifth research aim regarding possible differences among the three institutions (disregarding the editing type and draft order), indicates significant differences among the three universities, with Fujian University of Technology having the most fluency, and accuracy is higher for both error-free clause ratio and for errors/100 ratio compared to the Japanese universities though the difference data from Musashino university is insignificant. Syntactical complexity is rather similar to the data relating to MLT, C/T, and (T/S) (Table 5.)

Table 5: Differences Among the Three Institutions

IndType	Indicators	Fujian	Kyorin	Musashino
Accuracy	EFCR	0.68	2.07	1.79
	EFCT (Total)	21.41	9.24	19.21
	Errors/100 Ratio	5.17	12.25	2.34
Complexity	C/T	1.53	1.23	1.43
	Clauses	30.86	21.21	24.11
	CP/T	0.25	0.33	0.36
	MLT	12.01	8.68	13.80
	T/S	1.11	1.06	1.03
Fluency	Word count	240.83	149.24	227.92

Discussion

These findings suggest that over the course of a semester, CAF in students' writing doesn't essentially change. Although there has been a slight improvement in the variables of EFCR

and MLT, it appears that writing instructors are not adequately addressing syntactical issues, despite emphasizing syntactical complexity and fluency. Too frequently, classroom activities do not include timed writing assignments, much less monitoring students' output in terms of words written within a set amount of time. Furthermore, it was found that, in contrast to increased fluency, students' grammatical accuracy was frequently negatively impacted when they concentrated on increasing their syntactical complexity. In short, this study highlights the significance of examining grammatical forms within the framework of diverse syntaxes and suggests that working with longer and more intricate sentences and sentence structures could be an effective way to teach grammar to students.

Additionally, it was discovered that students' self-editing was less effective at correcting errors than online grammar checkers. Nevertheless, teachers must teach students about the benefits and limitations of each type of software as well as how to evaluate the reliability of the feedback they receive. These revised versions of these essays also showed that the complexity variables of CP/T and MLT had changed significantly, and there was a noticeable improvement in accuracy. Teachers should thus concentrate on guiding students through a methodical approach to revision, starting with content (identifying ideas that should be added or removed), moving on to complexity (combining and expanding upon sentences), and concluding with accuracy (verifying noun and verb phrases, prepositions, and other grammatical forms).

Even though these institutions differed greatly from one another, it's important to remember that all the students have had different experiences with the language and that the frequency of English instruction may have also varied greatly. Either way, as the students become more focused on their specialized subject area, it can be challenging for English language instructors to get intermediate students to write at more advanced levels. In other words, for students' writing to improve, teachers must place a greater emphasis on CAF in their assignments.

Conclusion

This study has shed some light on the impact that EFL instruction has had on CAF over an academic semester, highlighting the need for timed writing, training with syntax, phrasing, and transitional signals, along with more instruction with online grammar checkers. Teachers should provide students with more feedback on their output as it relates to CAF to improve the understanding of their progress and improve motivation. Even though there might be significant variations between educational institutions and even between students in the same class, it is important to remember that each student has a different background when it comes to language; however, with steady progress in accuracy, syntactical complexity, and fluency, students may still find it challenging to write at progressively higher levels as they continue their academic careers.

Acknowledgements

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Higher Education in Indonesia: A Comparative Analysis of Private vs Public Institutions (2018-2022)

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Abstract

This study examines the evolution of higher education institutions in Indonesia from 2018 to 2022, focusing on the comparative growth of private versus public universities. Utilizing mean and standard deviation metrics, we analyze the expansion patterns across Indonesian provinces, aiming to provide policymakers with critical insights into regional educational development needs. The data, sourced from Badan Pusat Statistik, encompasses 34 provinces and covers the number of higher education institutions, lecturers, and students from both public and private universities under the Ministry of Education, Culture, Research, and Technology. A total of 125 public and 2,982 private universities were included, selected based on their listing by the Ministry, ensuring comprehensive coverage of institutions officially recognized by the government. The findings reveal a marked stability within public universities, in stark contrast to a notable decline in private institution numbers. Additionally, we observe significant variability in student and lecturer populations. Public universities benefit from better funding, resources, and support, leading to more stable and consistent growth. In contrast, private institutions face challenges in maintaining quality and accessibility due to limited resources and higher variability in educational outcomes. This imbalance exacerbates educational inequality, particularly in underserved regions. The study advocates for tailored policy reforms aimed at fostering educational equality. Recommendations include equitable funding distribution, improved resource allocation, and strategic planning to elevate the quality and accessibility of private education. These measures are crucial for mitigating disparities and achieving a more balanced and high-quality higher education landscape in Indonesia.

Keywords: higher education, educational development, educational equality, policy reforms, educational quality

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Introduction

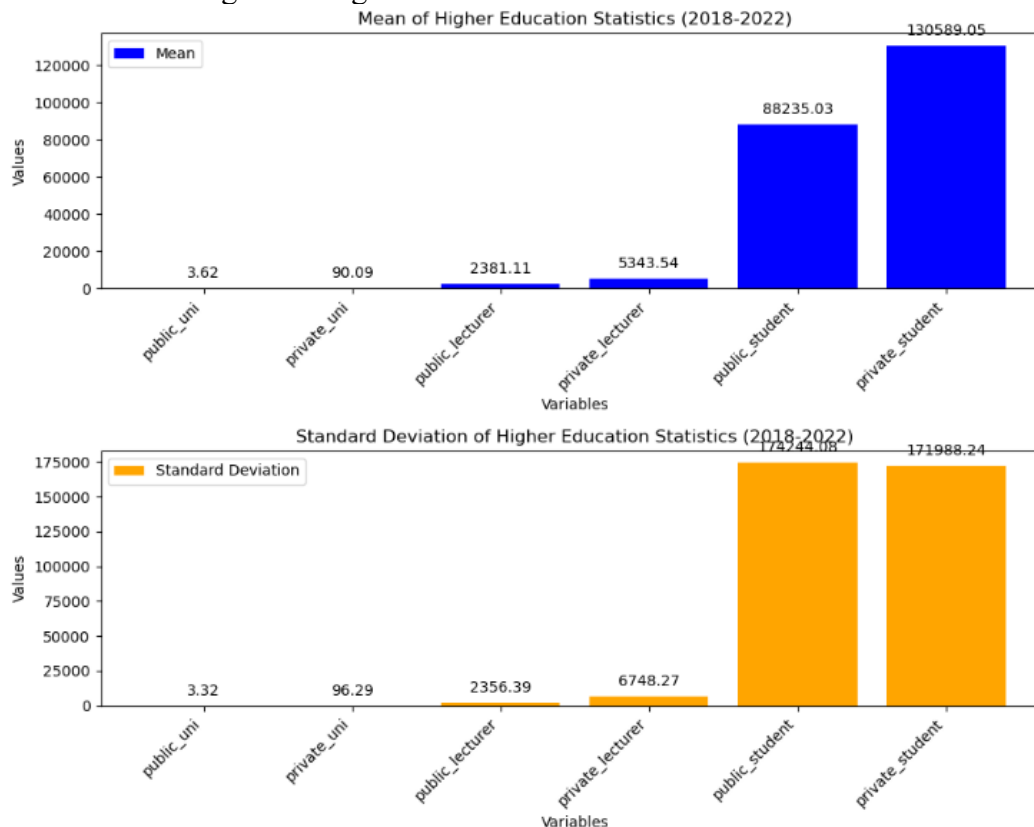
Education is a fundamental human right and a critical driver for sustainable development, as emphasized in the United Nations' Sustainable Development Goal 4 (SDG 4), which aims to ensure inclusive, equitable, and quality education while promoting lifelong learning opportunities for all. In the context of Indonesia, understanding the growth and distribution of higher education institutions across its provinces is essential to improving the quality of education nationwide. The higher education system has suffered internal inefficiency and poor initiatives due to a centralised education system (Wicaksono & Friawan, 2011).

The centralized nature of Indonesia's higher education system has led to internal inefficiencies and ineffective initiatives, hindering progress toward an internationally competitive education system. Political dominance by bureaucratic and corporate elites has resulted in poor management, inadequate funding, and a lack of innovation within universities. These inefficiencies are reflected in issues such as uneven resource allocation, with better-funded public institutions in urban areas thriving, while private institutions in rural areas struggle to maintain quality. Additionally, the centralization limits autonomy and flexibility, making it difficult for local institutions to address regional education needs or implement context-specific reforms. The lack of institutional independence further stifles innovation, leading to a stagnation of educational quality and growth across the country. (Rosser, 2018).

Recent studies have explored various issues surrounding higher education in Indonesia, shedding light on critical challenges such as enrollment disparities, educational equality, institutional capacity, student selection processes, financing, cross-border education, and graduate unemployment. For instance, Kumba (2020) highlights the ongoing debate between prioritizing the quality versus quantity of higher education institutions, a strategic dilemma that has profound implications for the nation's educational landscape. Similarly, Chiara Logli's (2016) work examines the evolution of Indonesian higher education, addressing governance, autonomy, access, equity, quality, and internationalization.

While these studies offer valuable insights into the broader challenges faced by the sector, there is still a need for more targeted research that focuses on the growth and distribution of higher education institutions across Indonesia's provinces. Such analysis is crucial for addressing regional disparities and providing a clearer roadmap for policymakers to enhance both quality and accessibility in underserved areas. By analyzing both public and private universities, this study offers valuable insights that can guide policymakers in identifying regions that require targeted interventions.

Figure 1: Higher Education in Indonesia 2018 - 2022



Methodology

The data for this study is sourced from Badan Pusat Statistik, covering 34 provinces in Indonesia from 2018 to 2022. The dataset includes information on the number of higher education institutions, lecturers, and students from both public and private universities, as listed under the Ministry of Education, Culture, Research, and Technology of Indonesia. The key variables examined are the number of universities (public and private), the number of lecturers (public and private), and the number of students (public and private), categorized by province.

The data was provided in tabular form, originally in XLS format, which was converted to CSV files for the years 2018 to 2022. Textual and numeric attributes were included, and subtotal amounts for Indonesia were removed during data transformation to focus on provincial-level insights. The data was combined into a single sheet to facilitate easier calculations across years. For analysis, the study uses mean and standard deviation (SD) as metrics, assuming a roughly normal distribution. These metrics allow for a straightforward comparison between public and private institutions in terms of central tendencies and variability.

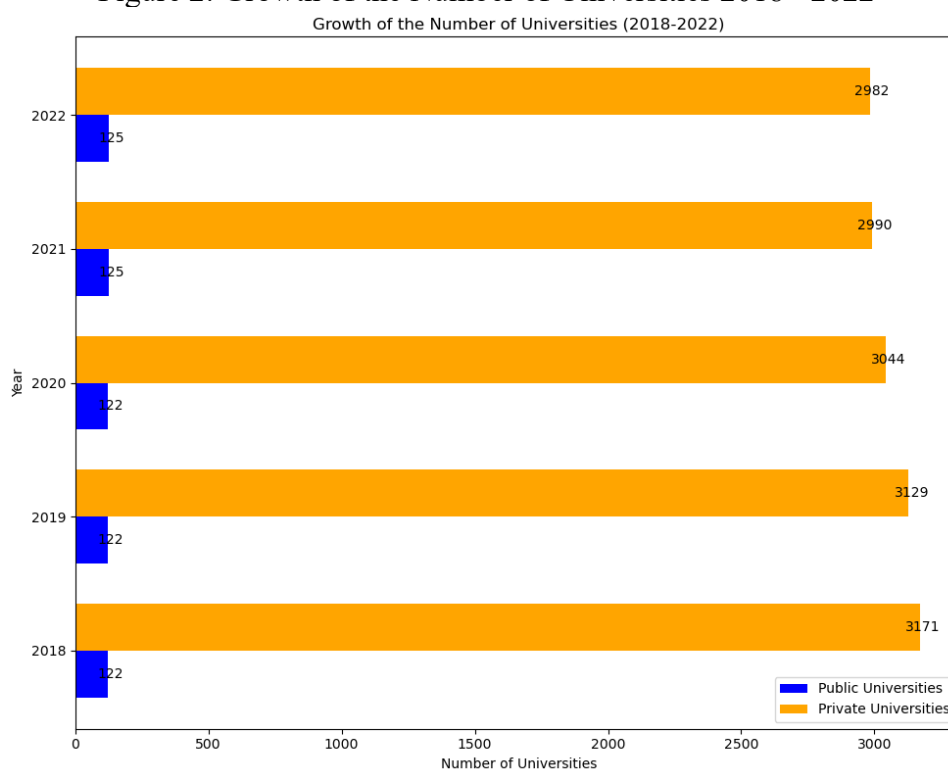
Python was employed for exploratory data analysis (EDA), including cleaning and preparing the data, calculating statistical measures, and visualizing the trends using libraries such as Pandas, NumPy, and Matplotlib. The use of Python allowed for efficient handling of the large dataset and facilitated accurate analysis of patterns across provinces.

A potential limitation of this study is that the data from Badan Pusat Statistik, covering 34 provinces from 2018 to 2022, may exclude universities not yet listed under the Ministry of Education, Culture, Research, and Technology, leading to possible gaps in coverage and introducing bias due to the restricted time frame.

Result and Discussion

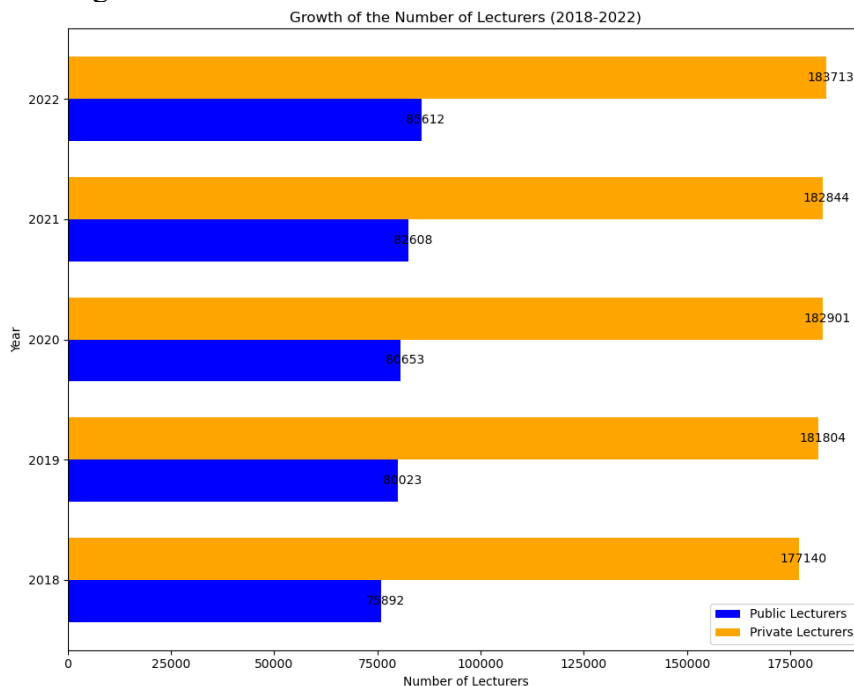
The results of the analysis reveal distinct differences in the distribution of public and private universities, lecturers, and students in Indonesia from 2018 to 2022. On average, there were approximately 3.62 public universities per year, while private universities significantly outnumbered them with an average of 90.09 institutions annually. Public universities employed an average of 2,381.11 lecturers per year, whereas private universities had a higher average of 5,343.54 lecturers. In terms of student enrollment, public universities hosted an average of 88,235.03 students per year, while private universities surpassed this with an average of 130,589.05 students annually.

Figure 2: Growth of the Number of Universities 2018 - 2022



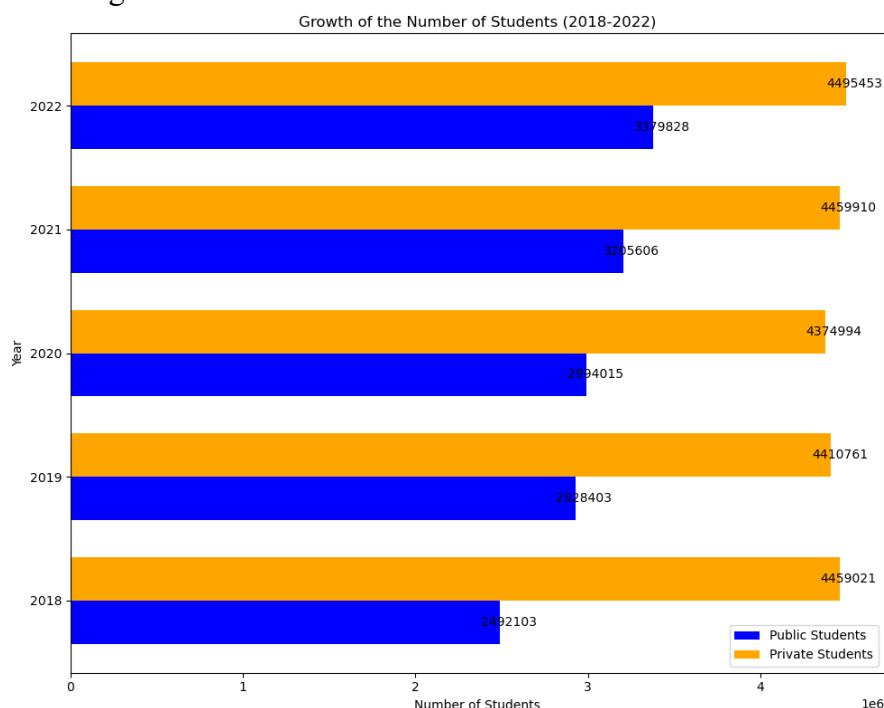
The bar chart shows the growth of universities in Indonesia from 2018 to 2022, with public universities remaining stable around 122-125 and private universities decreasing from 3171 to 2982. Variability in these metrics is reflected through the standard deviations. Public universities exhibited low variability, with a standard deviation of 3.32, indicating that their number remained relatively stable. Private universities, however, showed moderate variability with a standard deviation of 96.29. Lecturer numbers at public institutions had a substantial standard deviation of 2,356.39, while private institutions exhibited higher variability with a standard deviation of 6,748.27. Student enrollment displayed extreme variability in both public and private universities, with standard deviations of 124,248.08 and 171,988.24, respectively.

Figure 3: Growth of the Number of Lecturers 2018 - 2022



From 2018 to 2022, the number of public lecturers in Indonesia increased from 75,892 to 85,612, while private lecturers grew from 177,140 to 183,713. This number suggests a growing capacity to deliver educational services. However, simply increasing the number of lecturers does not automatically translate to improved educational quality. Quality is also influenced by factors such as lecturer qualifications, training, and ongoing professional development. Research indicates that a higher lecturer-to-student ratio can lead to more personalized instruction and greater student engagement, which are critical for enhancing learning outcomes (Darling-Hammond, 2000).

Figure 4: Growth of the Number of Students 2018 - 2022



The chart shows a steady increase in the number of public students from 2,492,103 in 2018 to 3,379,828 in 2022 (35.6% growth) and private students from 4,459,021 in 2018 to 4,495,453 in 2022 (0.8% growth), with private student numbers consistently higher. This trend contrasts with similar research in other Southeast Asian countries, where private institutions often see more significant growth in student enrollment due to increased demand for diverse educational offerings and perceived flexibility.

For instance, in Malaysia, the private higher education sector has expanded rapidly, with enrollment numbers consistently rising as students seek alternatives to public institutions, which can be limited by capacity (Mok, 2018). Similarly, the Philippines has experienced significant growth in private higher education enrollment, driven by factors such as accessibility and a broader range of programs available to students (Quisumbing & Gella, 2019).

In comparison, the slower growth in private student numbers in Indonesia suggests potential challenges such as resource limitations or a lack of confidence in private institutions, which may not be as pronounced in these other countries. This indicates a need for Indonesian private universities to enhance their offerings and reputation to attract more students, as seen in neighboring Southeast Asian nations where private education plays a vital role in meeting demand.

Private institutions consistently show higher student numbers compared to public institutions. For instance, in 2022, private universities had approximately 4.5 million students, while public universities had around 3.3 million. This gap is present in all years from 2018 to 2022, with private institutions maintaining a lead of over 1 million students annually. The consistent higher enrollment in private universities may indicate that private institutions are better positioned to cater to a larger number of students, possibly due to more flexible admissions policies, increased accessibility, or a larger variety of programs.

This suggests significant fluctuations in student populations across the years, especially within private universities. The significant fluctuations in student populations, particularly within Indonesia's private universities, are supported by similar trends in higher education studies in other Southeast Asian countries. For example, a study on higher education in Thailand found substantial variability in private university enrollment due to economic factors and competition from public institutions (Kosonen & Virasilp, 2020). Private institutions in Thailand saw fluctuations in student numbers because they were more affected by market dynamics and had fewer financial resources, leading to unstable enrollment compared to public institutions that benefitted from government funding.

Similarly, in Vietnam, research by Pham and Sloper (2016) showed that private universities experienced inconsistent student enrollment patterns, driven by perceptions of lower quality compared to public institutions. This variability was compounded by the limited resources and inconsistent academic standards, which made private institutions less attractive to students during periods of economic uncertainty.

The governance, funding models, and cultural attitudes towards higher education in Indonesia differ significantly from those in other Southeast Asian countries, influencing the performance and outcomes of higher education systems. In Indonesia, the higher education system has traditionally been centralized, with the Ministry of Education, Culture, Research, and Technology playing a dominant role in both governance and funding decisions. This

centralized approach contrasts with countries like Malaysia and Singapore, where universities enjoy greater autonomy in managing their resources and curricula. In Malaysia, for example, the higher education system benefits from a more decentralized governance model that allows universities to adapt quickly to market demands, fostering stronger industry-academia collaboration (Mok, 2018).

Funding models also vary. While Indonesia's private universities rely heavily on student tuition, government support for public institutions is limited compared to other countries. Singapore, on the other hand, provides significant government funding for both public and private institutions, ensuring consistent quality in education delivery. Cultural attitudes also shape the educational landscape; in countries like Vietnam, higher education is often seen as a critical driver of national development, leading to strong societal and governmental support for educational reforms. By comparison, Indonesia has struggled with political influences and bureaucratic inefficiencies that hamper the system's effectiveness (Pham & Sloper, 2016).

Overall, the data highlights the considerable imbalance between public and private institutions in terms of both capacity and resources. The findings of this study align only partially with Indonesia's national education goals. Indonesia aims to develop a "world-class" education system by 2025, focusing on improving both access and quality across public and private institutions (Kementerian Pendidikan dan Kebudayaan, 2020). The significant growth in public university enrollment—35.6% from 2018 to 2022—demonstrates progress toward the goal of expanding access. However, the minimal 0.8% growth in private university enrollment highlights a key divergence from the national goal of equitable access across both public and private institutions.

The overall trend from Figure 4 points to a growing demand for higher education in Indonesia. With both sectors combined, the number of students has steadily increased, from 6.9 million in 2018 to over 7.7 million in 2022. While in Figure 3, the trends in lecturer numbers can significantly impact the quality of education provided in Indonesia. The increase in public lecturers from 75,892 to 85,612, and in private lecturers from 177,140 to 183,713, suggests a growing capacity to deliver educational services.

If the growth in lecturer numbers is not accompanied by adequate training and support, it could lead to inconsistencies in teaching quality and educational delivery. Furthermore, the disparity in growth rates between public and private institutions may exacerbate existing inequalities in educational quality, especially if public institutions receive more resources and support.

To ensure that the increase in lecturer numbers positively impacts education quality, there must be a focus on not only hiring more lecturers but also investing in their professional development and ensuring equitable access to resources across institutions. To remain competitive globally, Indonesia must address these imbalances by ensuring that both public and private universities receive adequate funding and resources, while improving the quality of education across all regions.

Conclusion

Our analysis of higher education institutions in Indonesia from 2018 to 2022 reveals distinct patterns in the growth and distribution of public and private universities. In Indonesia, higher education institutions in urban areas tend to be better resourced and experience more stable

growth, both in terms of student enrollment and lecturer numbers. Urban public universities often benefit from government funding, higher levels of infrastructure, and access to more qualified faculty, leading to consistent growth in student numbers. Private institutions in urban areas also have better access to resources and tend to attract more students, though they still face challenges compared to public universities. Research on educational disparities in Indonesia suggests that rural areas often have fewer higher education institutions per capita, and the quality of education offered is generally lower compared to urban centers (Jones & Hagul, 2001).

These regions tend to have limited access to resources, fewer qualified lecturers, and infrastructure challenges, which contribute to lower enrollment numbers and higher variability. The data from 2018 to 2022 reflect these disparities, as many rural provinces struggle to maintain the same level of educational quality and access as urban regions. This imbalance exacerbates educational inequality, making it difficult for rural students to access the same opportunities as their urban counterparts, highlighting the need for targeted policies to address these regional disparities.

The stability in the number of public universities contrasts sharply with a decline in private institutions during the same period. There are several specific factors that might contribute to the decline such as limited financial resources, perceived as lower quality and higher cost for students. A regulatory challenges, demographic shifts and high competition from public universities create an environment where private universities face significant challenges to maintain enrollment and ensure the sustainability of their institutions.

Public universities consistently maintained their capacity in terms of lecturer and student numbers, while private universities exhibited significant variability, indicating challenges in sustaining resources and enrollment. These trends were visualized through bar charts for clarity in comparing categorical data, making it evident that private universities face greater fluctuations in lecturer and student populations. There are several socioeconomic factors that play a significant role in the imbalance of public versus private university enrollment in Indonesia, such as: affordability. Public universities are often more affordable than private institutions due to government subsidies and funding. This also creates a financial barrier to private education as private universities rely heavily on student tuition as their primary revenue source. This will result in higher tuition fees, where it cannot be afforded by students from lower socioeconomic backgrounds.

There is also this perception of value that public universities offer better value of money and have higher prestige. Regional economic disparities also played a part due to in wealthier regions, families may be more willing to invest in private education, while in poorer regions, students are more reliant on public universities due to financial constraints. This regional economic disparity influences enrollment trends, with private universities struggling in less affluent areas where fewer families can afford the higher tuition. Other than that, a lack of support from government for a scholarship in private universities also make public universities more accessible while at the same time making the private university less attractive to economically disadvantaged students. And last, public universities tend to have stronger reputations that lead to a higher likelihood of securing well-paying jobs, which is a critical factor for families aiming to improve their economic status. (Rosser, 2018). This imbalance underscores the need for targeted support to address the disparities between public and private institutions.

Indonesia's education goals emphasize inclusive and equitable access to higher education, as outlined in the National Medium-Term Development Plan (RPJMN) 2020-2024. Yet, the findings suggest an imbalance, with public universities receiving better support and resources, while private institutions struggle to attract and retain students. This divergence from national goals underscores the need for targeted policy interventions to ensure that private institutions can contribute equally to Indonesia's education system and reduce disparities between public and private sectors.

Quality education is closely linked to employment rates, as higher education institutions are expected to equip students with the skills and knowledge needed for the job market. In Indonesia, the uneven quality of education across public and private universities has contributed to disparities in graduate employability. A lack of resources and variability in educational quality, particularly in private institutions, often results in graduates struggling to secure jobs that match their qualifications. Research shows that improving the quality of education can directly influence employment rates by aligning curricula with market demands, enhancing skill development, and fostering practical, real-world experience for students (Rosser, 2018). This aligns with Indonesia's "Indonesia Emas 2045" goals, which emphasize the importance of human capital development to ensure the country's global competitiveness and sustainable economic growth. Without significant improvements in education quality, the ability of graduates to compete in both the national and global labor markets may remain limited.

Implications

The findings of this study suggest that private universities in Indonesia require increased support to stabilize their numbers and improve their capacity to provide quality education. The high variability in lecturer and student numbers at private institutions points to challenges in resource allocation and management. Policymakers should prioritize strategic interventions such as equitable funding distribution and better planning for resource allocation to address these imbalances. Furthermore, without proactive measures, the decline in private universities could exacerbate educational inequality, particularly in underserved regions, hindering the overall goal of achieving balanced and high-quality education across Indonesia.

The trends observed in this study could have significant implications for Indonesia's global competitiveness in higher education. The steady decline in private universities, coupled with the variability in student and lecturer numbers, highlights an imbalance that could negatively affect the quality and accessibility of higher education. If private institutions continue to face challenges in maintaining quality due to limited resources and insufficient support, it may limit Indonesia's ability to produce a highly skilled and globally competitive workforce. This, in turn, could reduce the country's appeal as a destination for international students and collaborations in higher education, as well as its ranking in global education performance metrics (Welch, 2007).

Future Research

Future research should extend beyond the 2018-2022 timeframe to capture long-term trends in higher education growth in Indonesia. Expanding the dataset will allow for a deeper analysis of regional policies and their impacts on institutional stability. Additionally, incorporating qualitative analysis, such as evaluating the quality of education, student

satisfaction, and institutional governance, could provide richer insights into the factors affecting both public and private universities. This comprehensive approach will enable policymakers to design more effective strategies for fostering educational equity and sustainability across Indonesia's diverse regions.

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Design and Preliminary Evaluation of a Remote Digital Logic Educational Game Combined With Sandbox Game Mechanisms

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Abstract

Sandbox games offer open maps and a high degree of freedom, allowing players to explore, build and interact with the environment, realizing a personalized gaming experience and making sandbox games a promising educational tool. Minecraft is a well-known sandbox game known for its unlimited creative possibilities, and the Minecraft Education is specially designed for teaching and learning, with enhanced interactivity and subject teaching functions. Teaching digital logic usually faces challenges such as conceptual abstraction and lack of motivation. Sandbox games, which provide interactivity, visualization, and real-time feedback, can effectively overcome these limitations. This study utilizes Minecraft Education as a teaching tool, leveraging its unique redstone circuitry system to design a scenario-based puzzle game based on a campus map. Learners need to analyze maps, NPCs, objects, and other information in the game, and manipulate the redstone circuit system and command cubes to construct a machine structure and then solve digital logic puzzles. Each room has a semi-finished redstone logic circuit gate, and players need to recognize the type of logic circuit and repair it to open the room. A total of 20 elementary school students participated in the empirical evaluation of this study. It was found that the learners had a high level of flow during the game and were highly motivated and receptive to the game. In addition, the students did not have a high cognitive load, and the learning effectiveness after playing the game were significantly improved, especially in the understanding and application of digital logic.

Keywords: sandbox game, Minecraft, digital logic

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Introduction

In today's digital learning trend, sandbox games are increasingly becoming part of the educational tools, Minecraft Education is a widely used STEM (Science, Technology, Engineering and Mathematics) educational game with high interactivity and subject teaching functions. However, digital logic, as a foundation of computer science and engineering, often faces the problem of high abstraction and lack of motivation in teaching. Traditional teaching methods rely on theoretical explanations and static images without sufficient interaction and real-time feedback, which makes it difficult for students to fully understand the concepts of digital logic.

Minecraft Education is gradually becoming a valuable educational tool and has been proven to enhance students' deep learning and motivation. For example, Nkadimeng and Ankiewicz (2022) suggest that Minecraft Education, as a gamified learning tool, effectively reduces the difficulty of learning abstract concepts while fostering learners' critical thinking and collaboration skills. Bile (2022) found that Minecraft enables learners to transform abstract mathematical and geometric concepts into concrete experiences through experimentation and trial-and-error processes, thereby improving learning outcomes. Additionally, when Minecraft Education is used as a game-based learning (GBL) tool in science classrooms, student engagement and motivation increase (Pusey & Pusey, 2015).

Research Questions

This study aims to explore the application of Minecraft Education in digital logic instruction and develop a scenario-based puzzle game centered on redstone circuits. Therefore, the main objectives of this study are as follows:

1. Evaluate students' learning performance in the "remote digital logic educational game integrating sandbox game mechanics."
2. Assess students' flow in the "remote digital logic educational game integrating sandbox game mechanics."
3. Examine students' learning motivation in the "remote digital logic educational game integrating sandbox game mechanics."
4. Investigate students' game acceptance in the "remote digital logic educational game integrating sandbox game mechanics."
5. Analyze students' cognitive load in the "remote digital logic educational game integrating sandbox game mechanics."

Game Design

The game used in this study was developed by the NTUST Mini Educational Game (NTUST-MEG) research team at National Taiwan University of Science and Technology. It is an educational game called "Taken@Campus", created using the well-known sandbox game Minecraft Education. The game utilizes Minecraft's creative mode to build a scenario-based puzzle game set on a campus map, aiming to help students understand and apply digital logic concepts. By integrating digital logic instruction with the high interactivity and visualization features of sandbox games, the game provides students with a challenging yet engaging learning environment.

Figure 1: Utilizing Minecraft's NPC Module to Provide Game Guidance



The game is set in a virtual campus, where players must solve specific logic puzzles to progress to the next scene. Players take on the role of a student who, on the way to school, discovers that the campus has been invaded by monsters, and all faculty members have mutated. To restore the school, players must explore the environment, follow NPC guidance (see Figure 1), and interact with various redstone circuit mechanisms, logic mazes (see Figure 2), and logic gate puzzle rooms. Players are required to repair these circuits and obtain key resources necessary to unlock the next level. Ultimately, they must break the school's curse to complete the game.

Figure 2: AND OR Logic Maze Built With Minecraft Chalkboard Module

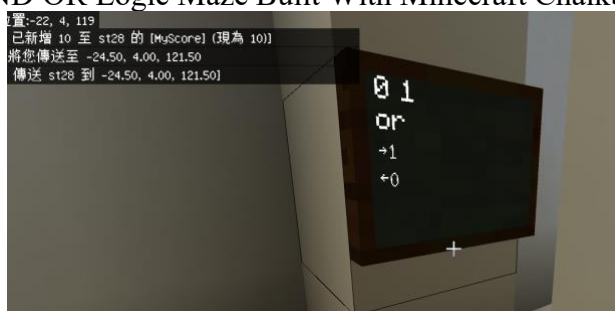


Figure 3: Using Minecraft's Redstone Module to Design Various Types of Digital Logic Gates



Each level is designed with an incomplete Redstone logic circuit, representing various fundamental concepts in digital logic, such as AND gates, OR gates, and NOT gates (see Figure 3). Players must analyze the circuit's inputs and expected outputs, then select appropriate redstone components to repair the circuit. Once the circuit functions correctly, players receive a key resource that grants access to the next challenge room. Each level presents a unique challenge, allowing students to progress from basic concepts to more complex digital logic skills. The game emphasizes real-time feedback and high interactivity. When players attempt to place redstone components, the system provides immediate feedback, indicating whether the action is correct (see Figure 4). Additionally, the game

incorporates NPCs and command blocks as assistive tools. NPCs provide hints or narrative background when players approach, while command blocks trigger specific events or offer further guidance to help players solve puzzles.

Figure 4: Utilizing the Minecraft Command Block Module to Provide the Player With Real-Time Feedback on Whether the Action Is Correct or Not



Participants

The participants in this study were 20 elementary school students from a school in northern Taiwan, consisting of 17 boys and 3 girls. All participants voluntarily enrolled in the camp activity through online recruitment. None of the students had previously attended this digital logic course.

Measurement

To assess learners' academic performance, we implemented a pre-test and post-test learning assessment. The assessment was designed by an experienced computer science teacher and consisted of two sections. The first section focused on digital logic gates, comprising 10 questions covering topics such as positive logic, negative logic, high and low potentials, and the identification of various types of logic gates. Each question was worth 7 points. The second section assessed spatial cognition, with 5 questions related to coordinate and orientation recognition within Minecraft. Each question in this section was worth 6 points. The total possible score for the learning assessment was 100 points.

In order to ascertain the degree of involvement of the learners in this game, the present study adopted the Chinese version of the flow scale by Kiili (2006). This 22-item version was translated into Chinese by Hou and Chou (2012) and included flow antecedents and flow experience. Flow antecedents consists of five sub-dimensions: challenge, goal, feedback, control, and playability. These sub-dimensions were used to measure learners' perceptions of the game. Learners' experience in the game was measured by four sub-dimensions of flow experience: concentration, time distance, autotelic experience, and loss of self-consciousness. All dimensions were measured using a five-point Likert scale, with 1 being strongly disagree and 5 being strongly agree. Higher scores on a dimension (sub-dimension) indicate a more positive evaluation or experience of that dimension, and the flow scale was highly reliable in this study (Cronbach's $\alpha = 0.99$).

According to the ARCS model of motivation proposed by Keller (1987), learning motivation consists of four elements: attention, relevance, confidence and satisfaction. In this study, the ARCS motivation scale was used to assess the motivation of the participants in the learning

activities. The questionnaire uses a five-point Likert scale ranging from 1 to 5, where 1 means strongly disagree and 5 means strongly agree, and the higher the score, the stronger the motivation of the learners. This scale showed high reliability in this study with an overall reliability (Cronbach's $\alpha = 0.99$), in other words, the scale was able to reliably measure the motivation of the participants in the learning activities.

This study was adapted with reference to the technology acceptance scale developed by Davis (1989), which consists of 13 questions and contains three main constructs: cognitive usefulness, cognitive ease of use, and game elements. This questionnaire uses a five-point Likert scale with scores ranging from 1 to 5, in which 1 means strongly disagree and 5 means strongly agree. This scale showed high reliability in this study, with an overall reliability (Cronbach's $\alpha = 0.95$), indicating that it can reliably assess the learners' acceptance of technology.

The cognitive load scale was developed based on the Leppink et al. (2013) measure, which contains three components: internal cognitive load, external cognitive load, and accretive cognitive load, and is based on a five-point Likert scale ranging from 1 to 5, where 1 represents strongly disagree and 5 represents strongly agree, and the overall reliability of this scale in this study was (Cronbach's $\alpha = 0.89$).

Procedure

A total of 100 minutes of research activities were conducted to evaluate the Taken@Campus game.

Table 1: Research Procedure

Procedure	Session time	Description
Description of teaching activities	5 minutes	Online explanatory teaching activities
Pre-test	15 minutes	Fill out pre-testing questionnaires online to learn about learners' prior knowledge.
Basic operation experience	10 minutes	Learners practice basic Minecraft operations.
Teaching activities	50 minutes	Taken@Campus game
Post-test	20 minutes	Fill out post-testing questionnaires to assess learner effectiveness, flow, motivation, game acceptance, and cognitive load.

Results and Discussion

Table 2-6 summarizes the results of this study. In terms of learning performance, Table 2 shows that students' learning performance was greatly enhanced by the game-based learning activities. This finding suggests that the Taken@Campus game is effective in helping students learn digital logic and spatial cognition.

Table 2: Learning Performance of Pre-test and Post-test (n = 20)

Dimension	Pre-test		Post-test		Z	p
	M	SD	M	SD		
Learning performance	42.15	15.47	64.9	19.25	-3.58***	.000

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Regarding the Taken@Campus gaming experience, Table 3 summarizes the students' flow state, which were validated using the Wilcoxon signed-rank test with the median 3 of the scale. The learners showed a high level of flow for the dimensions of the game and were fully engaged in the instructional activities. Students generally rated the game positively on the flow scale. These positive flow experiences indicate that the students were highly engaged in the game. From the positive feedback, it can be seen that the real sense of operation and immediate feedback are the key factors for students to be able to immerse themselves in the virtual environment.

Table 3: Non-parametric Statistical Results of Flow (n=20)

Dimension	M	SD	Z	p
Challenge-skills balance	4.33	1.08	3.27**	.001
Clear goals	4.38	.89	3.70***	.000
Unambiguous feedback	4.33	.91	3.68***	.000
Sense of control	4.55	.71	3.90***	.000
Action-awareness merging	4.38	.86	3.77***	.000
Concentration	4.45	.75	3.86***	.000
Time distortion	4.43	.77	3.86***	.000
Autotelic experience	4.45	.77	3.86***	.000
Loss of self-consciousness	4.38	.79	3.74***	.000

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4 summarizes the learning motivation of the learners in this study, which was examined using the Wilcoxon signed-rank test with a median of 3 on the scale, and the learners showed a high level of learning motivation for each dimension of the Taken@Campus game. This is evidenced by the increased student engagement and motivation when using Minecraft Education as a GBL tool in science classrooms in a study by Pusey et al. (Pusey & Pusey, 2015). In addition Nkadimeng and Ankiewicz (2022) highlighted the potential benefits of Minecraft Education, especially for junior school students learning about atomic structures, which can motivate and interest students.

Table 4: Non-parametric Statistical Results of Learning Motivation (n=20)

Dimension	M	SD	Z	p
Attention	4.30	0.79	3.69***	.000
Relevance	4.24	0.80	3.62***	.000
Confidence	4.34	0.85	3.69***	.000
Satisfaction	4.34	0.83	3.59***	.000

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5 summarizes the acceptability of the game, which was validated using the Wilcoxon signed-rank test with the median 3 of the scale, and the learners showed a high level of acceptance of the perceived usefulness, perceived ease of use, and game design elements of

the Taken@Campus game. In terms of game acceptance, the technology acceptance scale developed by Davis (1989) was used as a reference to adjust the game acceptance scale, which indicates that the game was designed and implemented appropriately to meet the needs and expectations of the learners. A high level of acceptability not only reflects the user-friendliness of the game interface and ease of operation, but also implies that the game is engaging and meaningful to the learners.

Table 5: Non-parametric Statistical Results of Game Acceptance (n=20)

Dimension	<i>M</i>	<i>SD</i>	<i>Z</i>	<i>p</i>
Perceived usefulness	4.27	0.89	3.57***	.000
Perceived ease of use	4.37	0.88	3.69***	.000
Game design elements	4.42	0.90	3.70***	.000

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

To assess the cognitive load of the learners in the game, Table 6 summarizes the data of the cognitive load of the learners in the game in various dimensions. In this study, the Wilcoxon signed-rank test was used to check with the number of digits 3 in the scale, and the learners do not have excessive cognitive load on the game of Taken@Campus, which is under better control. The game was designed with learning efficiency in mind, meaning that learners were able to learn without feeling overly stressed.

Table 6: Non-parametric Statistical Results of Cognitive Load (n=20)

Dimension	<i>M</i>	<i>SD</i>	<i>Z</i>	<i>p</i>
Intrinsic cognitive load	4.21	0.90	3.57***	.000
Extraneous cognitive load	3.11	1.43	0.44	.662
Germane cognitive load	4.19	1.06	3.38**	.001

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Conclusion

Taken@Campus can be considered an effective educational tool for promoting hands-on practice and situated learning. The game utilizes sandbox game mechanics to create scenario-based puzzle challenges, enhancing students' immersion and facilitating learning transfer. In this preliminary study, we demonstrated the effectiveness of the game, as well as students' positive evaluations and active engagement. However, the small sample size is the primary limitation of this preliminary study, and thus, the findings should be interpreted with caution. It is recommended that future studies be conducted with larger sample sizes to increase our understanding of the use of sandbox game design to improve student learning performance. In addition, this study did not analyze the behavioral patterns of student interactions to examine how scaffolding in games can help students learn better (Bakeman & Gottman, 1997; Chan et al., 2024; Hou, 2015). Additionally, considering the limitations of technical equipment, students' gaming experience may be affected by hardware performance constraints. This presents an area for future adjustments and improvements in game design.

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Design and Initial Evaluation of an Online Absolute Value Educational Game Using Sorting Mechanism and Scaffolding Hints

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Abstract

Absolute value is one of the basic concepts in secondary school mathematics. It is not easy for learners to maintain their motivation to learn and keep practicing. Using game-based learning activities and scaffolding guidance may help increase motivation and reduce anxiety, the provision of appropriate scaffolding allows students to reflect and strategize during the computation process. In this study, we designed an online educational game that combines a sorting mechanism and adaptive scaffolding hints to provide in-game uncertainty through a variety of easy-to-difficult and constantly changing numbered levels, so that players can complete the correct absolute value equations by sorting cards. Players can get two types of scaffolding hints in the game, i.e., the arrangement of absolute value equations and the rules of absolute value arithmetic. A total of 35 secondary school students participated in the empirical evaluation of this study. The study found that learners had high mind flow, low anxiety, enjoyed the game. (All scores are significantly higher than 3, i.e., the median of the scale.) In terms of academic achievement, the average score of the post-test was 7% higher than that of the pre-test. Regarding the scaffolding hints in the game, 80% of the participants considered that scaffolding was helpful in solving the problems; 77% of the participants considered that scaffolding could help to better understand the concept of absolute value; and 74% of the participants considered that scaffolding could help to improve their ability to calculate absolute value.

Keywords: educational game, scaffolding, sorting mechanism, absolute value

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Introduction

Absolute value is one of the mathematical concepts that students find difficult to understand (Pereira et al., 2020). Students who are confronted with the abstraction of absolute value computation, including the basic concepts, symbols, and operations, not only find it complex and difficult to understand, but also find it difficult to maintain their motivation to learn and keep practicing. Muthma'innah (2024) points out that the causes of students' learning difficulties in mathematics are not only low motivation, but also teachers' lack of creativity in teaching, such as only using the blackboard as a medium in class, which affects such difficulties. Many studies have indicated that the use of game-based learning is an effective teaching strategy in math education (Chen et al., 2023). Online educational games featuring scaffolding hints and card interactions may have the potential to allow students to reflect and strategize during absolute value operations. Providing uncertainty in the game through a variety of levels that are varied from easy to difficult and constantly changing numbers, the game is designed to allow players to complete the correct absolute value equation by sorting cards, which is expected to help students strengthen their mathematical skills and develop problem-solving abilities and logical thinking.

Altarawneh and Alkhateeb (2024) showed that students tend to confuse absolute value symbols with other mathematical symbols, fail to recognize their properties, or misapply arithmetic rules. In this study, an online educational game for absolute value learning is designed so that the player can get two types of scaffolding hints during the game, the hints about the way absolute value equations are arranged and the rules of absolute value arithmetic. These scaffolding hints help players enhance their understanding of absolute value concepts in practice, and if an error is made in the rules of arithmetic, the corresponding rule hints will be displayed. In addition, to ensure that the hints promote deeper learning than just telling the answer, the system has designed a second level of scaffolding hints to give the player part of the correct equation, encouraging the player to rely more on his or her own understanding to complete the challenge. Through the online educational game designed in this study and the scaffolding guidance, students can not only correct their existing misconceptions, but also construct a correct understanding of absolute value in the game-based learning environment, effectively improve the ability to solve mathematical problems, and at the same time, help to enhance learning motivation and reduce anxiety, generate flow, and then hopefully improve the learning effect.

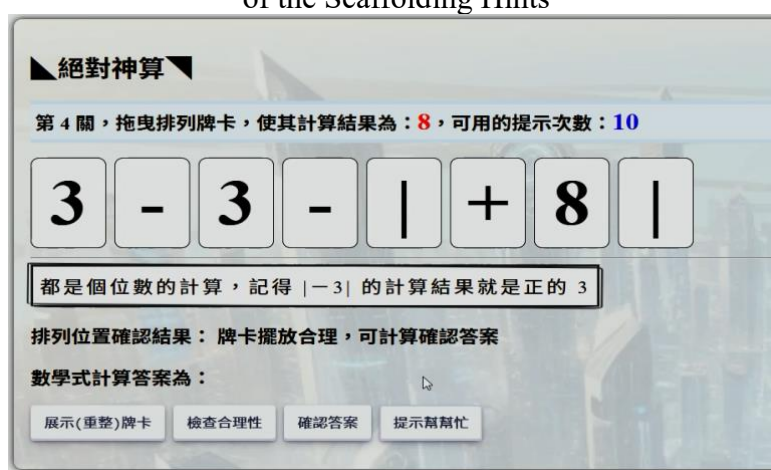
Methods

A total of 35 junior high school students from Taiwan participated in the pilot empirical evaluation of this study. This study independently developed an online educational game called "Absolute Math Genius". Players have a limited amount of time to move cards containing numbers, operators, and absolute value symbols in the game to arrange them into the correct equation so that it will produce the specified calculation result. If a player confuses absolute value symbols with other mathematical symbols, resulting in a wrong alignment position, the system will provide the first level of scaffolding guidance, as shown in Figure 1, and advise the correct alignment rules. If the alignment rules are correct, but the calculations do not match, the second level of scaffolding guidance can be activated, as shown in Figure 2, and the system will give the player a partial hint of the correct equation. In the game, players must also use their mathematical calculation, logical thinking and problem-solving skills to construct a correct understanding of absolute values and break through the levels of the game.

Figure 1: Sorting Mechanism of the Absolute Value Educational Game Operation Screen and the First Level of the Scaffolding Hints



Figure 2: The Operation Screen of the Absolute Value Education Game and the Second Level of the Scaffolding Hints



The instruments comprised a Flow Scale, a Game Anxiety Scale, a Game Feedback Scale, a Game Elements Scale, and a Cognitive Load Scale. The Flow Scale was translated and revised by Hou and Li (2014) from Kiili's Flow Scale (2006), encompassing flow antecedents and flow experience (Cronbach's $\alpha = 0.89$). To assess participant anxiety, this study adapted Hung's (2001) Activity Anxiety Scale (Cronbach's $\alpha = 0.73$). Game feedback was measured using Davis's (1989) scale (Cronbach's $\alpha = 0.94$). The Game Elements Scale, which achieved a Cronbach's α of 0.92, is based on the game motivational elements proposed by Hou (2016). The Cognitive Load Scale, with a Cronbach's α of 0.83, is derived from Leppink et al.'s (2013) scale and adapted from Klepsch et al.'s (2017) scale. Both scales were assessed using a five-point Likert scale.

Results and Discussions

Descriptive statistical analyses were performed in this study using single-sample T-tests. Table 1 shows the descriptive statistical analysis of the learners' flow state after the completion of the task. The overall flow ($M = 4.06$, $SD = 1.21$) is significantly higher than the median of the scale (i.e., 3). Flow antecedents ($M = 4.06$, $SD = 0.94$), Flow experience

($M = 4.20$, $SD = 1.08$), and mean values of all sub-dimensions of flow were significantly higher than the median of the scale (i.e., 3). These data show that the educational games in this study have successfully created a favorable learning environment that not only provides students with clear goals and appropriate task difficulty, but also gives players full control, which in turn promotes a deeply engaging learning experience. When practicing absolute value operations, the player is so immersed in the game situation that the player is not even aware of the passing of time.

Table 1: The Mean and Standard Deviation of Learners' Flow

(n = 35)				
	<i>M</i>	<i>SD</i>	<i>Z</i>	Sig.
Overall Flow	4.06	1.21	5.16***	0.000
Flow antecedents	4.06	0.94	6.67***	0.000
Challenge-skill balance	4.09	0.95	6.76***	0.000
Goals of an activity	4.11	1.16	5.70***	0.000
Unambiguous Feedback	4.00	1.03	5.75***	0.000
Control	4.23	1.00	7.25***	0.000
Playability	4.40	0.91	9.06***	0.000
Flow experience	4.20	1.08	6.58***	0.000
Concentration	4.40	0.81	10.20***	0.000
Time distortion	4.07	0.76	8.29***	0.000
Autotelic experience	3.91	0.79	6.83***	0.000
Loss of self-consciousness	3.57	0.95	3.57**	0.001

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2 shows the descriptive statistical analysis of learners' game anxiety, game ease of use and game elements. Overall anxiety ($M = 2.26$, $SD = 0.76$) was lower than the median of the scale (i.e., 3) and reached significance. Moderately low anxiety is an important indicator of sustained flow during gaming. In addition, game ease of use ($M = 4.26$, $SD = 0.96$) and game elements ($M = 4.15$, $SD = 0.86$) were also significantly above the median (i.e., 3) of the scale.

Table 2: The Mean and Standard Deviation of Learners' Game Anxiety, Game Ease of Use, and Game Elements

(n = 35)				
	<i>M</i>	<i>SD</i>	<i>Z</i>	Sig.
Game Anxiety	2.26	0.76	-5.77***	0.000
Game Ease of Use	4.26	0.96	7.72***	0.000
Game elements	4.15	0.86	7.94***	0.000

*** $p < 0.001$

Table 3 shows the descriptive statistical analysis of the cognitive load of the learners after task completion. Intrinsic cognitive load ($M = 2.9$, $SD = 1.1$) was below the median (i.e., 3) of the scale, but not significantly. Germane cognitive load ($M = 3.7$, $SD = 0.9$), above the median (i.e., 3) of the scale and reaching significance. When learners are faced with complex learning tasks, a moderate germane cognitive load can promote deeper thinking and understanding. When solving math problems, students need to apply what they know to deduce their thinking. This process increases germane cognitive load, but at the same time

enhances problem solving skills. The extraneous cognitive load ($M = 2.1$, $SD = 1.0$) was significantly lower than the median of the scale (i.e., 3), indicating that the design of the educational games in this study was appropriate and effective and did not cause unnecessary distractions, allowing the learners to focus on learning through the games.

Table 3: The Mean and Standard Deviation of Learners' Cognitive Load

	(n = 35)			
	<i>M</i>	<i>SD</i>	<i>Z</i>	Sig.
Intrinsic Cognitive Load	2.9	1.1	-0.53	0.600
Germane Cognitive Load	3.7	0.9	4.44***	0.000
Extraneous Cognitive Load	2.1	1.0	-5.11***	0.000

*** $p < 0.001$

Conclusions and Limitations

“Absolute Math Genius” is an online educational game with a sorting mechanism and scaffolding guide, allowing players to arrange cards to determine the correct equation, and to understand and practice the rules of absolute value arithmetic. It also allows learners to use their mathematical computation, logical thinking and problem-solving skills to construct a correct understanding of absolute value. The results of this study revealed that the learners had high flow, low anxiety, enjoyed the game, and had a will to play again (all scores were significantly higher than 3, which is the median of the scale). The scaffolding hints during the game were considered helpful by 80% of the participants in solving the problems; 77% of participants felt that scaffolding would help to better understand the concept of absolute value; 74% of participants felt that scaffolding helped to improve the ability to calculate absolute values.

In the future, this study can increase the sample size and include a control group to compare and analyze the relationship between different scaffolding feedback mechanisms and mathematical computational skills, and to explore more deeply the differences in computational fluency and cognitive thinking skills of players in game-based learning environments.

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Child Marriages and Female Education: Examining the Impact on Learning Opportunities in Pakistan

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Abstract

The present research investigated the profound effects of child marriages on female education and learning in Pakistan, focusing on how patriarchal beliefs and religious misconceptions contribute to this issue. Deeply entrenched patriarchal mindsets and traditional values perpetuate gender discrimination, leading to a high incidence of child marriages that adversely impact the educational opportunities and development of young girls. Present research explores the relationship between these socio-cultural factors and their detrimental effects on the education and mental health of 118 participants including 79 girls and 39 boys married before the age of 18. The girls were disproportionately more in sample as child marriage practice is more common in girls as compared to the boys. The present research used the qualitative research design consisted of in-depth interviews for rigorous information about the topic of investigation. Thematic analysis was conducted to explore the major findings from the transcripts of interviews. Findings reveal that child marriages significantly hinder educational attainment, resulting in lower academic performance and reduced school attendance among affected girls. The present research highlights gender-specific disparities, with girls experiencing greater educational setbacks compared to their male counterparts. These findings underscore the urgent need for targeted interventions to promote gender equality and improve educational outcomes for girls. By fostering accurate religious understanding and challenging regressive norms, present research aimed to contribute to the ongoing efforts to dismantle patriarchal paradigms and enhance the quality of life for girls impacted by early marriage in Pakistan.

Keywords: child marriages, educational disruption, gender inequality, patriarchal beliefs

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Introduction

Child marriage has a significant impact on young girls' education and general well-being. It is a problem that is common in many developing nations, especially in South Asia (Nasrullah et al., 2014). The practice of marrying girls at a young age is a reflection of gender inequality that limits educational prospects and impedes personal development in Pakistan, where societal norms are frequently extremely patriarchal (Bhabha, 2018). With an emphasis on how patriarchal ideas and religious misconceptions support this practice and its negative impacts on girls' learning possibilities, present research aimed to investigate the effects of child marriages on female education.

One in three Pakistani girls get married before turning 18, which is much higher than the global norm, according to UNICEF (2020). Girls who are forced into child marriages frequently lose their schooling, which restricts their access to education and exacerbates long-term educational gaps. Gender-specific impediments that limit girls' educational advancement are reinforced by underlying socio-cultural and religious dynamics in Pakistan, which are crucial in maintaining these harmful practices (Ali, 2021).

Literature Review

According to research child marriages frequently result in early school dropout, which reduces the chances of future scholastic success and employment (Malhotra & Elnakib, 2021). Young girls who marry are frequently overburdened with motherhood and family responsibilities, which leaves them with little time for further study (Nour, 2009). Cultural and religious conventions in Pakistan that place a higher priority on girls' home responsibilities than their academic endeavors further compound the educational difficulties faced by married girls (Jamal, 2020). Boys are more likely than females to continue their education after marriage, despite the fact that they are equally impacted by child marriages due to different societal expectations (Awan, 2017).

Pakistani society's strong patriarchal ideals are a major contributor to the continuation of child marriages (Mahmood & Shah, 2015). Early marriage is frequently seen by families as a means of preserving girls' honor, securing their future, and lessening the financial burden of the dowry (Anwar, 2018). Religious misunderstandings exacerbate the problem, since some groups use Islamic teachings as justification for early marriage customs (Shaikh, 2016). Scholars and religious leaders, however, stress that Islam forbids underage marriage and supports education for both boys and girls (Iqbal, 2020).

In Pakistan, child marriage is still a major problem, especially in rural areas where patriarchal attitudes and customs are prevalent. The practice of child marriage persists in undermining the educational, social, and economic opportunities for millions of girls, even in spite of notable global progress in this regard. Pakistan is among the nations where child marriage is still commonly practiced, according to UNICEF (2020), particularly in areas where family decisions are governed by patriarchal and religiously oriented societal institutions. Thus, present research aimed to investigate the deep and complex effects of child marriage on the education of girls, their access to learning opportunities, and their general development, paying particular attention to the ways in which sociocultural variables support and impede these effects.

The rationale for present research is threefold:

Examining the Educational Impact of Child Marriage

Studies continuously demonstrate that child marriage severely impairs girls' education, causing them to drop out of school early and consequently having poorer educational attainment (Nasrullah et al., 2014). Girls who marry young frequently take on domestic chores that leave little time for education, which makes it difficult for them to finish even a basic education. Since education is closely associated with improved health outcomes, economic growth, and gender equality, this disruption will have long-term effects on society as a whole as well as on the individual (UNICEF, 2020). Present research intends to close this gap by offering a thorough analysis of the educational obstacles experienced by young Pakistani brides and examining both the short- and long-term impacts on their education.

Calling Attention to Disparities Based on Gender

Although child marriage has an impact on both boys and girls, girls are disproportionately affected. According to earlier research, girls are expected to put family responsibilities ahead of education, but guys who marry young are more likely to finish their education (Awan, 2017). In order to better understand these gender differences, present research looks at the ways that patriarchal beliefs and cultural expectations put unique obstacles in the way of girls' education, which in turn exacerbates gender disparity. Through a comparative comparison of the experiences of girls and boys married before turning 18, the research will demonstrate the critical need for gender-sensitive treatments.

Challenging Patriarchal Norms and Religious Myths

In many regions of Pakistan, deeply ingrained patriarchal norms and religious myths are used as justifications for child marriage. Families may think that marriage after puberty is required by religious teachings, or they may view early marriage as a way to preserve family honor—beliefs that may be misguided (Shaikh, 2016). The present research aimed to conduct a critical analysis of the ways in which socio-cultural and religious elements perpetuate child marriage and undermine girls' educational opportunities. By dispelling these myths, the study hopes to support existing initiatives to rectify misinterpretations of religion and combat regressive attitudes that jeopardize girls' rights to an education and personal growth.

Given these circumstances, our study is not only relevant but also essential for guiding community-based initiatives and policy that support gender equality, improve access to education, and discourage detrimental practices like child marriage. Policymakers, educators, and activists striving to break down the socio-cultural barriers preventing girls from realizing their full potential and their right to an education will find great value in the findings.

Method

Objectives of Study

This study aimed to explore the following objectives:

1. **To explore the educational impact of child marriage** by examining how early marriage disrupts schooling, limits academic achievement, and affects future opportunities for girls in Pakistan.

2. **To analyze gender disparities in educational outcomes** by comparing the experiences of married girls and boys, highlighting the role of societal expectations in reinforcing inequality.
3. **To investigate the influence of patriarchal norms and religious misconceptions** in sustaining child marriage and restricting girls' access to education.
4. **To understand the psychosocial consequences of child marriage** on young brides, particularly in relation to their motivation, self-perception, and learning opportunities.
5. **To identify sociocultural barriers and enablers** affecting married girls' education and suggest community-driven strategies to improve their access to learning.
6. **To provide insights for policymakers, educators, and activists** on addressing child marriage through education-focused interventions and policy reforms.

Research Design and Sample

The present research used a qualitative methodology that consisted of in-depth interviews to investigate the experiences of 118 participants, 39 boys and 79 girls who had all gotten married before turning 18. Because they were chosen from both Pakistan's rural and urban areas, the participants represented a wide range of socioeconomic backgrounds.

The demographic details of the 118 study participants are broken down in detail in Table 1. It includes gender, age at marriage, education level, place of residence, and socio-economic status. Most participants were women as it is reported earlier in introduction that women are more effected by the practice of child marriages in Pakistan. Most participants reported that they aged 15-16 years at the time of their marriage. Most participants were only educated till middle school which is grade 6-8. The majority of participants belonged to rural areas of Pakistan. Plus, the majority belonged to Low Socioeconomic Status.

Table 1: Demographic Details of Participants

Variable	Category	Frequency (N = 118)	Percentage (%)
Gender	Women	79	66.9%
	Men	39	33.1%
Age at Marriage	12-14 years	47	39.8%
	15-16 years	52	44.1%
	17-18 years	19	16.1%
Education Level	No formal education	25	21.2%
	Primary education (1-5 grade)	39	33.1%
	Middle school (6-8 grade)	29	24.6%
	Secondary school (9-10 grade)	18	15.3%
	Higher secondary school (11-12 grade)	7	5.9%
Residence	Rural	82	69.5%
	Urban	36	30.5%
Socio-economic Status	Low-income	63	53.4%
	Middle-income	45	38.1%
	High-income	10	8.5%

Data Collection

Semi-structured interviews were used to gather data from the participants and their families. The main goals of the interviews were to investigate how child marriage affects schooling, what obstacles married couples encounter in their quest for higher education, and how cultural and religious attitudes affect marriage choices. Local languages were used for the interviews, which were then transcribed for analysis.

Results

Thematic analysis, a qualitative technique that finds patterns or themes in the data, was used to analyze the data. Braun & Clarke (2021) method has been used for conducting thematic analysis in present research. After the transcripts were transcribed, important themes about gender inequality, educational disruption, and the impact of patriarchal and religious traditions were found. This method made it possible to comprehend how child marriages impact women's education in the Pakistani setting in a more complex way.

Key themes emerged from the thematic analysis are as follow:

Disruption to Education

It was discovered that child marriages seriously impair girls' education, with the majority of participants stating that they were compelled to leave school soon after getting married. The main causes were pressure from in-laws to put household obligations ahead of schooling, early parenthood, and household responsibilities.

Gender Disparities

The study brought to light glaring differences between the educational outcomes of the sexes. Although child marriages had an impact on both boys and girls, boys were more likely to pursue further education after marriage. Girls, on the other hand, had to overcome more challenges, such as societal norms that demanded they stay at home full-time.

Patriarchal Influence

The choice to marry off girls at a young age was largely influenced by patriarchal views. Marriage was frequently seen by families as a means of regulating girls' sexuality and preserving family honor, which reflects ingrained gender stereotypes that place a low value on female education.

Religious Misconceptions

The study discovered that child marriages were excused by religious misconceptions, especially in rural communities. Despite the fact that Islamic scholars support education and are against child marriage, many participants and their families thought that Islam approved of the practice.

The details of themes, subthemes and the relevant verbatims from interviews are presented in Table 2.

Table 2: Thematic Analysis Table With Verbatim Quotes

Themes	Subthemes	Description	Verbatim Quotes
Educational Disruption	<ol style="list-style-type: none"> 1. School Drop out 2. Interruption in Educational Progress 3. Limited Access to Education 4. Financial Constraints 	Child marriages force young girls to drop out of school, limiting their future educational opportunities.	<p>"I had to leave school because my in-laws wanted me to take care of the house." (Participant 12, 17 years old)</p> <p>"My husband said education is no longer important, my duty is to look after our family." (Participant 22, 16 years old)</p>
Gender Disparities in Education	<ol style="list-style-type: none"> 1. Unequal Opportunities 2. Son Preference 3. Men as Bread earner and women as homemaker 	Boys tend to continue their education post-marriage, while girls face greater educational setbacks.	<p>"My brother still goes to school even after his marriage, but they didn't allow me to." (Participant 45, 18 years old)</p> <p>"For boys, it's different. They are expected to study and work, but for girls, marriage is the end of their education." (Participant 28, 15 years old)</p>
Patriarchal Influence	<ol style="list-style-type: none"> 1. Control over female decision making 2. Societal Norms and Conforming 3. Limited Autonomy in educational choices 	Patriarchal norms and beliefs prioritize marriage and household duties over girls' education.	<p>"My parents believed that the earlier I got married, the better. They said I didn't need education to be a good wife." (Participant 9, 16 years old)</p> <p>"They said a girl's place is in her husband's home, not in school." (Participant 34, 17 years old)</p>
Religious Misconceptions	<ol style="list-style-type: none"> 1. Misinterpretations of religious teachings 2. Use of religion to justify illegal acts 3. Resistance to Co-Education 	Families often misinterpret religious teachings to justify child marriages.	<p>"My family said Islam allows girls to marry early, so there was no need for me to study more." (Participant 67, 14 years old)</p> <p>"They believed that once a girl reaches puberty, she should marry as per religious teachings." (Participant 73, 15 years old)</p>
Psychological Impact	<ol style="list-style-type: none"> 1. Emotional Distress and Trauma 2. Anxiety and Depression due to forced responsibilities 3. Reduced Self Esteem 	Girls experience emotional and mental stress due to early marriage, which affects their learning ability.	<p>"I always feel sad and anxious because I had to leave my dreams behind." (Participant 14, 16 years old)</p> <p>"I feel like I lost a part of myself when I got married and left school." (Participant 51, 17 years old)</p>
Lack of Support for Education	<ol style="list-style-type: none"> 1. Absence of female role models 2. Lack of support in handling household chores 3. Lack of Support by spouse 	Girls married young often lack financial or emotional support to continue their education.	<p>"No one in my family supported my decision to go back to school after marriage." (Participant 40, 18 years old)</p> <p>"I wanted to study further, but there was no one to help with my children while I attended classes." (Participant 21, 16 years old)</p>

The primary concerns that women married before the age of eighteen experience are encapsulated in this thematic analysis, which also highlights the complex effects of child marriage on Pakistani society and education. The verbatim quotes offer a firsthand understanding of the participants' actual experiences.

Discussion

The findings of the research highlight how urgently focused interventions are needed to address the sociocultural and religious variables that contribute to child marriages in Pakistan. The promotion of accurate religious understanding and the challenge of patriarchal norms can bolster attempts to improve the educational achievements for girls. The study also emphasizes the value of community-based initiatives that give girls the tools and confidence to pursue their education long after they are married.

According to the present research, patriarchal practices provide a serious obstacle to female education in Pakistan. Many families, especially in rural areas, believe that education is superfluous for girls' domestic tasks and favor early marriage for them as a means of upholding family honor (Ali, 2021). This kind of thinking supports the idea that a female should prioritize becoming a bride and mother above going to school or achieving her career aspirations.

Consequently, as participants who expressed a strong desire to continue their education but were constrained by family expectations showed, girls who marry early are often forced to drop out of school and take on home obligations. This is in line with other research suggesting that one of the main causes of the high rates of female dropout in South Asia is patriarchal ideas (Malhotra & Elnakib, 2021). Furthermore, the psychological effects of an early marriage are an important but sometimes disregarded aspect. Several study participants expressed emotions of melancholy, worry, and a sense of unrealized potential as a result of having to drop out of school at an early age in order to assume the obligations of marriage and parenthood. These results are consistent with earlier studies that show a link between child marriage and increased rates of anxiety, depression, and other mental health issues, which further hinders the girls' capacity to achieve their academic and personal development goals (Ali, 2021; Nour, 2009).

The study shows that there are significant gender differences in how child marriage affects schooling. Although early marriage had an impact on both boys and girls in the study, boys were more likely to continue their studies after marriage, while girls had major educational setbacks (Awan, 2017). This is indicative of larger cultural expectations in which boys are viewed as future breadwinners and, as such, education is valued highly, even beyond marriage (Malhotra & Elnakib, 2021). Girls, on the other hand, are encouraged to prioritize household responsibilities, which limits their opportunities for the future and perpetuates the cycle of gender inequality.

The difference in the educational attainment of the sexes emphasizes the necessity of policies that primarily focus on the education of girls, especially in areas where child marriage is common. Along with community awareness campaigns that highlight the long-term advantages of educating females, offering financial incentives to families to keep their daughters in school can aid in changing societal perceptions. Furthermore, married girls may be able to continue their education with the support of flexible learning choices like remote learning or evening sessions.

The issue of child marriage and how it impacts women's access to education calls for a multimodal strategy that involves community-based interventions, educational reforms, and legal changes. Although child marriage is already illegal in Pakistan, there is frequently lax enforcement of the law, especially in rural regions where the practice is still strongly

ingrained in local norms (Ali, 2021). To alter opinions about the importance of girls' education, community involvement must be combined with strengthened law enforcement.

Community-based initiatives involving parents, religious authorities, and other local stakeholders can be extremely effective in posing challenges to the cultural norms that support child marriage. These initiatives ought to center on educating people about the detrimental effects of young marriage and the value of education for girls. They should also provide assistance to married girls who want to go back to school. Studies indicate that community-wide interventions, as opposed to focusing just on individual targets, are more successful in altering detrimental behaviors (Malhotra & Elnakib, 2021).

Conclusion

In Pakistan, child marriages continue to be an important threat to female education. The practice significantly restricts the educational prospects available to young females, leading to long-term socio-economic disadvantages. It is motivated by patriarchal ideas and religious misconceptions. A multimodal strategy is needed to address this problem, one that challenges detrimental cultural norms and advances gender equality through community engagement, educational initiatives, and legislative changes. Pakistan may make a significant advancement in the lives of women and girls and achieve sustainable development by guaranteeing that girls have access to education.

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Psychoeducation to Increase Self-Harm Literacy in Magetan Middle School Students

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Abstract

In November 2023, the Magetan District Health Service reported 870 cases of self-harm among middle school students in Magetan. These acts of self-harm involved teenagers cutting their hands with sharp objects. This study aims to analyze the effectiveness of psychoeducation in improving self-harm literacy among middle school students. The research employed a pre-experimental design using a one-group pre-test and post-test approach. A total of 50 junior high school students in Magetan, aged 12–14 years, participated in the study and were randomly assigned to the experimental group. Data collection was conducted using a multiple-choice self-harm literacy test. The analysis utilized a paired t-test (dependent t-test) to determine the significance of the intervention's effects, with the criterion for significance set at a p-value of < 0.05 . The results indicated a p-value of < 0.05 , demonstrating that the intervention had a significant effect. It was concluded that psychoeducation effectively improved self-harm literacy in the experimental group. Furthermore, the R-square value exceeded 0.5 (53%), indicating a strong influence of psychoeducation on enhancing self-harm literacy. These findings affirm that psychoeducational interventions play a substantial role in increasing students' awareness and understanding of the dangers of self-harm.

Keywords: literacy, psychoeducation, self-harm, students, self-compassion

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Introduction

Adolescence is a dynamic phase of life marked by significant emotional changes and high-stress levels. Adolescents tend to experience emotional instability, easily feel anxious and are prone to conflicts in daily life (Dianovinina, 2018). The World Health Organization (WHO) defines adolescents as individuals aged between 10 and 19 years. At this stage, their primary developmental task is to achieve emotional independence, allowing them to manage their feelings and stress more constructively (Lubis & Yudhaningrum, 2020). Globally, WHO data indicate that approximately one in seven adolescents in this age range experience mental health disorders, with depression, anxiety, and behavioral disorders including self-harm, being among the leading causes of adolescent mortality, particularly in those aged 15 to 19 years.

Self-harm typically emerges in early adolescence and continues into young adulthood (Nock, 2010). Adolescents often engage in self-harm as a mechanism to release emotions they struggle to regulate (Elvira & Sakti, 2021). Walsh (2005) defines self-harm as intentional self-inflicted injury aimed at relieving psychological distress, even though it rarely leads to death. This behavior also contradicts prevailing social norms. Hungerford et al. (2016) identified various forms of self-harm, including cutting the skin with sharp objects, scratching the body, hitting oneself, banging one's head, burning parts of the body, pulling out hair, and substance abuse such as alcohol and illicit drug use.

A report from the Magetan District Health Office in November 2023 recorded 870 cases of self-harm among middle school students. These adolescents typically engaged in self-harm by cutting their hands with sharp objects. The primary triggers for this behavior are believed to include past traumatic experiences, a lack of understanding regarding the risks of self-harm, and the influence of social media trends. Self-harm has complex consequences for those who engage in it. According to Higgins (2015), the short-term effects include temporary relief; however, this is often followed by feelings of shame, guilt, stress, social isolation, low self-esteem, and an increased risk of infection from open wounds. In the long term, self-harm can lead to tissue damage, nerve and tendon injuries, and even impairment of vital organ function due to substance abuse.

Several factors contribute to self-harming behavior, including mental health issues such as depression and anxiety, experiences of physical, emotional, and sexual abuse, and genetic predispositions. Additionally, a lack of a supportive environment, ineffective coping skills, and intense emotional distress such as anger, sadness, hopelessness, and feelings of isolation also contribute to self-harm (Higgins, 2015). Goncalves et al. (2023) found that a history of psychopathology and low self-compassion are primary predictors of self-harm. Individuals with low self-compassion tend to struggle in accepting negative experiences and are more likely to use self-harm as a coping mechanism. Conversely, individuals with high self-compassion are better able to navigate challenges more healthily and develop a more accurate understanding of their negative experiences (Jiang et al., 2017).

Neff and McGehee (2010) assert that self-compassion can be an effective intervention for individuals with a negative self-view, helping them develop a healthier relationship with themselves and improving their psychological well-being. Neff (2009) further explains that high levels of self-compassion are associated with increased happiness and optimism, as well as reduced anxiety, depression, and fear of failure. Therefore, self-compassion can function as a protective factor in mitigating tendencies toward self-harm. Given the rising number of

self-harm cases among adolescents, a comprehensive psychological approach is necessary to raise awareness of the harmful consequences of this behavior. One viable strategy is psychoeducation. Based on this background, this study aims to analyze the impact of psychoeducation in improving adolescent literacy on self-harm and to evaluate its effectiveness in reducing self-harming tendencies.

Method

This study employed a quantitative pre-experimental design using a pre-test and post-test approach with a single group. The study population comprised middle school students from a selected school in Magetan. The sample consisted of 50 students who were selected using purposive sampling based on the following inclusion criteria:

1. Adolescents aged 12–14 years,
2. Enrolled as students at Middle School X in Magetan, and
3. Willing to participate as respondents.

The research procedure included the following steps:

1. Selection of respondents based on inclusion and exclusion criteria,
2. Provision of information about the study objectives and procedures to prospective respondents,
3. Completion of informed consent forms and the pre-test by willing participants,
4. Implementation of the psychoeducational intervention in a single session through seminar posters, and
5. Data analysis using a t-test.

The instrument used in this study was the Indonesian version of the Self-Compassion Scale, developed by Muttaqin and colleagues (2020), consisting of 26 items. Jiang, You, Zheng, and Lin (2017) discovered that self-compassion serves as a protective factor against self-harm behavior. Therefore, this study aimed to assess the impact of psychoeducation on increasing self-compassion and reducing self-harm tendencies among adolescents.

Result and Discussion

The prerequisite test in this study included a normality test. The normality test results for self-compassion showed a significance value of 0.200. The applied criterion was $p > 0.05$. Based on this criterion, the self-compassion data were normally distributed, indicating no significant difference between the research sample and the population. The results of the normality test are presented in Table 1.

Table 1: Normality Test Results				
	Kolmogorov-Smirnov ^a			Caption
	Statistic	df	Sig.	
<i>Self-compassion</i>	0.106	50	0.200	Normal

Next, a hypothesis test was conducted to assess the effectiveness of self-compassion psychoeducation in reducing self-harming behavior among adolescents. The analysis results indicated a significant difference in self-compassion levels before and after the psychoeducational intervention. The paired sample t-test yielded a p-value of 0.000 ($p < 0.05$), with an R-square value of 53%. This finding suggests that a significant change

occurred between pre-test and post-test results, demonstrating that psychoeducation delivered through seminars and posters has a positive impact on adolescent mental health.

Table 2: Self-Harm Test Results

	N	Mean	St.dev	t	df	p value (Asymp. Sig. [2-tailed])
Pretest	50	79.92	8.083	- 7.398	49	0.000
Posttest	50	90.38	9.187			
Rsquare	$t^2 : (t^2 + df)$		0,5276		53%	

These findings align with Xavier et al. (2016), who stated that adolescents with negative self-perceptions, a desire for self-harm, and an inability to regulate their emotions in stressful situations tend to struggle with low self-compassion. Excessive self-criticism, fear, and avoidance of self-kindness should be addressed through self-compassion-focused interventions. Self-compassion helps adolescents develop a sense of security, self-love, and emotional regulation, particularly in managing negative thoughts such as excessive self-criticism. Neff (2003) suggested that self-compassion levels in adolescence tend to be lower compared to other life stages. Germer (2009) also stated that self-compassion is associated with life satisfaction, better emotional regulation, lower depression levels, and reduced anxiety. Adolescents who possess self-compassion engage more effectively with challenges and stress (Neff, 2003). For instance, when adolescents experience failure or face difficulties, those with higher self-compassion tend to treat themselves with kindness, care, and understanding rather than engaging in self-blame.

Negative thought patterns and responses toward distressing conditions often trigger self-harm behaviors. Self-compassion encourages individuals to reinterpret challenges with a more positive perspective. Aulia and Rahayu (2022) found that self-compassion promotes positive thinking and adaptive responses, even when facing adverse circumstances. Individuals with high self-compassion maintain self-love despite challenges and do not resort to self-blame. Instead, they accept difficult situations and believe in their ability to resolve them constructively. Further supporting this, Sumargi et al. (2022) found that self-compassion negatively correlates with self-harm tendencies. Self-compassion-focused psychoeducation interventions have been shown to reduce self-criticism, help individuals identify negative thoughts and emotions, and play a crucial role in preventing and managing self-harm tendencies. Khairunnisa et al. (2022) emphasized that the three core components of self-compassion self-kindness, common humanity, and mindfulness are critical factors in helping adolescents who tend to self-harm.

Psychoeducation plays a vital role in preventing, recognizing, and managing mental health issues. Maya (2021) emphasized that knowledge of mental health symptoms and disorders helps individuals identify early warning signs and take appropriate preventive measures. This aligns with the findings of Jafar and NR (2023), which demonstrated that mental health literacy significantly improved among seminar participants after receiving psychoeducation on self-harm. Increased literacy helps individuals detect early mental health issues, seek professional help, and reduce social stigma associated with mental health struggles.

This conclusion is further supported by research conducted by Liguin and Cuartero (2022), which found that mental health education significantly reduces the stigma surrounding professional help seeking behavior. As students' understanding of mental health increases,

they become more likely to seek appropriate assistance when experiencing psychological distress. Therefore, self-compassion-focused psychoeducation, delivered through interactive discussions, seminars, and visual materials, can be an effective intervention strategy for enhancing adolescent emotional well-being and preventing self-harm behaviors.

Conclusion

This study demonstrated that psychoeducation focusing on self-compassion effectively improves self-harm literacy among adolescents. Hypothesis testing results indicated that this intervention significantly contributed to reducing self-harming tendencies. Self-compassion plays a crucial role in helping adolescents develop a sense of security, self-love, and the ability to manage emotions and negative thoughts, including excessive self-criticism. These findings align with previous studies, which show that higher levels of self-compassion correlate with a lower likelihood of engaging in self-harm. Therefore, psychoeducational interventions on self-compassion can serve as an effective strategy to enhance adolescents' emotional well-being and prevent self-harming behaviors.

Recommendations

Future studies should consider using different methodologies and increasing the number of intervention sessions to assess whether psychoeducation through socialization and posters has a substantial and relevant impact on reducing self-harm intensity among adolescents. Additionally, an initial assessment should be conducted to determine whether self-harm is caused by underlying mental health disorders or external influences (such as social media, peer pressure, etc.) to optimize the psychoeducational process.

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Personalizing Language Learning: Maximizing Student Potential Through MBTI

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Abstract

This paper explores a strategic approach to maximizing student potential and success in language learning through insights from the Myers-Briggs Type Indicator (MBTI). By identifying individual personality types, educators can tailor learning plans to align with each student's unique preferences, enhancing their overall learning experience and outcomes. We will delve into how understanding personality types—such as Introverts, Extroverts, Intuitives, Sensors, Thinkers, Feelers, Judgers, and Perceivers—can inform the development of personalized and effective learning strategies. Attendees will be introduced to specific, actionable techniques tailored to Myers-Briggs personality types, ensuring that the learning process resonates with students' natural inclinations and strengths. The presentation will emphasize the importance of creating learning environments that cater to diverse personality types, fostering greater engagement and facilitating targeted skill development. By implementing these personalized strategies, educators can help students improve their proficiency levels more effectively, ultimately enhancing their performance in language learning. To support these strategies, we have collected data from students over the past decade (2014–2024) through surveys, integrating their MBTI profiles into their learning records. This presentation draws on action research based on these personalized learning plans, summarizing our experiences in maximizing student potential. Through empirical findings, we aim to substantiate the proposed strategies, enhancing their academic and practical value. By leveraging personality-based education, educators can optimize student learning and success, maximizing language proficiency and ensuring that each learner's journey is both engaging and productive.

Keywords: Myers-Briggs Personality Type Indicator (MBTI), second language learning, learning strategies, learning style, language acquisition

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Introduction

In exploring how personality type, as defined by the Myers-Briggs Type Indicator (MBTI), relates to the learning strategies employed by students attending foreign language courses, it becomes clear that individuals with different personality types process, retain, and respond to information in distinct ways. This divergence in cognitive processing is fundamental, as the strategies these students adopt to learn a foreign language are often shaped by their inherent personality traits. For example, students who score highly on extraversion may thrive in interactive group activities and verbal exchanges, while those with a preference for introversion may find individual reflection and quiet study environments more conducive to their learning. Similarly, students who are more sensing may prefer hands-on activities and concrete examples, while intuitive learners may excel when exploring abstract concepts and theoretical language patterns.

Understanding these varied responses and preferences provides critical insights into how language instruction can be tailored to better suit each student's strengths. When educators gain an understanding of the MBTI personality types of their students, they are able to design more customized courses and study plans. These plans can incorporate a variety of learning activities and teaching methods that align with the individual preferences and cognitive styles of different learners, ultimately making the learning process more effective. For instance, visual learners may benefit from the use of imagery, diagrams, and video materials, while auditory learners might respond better to podcasts or spoken exercises. Furthermore, by acknowledging the diversity in learning approaches, teachers can create more inclusive environments where all students feel confident and supported in their language acquisition journey.

Additionally, such personalized course design has the potential to positively impact student outcomes, particularly in terms of their performance on final tests and assessments. Students who are engaged with material that resonates with their learning style are more likely to retain information, develop proficiency in the target language, and feel motivated to succeed. By incorporating MBTI insights into the curriculum, instructors can promote an atmosphere of confidence, engagement, and academic success, helping students to reach their full potential. Ultimately, this personalized approach not only ensures that students perform better on their assessments, but it also cultivates a deeper, more meaningful connection with the language, encouraging lifelong learning and linguistic proficiency.

By gaining a deeper understanding of our students' personalities, we can better align their learning strategies with their individual tendencies, allowing us to design courses that cater specifically to the diverse needs of each learner. This alignment not only optimizes the learning experience but also ensures that students are engaged, motivated, and able to leverage their inherent strengths for success in mastering a foreign language. Every student processes information in unique ways, and by identifying these individual differences, we can fine-tune our teaching methods to be more effective, promoting better language acquisition.

Language teachers can greatly benefit from assessing their students' personalities through tools like the Myers-Briggs Type Indicator (MBTI), as it helps them match learning strategies to students' natural inclinations and preferences. This personalized approach is grounded in the understanding that students will excel when learning methods align with their cognitive and emotional tendencies. By incorporating these personality insights, teachers can create a more tailored and dynamic learning environment that speaks to the strengths of each

individual. As stated by Bousalem et al. (2025), “integrating MBTI traits into learning systems allows for the alignment of educational content with learners’ personality-driven preferences,” highlighting the importance of customizing educational content to fit how students naturally approach learning.

Background Survey

The MBTI itself is a personality model developed by Isabel Briggs Myers and her mother, Katherine Cook, building upon Carl Jung’s theory of psychological types. This model classifies individuals into 16 distinct personality types, based on preferences in four key domains. Understanding these individual preferences allows students to apply their strengths more effectively to second language learning. By using techniques and strategies that resonate with their personality types, learners can become more confident and efficient in their study habits. This tailored approach not only enhances their ability to understand and retain the language but also empowers them to take ownership of their learning journey, cultivating a deeper connection with the language and increasing their chances of long-term success. Through this understanding, we create an environment where students feel valued and supported, setting them up for success in their language learning and beyond.

Recent data accumulated over the past decade (2014-2024) reveals that the majority of students belong to three broad personality categories: STJ, SFJ, NTJ and NFJ. These personality types share common traits that significantly impact their approach to learning a foreign language. For example, Sensing (S) students focus on practical, real-world information rather than abstract concepts, and Judging (J) students prefer structured environments and clear expectations. Additionally, students with Feeling (F) traits, such as those in SFJ types, value harmony, collaboration, and empathy, while Thinking (T) students, found in STJ types, prioritize logic, efficiency, and task-oriented goals.

Table 1: Recent Data Accumulated Over the Past Decade (2014-2024)

	MBTI	# of Ss
Top1	ISTJ	39
Top2	ESTJ	27
	ISFJ	27
Top3	INTJ	11
	INFJ	10

Given that over 50% of students in foreign language courses fall under the STJ and SFJ categories, with ISTJ, ESTJ and ISFJ being the most prominent personality types within these groups, the class design will prioritize activities that align with the preferences and strengths of these two personality types. This approach aims to ensure that the majority of students feel engaged, comfortable, and successful in their learning environment.

By focusing on these two prominent personality types, instructors can create a more tailored learning experience that fosters greater success. For instance, STJ students, who tend to prefer structure and logic, may benefit from a course design that includes clear, step-by-step instructions, well-defined goals, and measurable outcomes. These students will likely excel in a learning environment where progress is tracked through assessments such as quizzes, written tasks, or structured dialogues.

On the other hand, SFJ students, who place importance on collaboration and empathy, may respond best to group-oriented activities, collaborative projects, and interactive exercises. In these scenarios, students can share insights, practice language skills with peers, and build on their natural tendency for harmony and cooperation. This type of environment will encourage SFJ learners to engage more fully with the course material and feel supported in their social learning journey.

Moreover, the design of the curriculum must also accommodate the unique characteristics of each student. For example, Sensing (S) students in the SFJ and STJ categories appreciate practical applications and concrete information, so language learning activities should emphasize real-life examples and tangible experiences. These learners will benefit from case studies, role-playing, and hands-on practice that integrate language use into everyday scenarios. In contrast, Intuition (N) students, particularly in the NTJ category, may prefer a broader exploration of language concepts, drawing connections to abstract ideas and theorizing about language use in different contexts.

The balance between providing structure (which appeals to Judging types) and allowing flexibility (which resonates with Perceiving types) can be achieved by offering a blend of planned, structured tasks alongside more open-ended activities. This balance ensures that the course caters to a diverse range of student preferences while still promoting overall language acquisition.

Technology-Enhanced Activities for ISTJ and ESTJ Learners

Structured Learning Through Interpretation and Symbolic Representation

One of our key strategies was incorporating interpretive and paraphrasing exercises to strengthen language skills. Students worked in pairs to translate or paraphrase Chinese sentences into English or explain key terms in Chinese. To enhance engagement, they also illustrated sentence meanings through drawings. These sentences were presented in multiple formats—text, audio recordings, and peer-led live readings—to accommodate various learning preferences. This activity particularly benefited ISTJ students, who preferred clear guidelines and logical task progression, and ESTJ students, who enjoyed the collaborative and results-driven aspect of the task.

At the paragraph and passage level, students engaged in symbolic representation exercises, where they read or listened to a passage, identified key themes, and selected images or symbols to represent them. The groups then used these symbols to present their interpretations. This method encouraged active processing of information, an approach supported by cognitive load theory, which emphasizes the benefits of structured, chunked learning to prevent cognitive overload (Sweller et al., 2011). ISTJ students appreciated the structured analysis and categorization process, while ESTJ students thrived in the team-based presentation aspect of the task.

Enhancing Engagement Through Social Media Integration

Social media platforms have become valuable tools for fostering student engagement and peer collaboration (Junco et al., 2011). In our project, students shared personal experiences through social media platforms such as Instagram and Facebook. This initiative encouraged students to reflect on and articulate their thoughts interactively, deepening peer connections.

ISTJ students preferred a structured, pre-planned approach to sharing, whereas ESTJ students thrived in the instantaneous and public nature of social media engagement. By incorporating social media into coursework, we provided students with opportunities for authentic communication and self-expression, reinforcing research that highlights the positive impact of digital literacy in second language learning (Blake, 2013).

Critical Thinking and Creativity With RAFT Writing

A RAFT (Role, Audience, Format, Topic) writing project was another impactful activity. RAFT assignments encourage students to explore different perspectives and writing formats, enhancing their critical thinking and creativity (Santa et al., 2004). Students began by brainstorming various roles, audiences, formats, and topics, writing them on digital slides for discussion. They then crafted their own RAFT writing pieces, selecting strong verbs and engaging in real-world applications of language.

One assignment involved the Chinese idiom story "It Is Never Too Late to Mend," which has a British proverb equivalent. After learning the story, students brainstormed and created diverse RAFT responses, including:

- A community email from a neighbor warning about the wolf.
- A safety booklet written from a sheep's perspective.
- A journal entry by the shepherd reflecting on his mistake.

This activity reinforced higher-order thinking skills, as students had to synthesize prior knowledge, analyze perspectives, and creatively express their interpretations. ISTJ students appreciated the structured approach, while ESTJ students enjoyed the real-world application and leadership opportunities the project provided. Research on authentic writing tasks suggests that such projects increase student motivation and engagement by making learning personally meaningful (Duke et al., 2006).

While the course design primarily centers on the most common MBTI personality types in our dataset—namely STJ and SFJ types—our classroom experiences have also included students from other personality categories. Notably, INTJ learners, though less prevalent, have demonstrated distinct learning needs and behaviors that offer valuable insights for instructional adaptation. The following case studies highlight personalized strategies developed to support these less frequent but equally important personality types, further reinforcing the value of personality-informed teaching.

Case Study

The following section presents three case studies, each focusing on tailored strategies that have proven effective in supporting ISTJ, INTJ, and ISFJ students in their language learning. These strategies are designed to align with the unique strengths and preferences of each personality type, helping to enhance their success in learning a new language.

The first personality type is the ISTJ, also known as the Logistician. ISTJs are known for their reliability, sense of responsibility, and keen attention to detail. They thrive in environments characterized by structure and order, making them particularly effective when clear instructions and well-defined goals are present. However, ISTJs often face challenges with unstructured approaches, especially in dynamic learning contexts. As a result, they often find activities like listening and speaking exercises uncomfortable, as these tasks require

quick thinking. They tend to feel more confident when they have had the time to prepare and organize their thoughts in advance. To support ISTJ students in their language learning journey, one strategy I use is reminding them of the powerful tool of organization. Asking them to create hourly schedules of their daily activities helps them gain insight into how they allocate their time, allowing for more conscious time management. By reviewing these schedules together and pointing out areas for improvement, you will best help them. A common weakness of ISTJs is their tendency to study for long, uninterrupted periods without taking breaks, which can lead to burnout and decreased productivity. To address this, I recommended the Pomodoro technique (Cirillo, 2018) to ISTJs, so they understand the importance of breaking their study sessions into smaller intervals and incorporating regular breaks to improve effectiveness. In addition, suggesting that ISTJs join a study group can help provide the structure they need while promoting active learning through peer interaction. Encouraging ISTJ students to step outside their comfort zones, such as by teaching others, can also be an effective strategy. This not only boosts their confidence but also deepens their understanding of the target language.

The next personality type is the INTJ, also known as the Architect. INTJ students are known for their creativity and strong problem-solving abilities. With a strong work ethic and a deep thirst for knowledge, INTJs often excel as independent learners. INTJs tend to do well in language learning, especially in areas like reading and grammar, where logic and structure play an important role. They enjoy mastering systems and abstract concepts, which gives them an advantage in understanding the intricacies of a new language. Their ability to focus on underlying patterns enables them to excel in these areas of study. However, INTJs may encounter similar challenges to ISTJ types when it comes to flexibility and spontaneity. Activities such as speaking in a second language can be uncomfortable, for them they prefer more structured and thoughtful exchanges. Additionally, they may struggle to express emotions or connect on a personal level, which can make language learning seem less engaging and meaningful. To align with their strengths in creativity and strategic thinking, I gave an INTJ student an assignment to create a monologue based on his passions. For example, in one lesson, we learned about a reporter traveling to Tibet to visit an ethnic group and acquired new vocabulary, including words like “mine,” “iron,” “ranch,” “wildlife,” “diamond,” and “sheep.” The student was then challenged to create a monologue incorporating these words. Initially, he was uncertain about how to use them, but after some guidance and a discussion of his personal interests, he developed a monologue set in his favorite game, Minecraft. This type of assignment, where language is applied in a creative and personal context, serves as a powerful motivator for INTJs. It ignites the INTJ student's desire to continue learning and using the language in ways that feel both meaningful and authentic.

Finally, the ISFJ personality type, also known as the Defender, is quite protective and supportive—not only toward others but also regarding their own learning. In the classroom, this shows as a strong commitment to their work and a genuine desire to help their peers. ISFJs tend to approach learning in a meticulous, detail-oriented manner, which serves them well in areas such as writing, listening, and speaking. However, ISFJs often strive to get things “just right,” which can lead to overthinking, particularly when speaking or writing in the target language. They may second-guess themselves frequently. If they feel they are not performing perfectly, it can be a source of frustration. Additionally, ISFJs thrive on routine and familiarity. If a language learning approach feels too unpredictable or disorganized, they may struggle to adapt. From experience, ISFJ students tend to excel when they feel genuinely supported. They need to know that their progress matters and that their efforts are recognized.

A little encouragement can go a long way for ISFJs—they respond especially well to praise and positive reinforcement. Small gestures such as high fives and taking a moment to recognize them can significantly boost their morale. One student stands out in my memory. Initially, he was disinterested in learning and ready to quit. He proved to be a challenge for every teacher, but once I started providing personalized attention—designing tailored homework assignments specifically for him and sharing Chinese songs that I knew he enjoyed singing—he began to slowly open up. When he sensed that his teachers genuinely cared about his success, his attitude shifted. He became more engaged, and over time, his grades improved. This experience reinforced the importance of showing that teachers care and providing extra support, as it can make a significant difference for ISFJ students.

Conclusion

In conclusion, this research has highlighted the significant role that Myers-Briggs personality insights can play in enhancing language learning. By recognizing and embracing the diverse personality types, educators can tailor their teaching approaches, making language learning more effective and engaging. The case study suggests that a personalized approach, based on an understanding of individual personality traits, can lead to improved outcomes in language acquisition. By carefully aligning teaching strategies with personality-driven preferences, we can optimize the language learning experience and ensure that each student reaches their full potential in mastering a foreign language.

This study has demonstrated that understanding MBTI personality traits can significantly enrich language learning experiences. By tailoring instruction to fit the cognitive and emotional preferences of different personality types—such as ISTJ, ESTJ, INTJ, and ISFJ—educators can better meet students' individual needs. These case studies affirm that even less represented types can benefit from thoughtful, customized approaches. Ultimately, integrating personality-based strategies not only fosters improved language acquisition outcomes but also promotes a more inclusive and responsive learning environment.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

This manuscript was refined with the assistance of AI-based language generation and editing tools, specifically ChatGPT. The AI was used to enhance clarity, coherence, and structure in support of the discussion.

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The Connection Between Mental Health and Well-being Among Polytechnic Students in Malaysia

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Abstract

The mental health and well-being of polytechnic students in Malaysia are essential determinants of their academic performance, personal growth, and future career prospects. This study examines the complex relationship between mental health and well-being within this demographic, emphasizing the prevalence of mental health challenges and their impacts on students' quality of life and academic outcomes. Using a mixed-methods approach, the research incorporates quantitative data from a survey of 300 polytechnic students, selected through stratified sampling, along with qualitative insights from semi-structured interviews with a subset of 20 students. Findings reveal a significant correlation between mental health and well-being, showing that high stress and anxiety levels adversely affect students' overall quality of life and academic success. Additionally, while some students benefit from supportive networks and available institutional resources, many face barriers to accessing mental health support, including stigma, limited awareness, and insufficient services. This research underscores the importance of destigmatizing mental health support, promoting awareness, and enhancing access to resources within polytechnic institutions. Future research is recommended to explore targeted interventions and develop sustainable strategies for maintaining and enhancing mental health and well-being in this educational context.

Keywords: mental health, well-being, academic achievement

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Introduction

The increasing prevalence of mental health issues among students globally has drawn significant attention from researchers and policymakers alike. In Malaysia, the situation is particularly alarming among polytechnic students who face unique academic pressures that can adversely affect their mental health.

Background of the Study

Mental health is a critical aspect of overall well-being that influences various life domains, including education, social interactions, and career development. The Malaysian context presents specific challenges as cultural stigmas surrounding mental health often hinder students from seeking help (Kumar & Kaur, 2020). These stigmas are particularly pronounced among youth, including polytechnic students, who are navigating the transition from adolescence to adulthood. This period is marked by increased academic pressures, social adjustments, and the need to meet familial expectations, all of which can exacerbate mental health concerns.

In the polytechnic setting, students often face additional stressors such as adapting to technical coursework and preparing for industry demands. Research indicates that a significant proportion of Malaysian polytechnic students experience symptoms of anxiety, depression, and stress, which can impair academic performance and disrupt daily life (Yusoff et al., 2021). Despite these challenges, institutional support systems remain underutilized due to limited awareness and accessibility. This study aims to explore the connection between mental health and well-being among Malaysian polytechnic students, shedding light on their unique struggles and identifying strategies to foster a supportive educational environment.

Objective

The primary objectives of this study are:

- a) To investigate the prevalence of mental health challenges among polytechnic students.
- b) To examine the relationship between mental health and academic performance.
- c) To identify barriers to accessing mental health resources.

Significance of the Study

This study is significant as it addresses a gap in the existing literature regarding polytechnic students in Malaysia, a demographic often overlooked in mental health research. Understanding their unique challenges can inform policy changes and improve support systems.

For students, this study highlights the importance of mental health awareness and its role in enhancing academic performance, personal development, and overall well-being. By shedding light on common mental health issues and their impact, it aims to empower students with knowledge and encourage them to seek help when needed. This can lead to improved coping mechanisms and better outcomes in both their studies and personal lives.

For institutions, the findings can guide the development of more targeted and effective mental health programs. By identifying specific stressors and challenges faced by polytechnic

students, institutions can implement proactive measures such as counseling services, peer support groups, and stress management workshops. These initiatives can foster a supportive educational environment, reduce dropout rates, and enhance student satisfaction.

For the industry, this study underscores the importance of preparing mentally resilient graduates who can thrive in demanding professional settings. By understanding the mental health challenges faced by polytechnic students, industries can collaborate with educational institutions to support student well-being and ensure that future employees possess not only technical skills but also the emotional stability required for long-term success in the workforce.

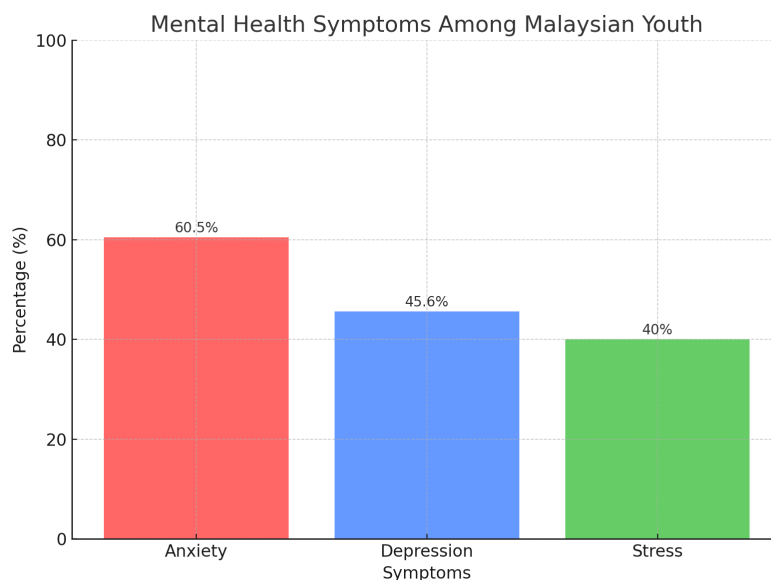
Literature Review

This section reviews existing literature on mental health issues among polytechnic students in Malaysia, focusing on factors such as academic stress, financial pressures, social relationships, and access to support services.

Mental Health Challenges

Research indicates that a significant proportion of Malaysian youth experience mental health issues such as anxiety and depression (Kumar & Kaur, 2020). A nationwide study found that approximately 45.6% of participants reported depressive symptoms, while 60.5% experienced anxiety symptoms (National Health & Morbidity Survey, 2021). The transition to higher education often exacerbates these challenges due to increased academic demands.

Figure 1: Prevalence of Mental Health Issues Among Malaysian Youth



Note: A bar graph showing the percentage of Malaysian youth experiencing anxiety (60.5%), depression (45.6%), and stress (40%).

Impact on Academic Performance

Studies have consistently shown that poor mental health negatively impacts academic performance (Mahmud et al., 2021). Students experiencing high levels of stress are more likely to have lower grades and higher dropout rates. A recent survey indicated that 35% of

college freshmen report symptoms consistent with diagnosable mental health disorders (Donaldson et al., 2023).

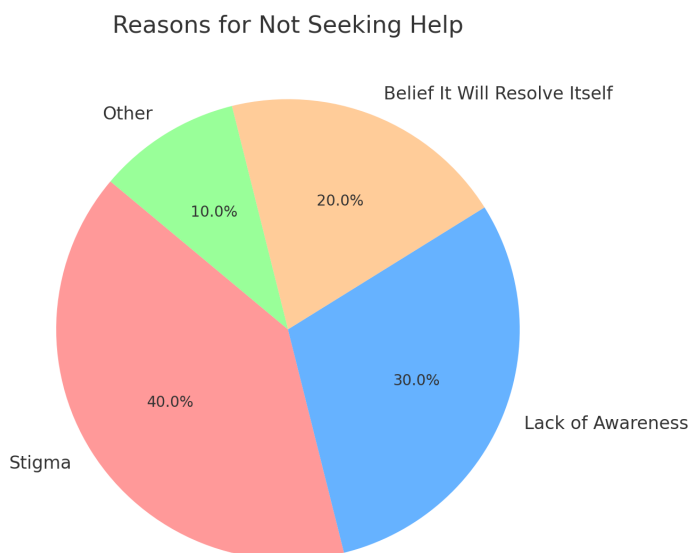
Table 1: Correlation Between Mental Health Symptoms and Academic Performance

Mental Health Issue	Correlation with GPA
Anxiety	-0.65
Depression	-0.58
Stress	-0.70

Barriers to Support

Despite the availability of support services in educational institutions, many students do not utilize them due to stigma or lack of awareness (Lee et al., 2019). Understanding these barriers is crucial for developing effective interventions.

Figure 2: Reasons for Not Seeking Help Among Students



Note: A pie chart illustrating reasons for not seeking help: stigma (40%), lack of awareness (30%), belief that it will resolve itself (20%), other (10%).

Methodology

A mixed-methods approach was employed to gather comprehensive data on the mental health status of polytechnic students.

Participants

A total of 300 polytechnic students were surveyed using stratified sampling methods to ensure representation across different demographics (gender, age groups, year of study).

Data Collection

Quantitative data were collected through self-administered questionnaires assessing various aspects of mental health and well-being (see Appendix A). The questionnaire included

standardized scales such as the Generalized Anxiety Disorder-7 (GAD-7) for anxiety assessment and the Patient Health Questionnaire-9 (PHQ-9) for depression assessment.

The Generalized Anxiety Disorder-7 (GAD-7) and the Patient Health Questionnaire-9 (PHQ-9) are widely used standardized scales designed to assess symptoms of anxiety and depression, respectively. Both tools are validated for use in diverse populations, including Malaysia, making them suitable for understanding mental health challenges in a local context.

The GAD-7 is a seven-item self-reported questionnaire developed to screen and measure the severity of generalized anxiety disorder. Each item assesses symptoms such as excessive worry, restlessness, and difficulty concentrating over the previous two weeks. Respondents rate the frequency of these symptoms on a scale from 0 (not at all) to 3 (nearly every day), yielding a total score ranging from 0 to 21. Scores categorize anxiety levels as mild, moderate, or severe. In the Malaysian context, studies have demonstrated the reliability of the GAD-7 in identifying anxiety among students, with cultural sensitivity in interpreting the results. Factors such as academic pressure, familial expectations, and financial constraints are frequently linked to heightened anxiety among Malaysian polytechnic students.

The PHQ-9 is a nine-item self-administered tool for screening and diagnosing the severity of depression. It evaluates symptoms such as loss of interest, fatigue, changes in appetite, and suicidal thoughts, based on their frequency over the past two weeks. Each item is rated from 0 (not at all) to 3 (nearly every day), producing a total score between 0 and 27. Scores categorize depression levels as minimal, mild, moderate, or severe. In Malaysia, the PHQ-9 is commonly used in research and clinical settings to understand depression trends, including among youth. Its relevance lies in capturing how cultural factors, such as stigma and collectivist values, impact the experience and reporting of depressive symptoms.

Both scales provide robust, quantifiable data on mental health, facilitating cross-cultural comparisons while accommodating Malaysia's multicultural society. Their simplicity and brevity make them ideal for self-administration in academic settings, where large-scale mental health assessments are necessary. By applying these tools, this study aims to highlight the prevalence of anxiety and depression among Malaysian polytechnic students and to inform culturally appropriate interventions to address these mental health concerns.

Qualitative Data Collection

Qualitative data were gathered through semi-structured interviews with a subset of 20 participants. These participants were carefully selected using purposive sampling to ensure a diverse representation of demographics, including age, gender, and socio-economic backgrounds. The interviews focused on exploring participants' lived experiences, perceptions, and coping mechanisms concerning mental health challenges.

Each interview lasted approximately 45 to 60 minutes and was conducted either face-to-face or via video conferencing platforms, depending on the participants' preferences and availability. The interview questions were designed to be open-ended to allow participants to share their narratives freely, fostering a deeper understanding of their unique experiences.

To maintain data reliability, all interviews were audio-recorded with participants' consent and subsequently transcribed verbatim for analysis. Field notes were also taken to capture non-

verbal cues and contextual details. These qualitative insights were used to complement the quantitative data from surveys, providing a richer, more comprehensive understanding of the topic.

Data Analysis

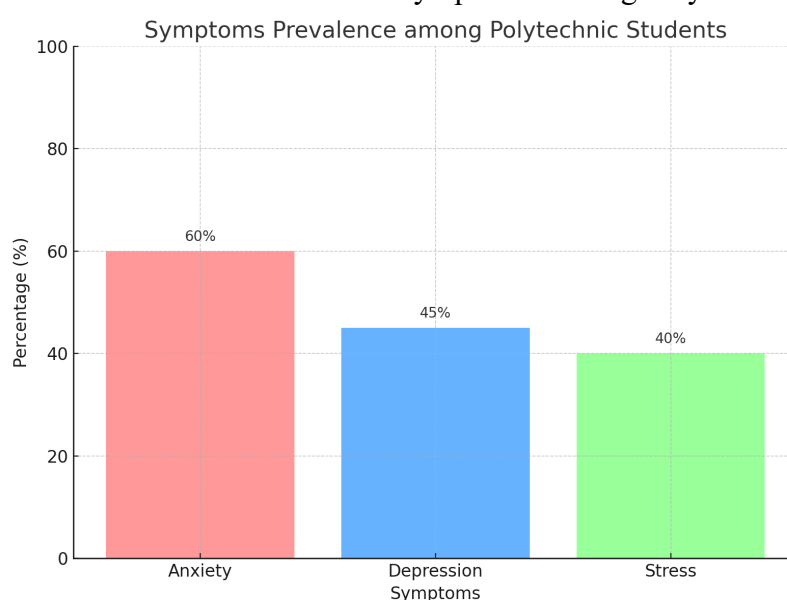
Quantitative data were analyzed using statistical software (SPSS) to determine correlations between variables. Qualitative data were analyzed thematically to identify common themes related to mental health experiences.

Findings

Quantitative Findings

The survey results indicated that approximately 40% of participants reported experiencing symptoms consistent with anxiety or depression (Figure 3). A significant correlation was found between high stress levels and poor academic performance ($r = -0.65$, $p < .01$).

Figure 3: Prevalence of Mental Health Symptoms Among Polytechnic Students



Note: A stacked bar chart displaying percentages for anxiety symptoms (60%), depression symptoms (45%), and stress symptoms (40%).

The quantitative analysis revealed the following key points:

- **Prevalence of Mental Health Symptoms:** Approximately 40% of participants reported symptoms consistent with anxiety or depression.
- **Correlations:** A strong negative correlation was identified between high stress levels and academic performance ($r = -0.65$, $p < .01$), indicating that increased stress adversely impacts students' academic success.

Qualitative Findings

Interviews revealed that many students felt overwhelmed by academic pressures and financial stressors. Participants highlighted the importance of social support but also noted barriers such as stigma when seeking help.

Table 2: Themes From Qualitative Interviews

Theme	Description
Academic Pressure	High expectations leading to stress
Financial Stress	Concerns about tuition fees and living expenses
Social Support	Importance of friends and family for emotional support
Stigma	Reluctance to seek help due to fear of judgment

The interviews underscored the complex interplay between academic and financial pressures, social support systems, and the cultural stigma surrounding mental health. Participants often expressed a desire for greater mental health awareness and resources within their academic institutions.

Integration of Quantitative and Qualitative Findings

The integration of quantitative survey results with qualitative interview insights provides a comprehensive understanding of the mental health landscape among polytechnic students in Malaysia.

Quantitative and qualitative data collectively demonstrate that mental health challenges are prevalent among polytechnic students. While statistical analysis quantified the impact of stress on academic performance, thematic insights revealed deeper personal and systemic barriers to mental health, such as stigma and financial concerns. Both datasets point to the urgent need for targeted interventions that address academic expectations, financial burdens, and mental health stigma.

Discussion

Implications for Policy

To enhance student well-being, educational institutions must prioritize implementing policies that actively promote mental health awareness and ensure accessible support services. One critical step involves providing training programs for faculty and staff to help them recognize signs of distress among students and respond effectively. Faculty members, as primary points of contact for students, can play a pivotal role in creating a supportive environment when equipped with the necessary skills and knowledge.

Additionally, institutions should invest in awareness campaigns designed to reduce stigma surrounding mental health issues. These campaigns could include workshops, seminars, and social media initiatives that educate students about the importance of seeking help and foster an inclusive culture where discussing mental health is normalized.

Furthermore, the allocation of additional resources toward counseling services within polytechnics is essential. Increasing the availability of trained mental health professionals, ensuring confidentiality, and reducing wait times for appointments are crucial measures that can encourage more students to seek support. By prioritizing these initiatives, educational institutions can create an environment where students feel supported, enabling them to thrive academically and emotionally.

Recommendations for Future Research

Future studies should focus on interventions specifically designed to reduce the stigma associated with mental health issues among students. Longitudinal research examining changes in student mental health over time could provide insights into evolving needs and inform policy adjustments. Additionally, exploring the impact of peer support programs on student well-being would offer valuable data on the effectiveness of peer-led initiatives. Comparative studies between different educational settings, such as universities and polytechnics, could also shed light on context-specific challenges and solutions, enhancing overall student support systems.

Conclusion

This research highlights the urgent need for improved mental health support systems within polytechnic institutions in Malaysia. Addressing these challenges is vital for fostering a healthier student population capable of achieving their full potential academically and personally.

Acknowledgement

First and foremost, I dedicate this research to the loving memory of my late father, whose wisdom, sacrifices, and unwavering belief in me continue to inspire and guide me every day. Although he is no longer with me, his values and dreams for my success have been a constant source of strength throughout this journey. I extend my deepest gratitude to my beloved mother, whose unwavering love, guidance, and encouragement have been the cornerstone of my journey. To my family, thank you for your support and belief in my dreams, which has fueled my perseverance and determination to achieve this milestone.

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The Effect of Directed Reading Thinking Activity (DRTA) Learning Model on Students' Reading Comprehension Ability

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Abstract

Reading and comprehension remain challenging for primary school students. A fifth-grade teacher at SDN Purwadadi 1 noted low enthusiasm for reading and limited vocabulary among students, affecting their understanding of texts. This study aims to evaluate the effect of the Directed Reading Thinking Activity (DRTA) model on students' reading and comprehension ability. Using a quantitative approach with a Non-Equivalent (pre-test and post-test) control group design, the study involved 43 fifth-grade students—22 in the experimental group and 21 in the control group, selected through purposive sampling. Data were analyzed using an independent sample t-test, yielding a Sig (2-tailed) value of 0.016 (< 0.05), indicating a significant difference between the groups. The t-count was -8.074 with a significance level of < 0.001 , confirming the positive impact of the DRTA model. N-Gain scores showed improvement in both groups, with the experimental group scoring 0.5146 and the control group 0.3782, both in the medium category, but with higher gains in the DRTA group. These results suggest that the DRTA model is effective in improving reading and comprehension skills and can serve as a reference for instructional strategies tailored to students' needs.

Keywords: reading comprehension, DRTA, elementary school

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Introduction

Education is an activity designed to transfer knowledge, skills, and values to individuals, with the expectation that education can provide encouragement to individuals to provide benefits to society. According to Ki Hajar Dewantara, "Education is a demand in the life of growing children." The purpose of education is to optimise all the potential possessed by children, so that they, as humans and members of society, can achieve the highest possible safety and happiness (Pristiwanti et al., 2022). Furthermore, education is a tool for holistic individual growth, promoting social inclusion and building the foundation for sustainable development (Sriatun et al., 2024). Not only that, education is a process that facilitates learning, or the acquisition of knowledge, skills, values, morals, beliefs, and habits through various methods, such as teaching, training, storytelling, discussion, and directed research (Aly, 2023). It can be concluded that education is a process that seeks to optimise all abilities possessed by individuals, with the aim of developing and facilitating human life in society.

Education and learning are two things that cannot be separated, because the activity of transferring knowledge is called learning. Learning can be interpreted as a process of interaction between teachers and students in achieving predetermined goals. Furthermore, the learning process involves cognitive development, logical reasoning, emotional intelligence, and motivation. Learning will be more effective if it is supported by internal encouragement, expected value theory, and clear goal setting (Mas'ud, 2023). Furthermore, children aged 8 to 10 years old show a deep understanding of learning as a process (Sobel & Letourneau, 2015). Learning is an important element in the educational process. A well-designed learning design, focusing on students' needs, interests and learning styles, will support the achievement of educational goals (Alwis et al., 2024). It can be concluded that learning is a process that occurs between teachers and students, where there is a transfer of knowledge, transfer of understanding, and the process of receiving various information. In this context, both parties collaborate with each other to achieve learning goals.

In primary schools, there are various lessons or materials delivered to students, one of which is Indonesian language learning. There are four basic skills taught in Indonesian, namely reading, writing, listening and speaking. The purpose of this learning is for students to be able to speak well, have an understanding of vocabulary, grammar, and effective communication skills. Indonesian language learning in primary schools focuses on developing listening, speaking, reading and writing skills, which are essential for students' social and academic development (Porwokerto & Maritim, 2023). Furthermore, primary school teachers face challenges in teaching Indonesian. However, by ensuring adequate resources, aligning the curriculum, designing materials based on students' characteristics, and creating a positive learning environment, these challenges can be significantly overcome (Sukma et al., 2023). Therefore, teachers have a very important role in education, especially in Indonesian language learning.

One of the main tasks in the teaching profession is training. The education and learning process requires skill training, both intellectual and motor skills (Yestiani & Zahwa, 2020). In this context, teachers act as trainers who are tasked with developing these various skills, including reading skills in students. Reading skills are very important in education, because good reading skills allow a person to obtain extensive information and various experiences. This, in turn, will enrich the reader's vocabulary (Rinawati et al., 2020). Reading is a process of interaction between the reader and the text, in which the reader uses and processes the information conveyed by the author through writing (Fitriyani & Utama, 2019). Reading is a

thinking process that includes understanding, telling, and interpreting the meaning of written symbols. This process involves the senses of sight, eye movement, mental speech, and memory (Harianto, 2020). Therefore, reading is not just looking at a bunch of letters that form syllables, groups of words, sentences, and paragraphs.

In reading learning activities, there is what is referred to as reading comprehension skills. Reading comprehension is the process in which a person understands reading to recognise, understand, and at the same time store the information contained in reading material (Alpian & Yatri, 2022). A simplistic view of reading explains variations in reading comprehension and helps classify reading disorders. Weaknesses in decoding and linguistic comprehension contribute to reading comprehension difficulties experienced by children (Nation, 2019). Furthermore, improving reading comprehension requires collaborative efforts between researchers, educators and policymakers. The main focus of this collaboration is on developing background knowledge, vocabulary, inference, and comprehension monitoring skills throughout the development process (Elleman & Oslund, 2019). In simple terms, reading comprehension is a process carried out to obtain the right information from the reading that has been read. It can be concluded that reading comprehension involves a complex and interactive cognitive process, which includes language comprehension, word recognition, background knowledge, vocabulary, inference, and comprehension monitoring.

This ability is still lacking in elementary school students, due to students' low interest in reading, which greatly affects their reading comprehension skills (Halawa, 2020). The reading literacy index released by the Ministry of Education and Culture shows that the index value is only 37.32%, which is included in the low category (Permatasari et al., 2022). In addition, Indonesia still has a fairly low value, especially from the reading index parameter itself. This problem has been going on for a long time and has not shown significant improvement during that period (Huda & Firman, 2024). Meanwhile, according to the International Survey Institute, Indonesia's average reading literacy score only reached 358, which is far below the OECD average of 476. In addition, only around 25% of Indonesian students reach the minimum proficiency level (Level 2) in reading, compared to the OECD average of 77% (OECD, 2023). In line with the results of interviews with grade V teachers at SDN Purwadadi 1, who stated that students' interest in reading is still lacking and needs to be continuously improved, limited vocabulary understanding also causes students difficulty in understanding reading. In addition, teachers are still looking for solutions in choosing the right learning model that can improve students' reading comprehension skills.

Choosing a learning model that suits students' interests and abilities can improve their reading skills. In learning activities, there is a model or strategy known as Direct Reading Thinking Activity (DRTA). The Direct Reading Thinking Activity (DRTA) learning model is a comprehension activity that involves story prediction, with the aim of helping students get an overall picture of the material read (Nyoman Ganing et al., 2023). This Direct Reading Thinking Activity (DRTA) model guides students in learning activities that start from reading, making predictions, re-reading, and confirming the predictions that have been made (Ayu Pratiwi et al., 2023). This activity stimulates students to think critically and make predictions by looking at the images and reading presented, with the aim of understanding the content of the reading. The stages in reading skills using the Direct Reading Thinking Activity (DRTA) learning model are as follows: (1) pointing and reading the reading text starting from the illustration (the introductory part of the reading), (2) students read the reading text with the help of the teacher for those who have difficulty in understanding the words, (3) the teacher assigns students to summarise the reading, (4) the proof is carried out according to the final

choice, and (5) students summarise the entire content of the story and arrange the rounds in order (Debyo et al., 2018).

Some of the advantages of the Direct Reading Thinking Activity (DRTA) model that can affect students' reading comprehension skills include: (1) actively involving students in reading activities and predicting reading content, (2) encouraging students to think critically, and (3) involving learning media that can help comprehension (Astri, 2019). In line with that, the results of research (Fadil et al., 2024) state that the Direct Reading Thinking Activity (DRTA) technique has a significant positive impact on students' reading comprehension skills. In addition, the application of Directed Reading Thinking Activity (DRTA) can improve students' reading comprehension and critical thinking skills by making the learning process more interactive and active (Anaktototy & Lesnussa, 2022).

Based on the three previous research results mentioned, it can be concluded that the Direct Reading Thinking Activity (DRTA) learning model can improve students' reading comprehension skills. Therefore, in this study, researchers will examine how far and effective the DRTA model is if applied in learning, especially for elementary school students in Indonesian language subjects. The researcher will conduct research in class V of SDN Purwadadi 1 with the aim to see the average reading comprehension ability of students who get learning using the DRTA model compared to students who follow conventional learning. This research also aims to analyse the effect of DRTA learning model and the improvement obtained by applying the model in learning. Therefore, this research is important to do in order to provide new references in Indonesian language learning, especially in looking at students' reading comprehension skills in elementary schools

Method

This study used a quantitative research design with an experimental research type, which adopted a *"Non-equivalent (pre-test post-test) control group design."* In this case, the control and experimental groups were not randomly selected. This design involves administering a pre-test to determine initial ability as well as to identify whether there is a difference between the experimental and control groups.

This research went through several stages, starting from the preparation stage, the implementation stage, to the final stage of the research. Based on the results of interviews with the fifth grade teacher of SDN Purwadadi 1, it is known that the placement of students in classes A and B is not based on high or low ability, which means that in this school there are no superior classes with the same ability. These population characteristics caused the researcher to take samples using purposive sampling technique, where the sample used is available, in the sense that the researcher does not group randomly (Rubin & Babbie, 2007). Thus, the sample selection was determined by the school in order to avoid chaos in the schedule.

Therefore, class A was taken as the experimental class and class B as the control class, with data collection using tests. The test used is an essay test which aims to measure students' reading comprehension skills.

The results of the research data analysis include descriptive statistical analysis and inferential analysis. Descriptive statistics are statistics used to analyse data by describing the data that has been collected in order to draw conclusions (Sugiyono, 2023).

Descriptive analysis technique used in this study was applied to determine the reading comprehension ability of students who used Direct Reading Thinking Activity (DRTA) learning model as well as the reading comprehension ability of students who used conventional learning model. This descriptive statistic was used on reading comprehension ability data in experimental and control classes, which was presented to determine the average value (mean), the most frequently occurring value or the value with the highest frequency (mode), the middle value (median), standard deviation, and variance.

Inferential statistical analysis is a statistical technique used to analyse sample data, where the results can be applied to the population. This technique involves processing data using inferential statistical formulas to test the research hypothesis presented, and drawing conclusions based on these tests. This process is carried out to test the hypothesis using the t-test, after first conducting prerequisite tests such as normality and homogeneity tests.

Result and Discussion

The research was conducted in class V, consisting of an experimental class of 22 students who received the Direct Reading Thinking Activity (DRTA) learning model treatment and a control class of 21 students who received conventional learning. The following table presents the results of descriptive statistical tests on students' reading comprehension post-test data:

Table 1: Descriptive Statistics

Calculation Type		Group	
		DRTA	Conventional
A lot of data		22	21
Post- Test	Mean	76.50	64.00
	Std. Deviation	15.626	17.146
	Minimum	51	26
	Maximum	97	94

Based on Table 1 which shows the descriptive statistics of post-test results, there is a difference in the average acquisition of reading comprehension skills between experimental class students who received Direct Reading Thinking Activity (DRTA) learning and control class students who received conventional learning. This can be seen from the average gain of the experimental class, which is 76.50, while the average gain of the control class is 64.00.

The normality test in this study used the Shapiro-Wilk method. The sample used totalled 43 students. The results of the normality test can be seen in the following table.

Table 2: Normality Test Results

Group	Shapiro-Wilk			Description
	Statistics	Df	Sig.	
Experiment	0.920	22	0.76	H ₀ accepted
Control	0.914	21	0.67	H ₀ accepted

Based on Table 2, it can be seen that the normality test resulted in a significance value (sig.) of 0.076, which is greater than $\alpha = 0.05$ or 5%. Thus, H₀ is accepted, which means that the students' reading comprehension data is normally distributed. Based on the results of the normality test which showed that the data were normally distributed, the homogeneity test was then conducted.

The homogeneity test in this study used the F-test (Levene's Test). The results of the homogeneity test can be seen in the following table.

Table 3: Homogeneity Test Results				
	Levene Statistic	df1	df2	Sig.
Base On Mean	1.732	1	41	.195

By Hypothesis:

H_0 : The variance between groups is the same (homogeneous)

H_1 : Variances between groups are not equal (not homogeneous)

It can be concluded that the homogeneity test using Levene's Test resulted in a significance value (sig.) of 0.195, which is greater than $\alpha = 0.05$. Thus, H_0 is accepted, and it can be concluded that the variance between groups is the same (the variance between groups is homogeneous).

The normality and homogeneity tests showed that the data came from a normally distributed and homogeneous population. Therefore, the mean difference test was conducted using t-test, namely independent sample t-test, to observe the mean difference of students' reading comprehension ability. The hypotheses of the students' reading comprehension test in the experimental group and control group are as follows:

H_0 : There is no significant difference between the means of students' reading comprehension ability in the experimental class and the control class.

H_1 : There is a significant difference between the means of students' reading comprehension ability in the experimental class and the control class.

The results of the t-test of students' reading comprehension in the experimental class and control class are as follows:

Table 4: Student Reading Comprehension t-Test Results		
Testing	Df	Two-Sided Sig. p
Equal variances assumed	41	.016

Based on the results of the independent sample t-test, the Sig. (Two-Sided P) of 0.016, which is smaller than $\alpha = 0.05$ (5%). Thus, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. Therefore, it can be concluded that there is a significant difference between the average reading comprehension ability of students in the experimental group and the control group.

The paired sample t-test results show that the average score of students' reading comprehension ability in the pre-test is 53.00, while in the post-test is 76.50. The standard deviation and variance values are both more than zero, which indicates that the data has variation. The Two-Sided p significance value is < 0.001 , which is smaller than $\alpha = 0.05$ (5%). Therefore, it can be concluded that there is a significant improvement in performance between the pre-test score and the post-test score.

Furthermore, based on the results of the paired sample t-test, the t-count value for the experimental class using the DRTA model is -8.074 with a significance value of < 0.001 , which is smaller than $\alpha = 0.05$. Thus, the null hypothesis (H_0) is rejected, and it can be concluded that learning with the DRTA model has a significant effect on students' reading comprehension ability. In addition, the Cohen's d value of -1.723 indicates that the effect of DRTA model on students' reading comprehension ability is very large.

Based on the results of the paired sample t-test analysis, it can be concluded that there is an improvement in performance between the pre-test and post-test, with higher scores in the post-test. In addition, there is a significant correlation between the pre-test score and the post-test score. Learning in the experimental class using the DRTA model influenced and had a significant effect on the acquisition of students' reading comprehension skills.

Based on the results of descriptive statistical analysis of N-Gain, the average increase in students' reading comprehension ability was obtained in the moderate category. This can be seen from the average N-Gain in the experimental class using the DRTA model, which is 0.5146, while the average N-Gain in the experimental class with conventional learning is 0.3782, which is also in the moderate category. Thus, it can be concluded that the criteria for improving the reading comprehension ability of students who follow the DRTA learning model and students in the control class who use conventional learning are in the moderate category.

In the learning activity, the teacher conveys the title of the reading passage to be learnt. Next, students are asked to guess what the content of the reading passage is and how the storyline is presented, with the help of the initial picture displayed on the board. This activity is a way for the teacher to stimulate and not limit students' thinking abilities. The teacher also starts asking questions to elicit students' predictions about the content of the reading. The purpose of using this model is to help students more easily understand the reading presented, with the first step of predicting the content of the reading through pictures before reading activities. At this stage, students are expected to concentrate more on finding further information and proving their predictions through reading activities that can be done repeatedly. In addition, students can also assess their predictions by discussing with friends and teachers.

Learning that uses the DRTA model positions the teacher as a facilitator who provides space for discussion, provides motivation and reinforcement of students through questions that provoke student thinking activities. This learning is certainly student-centred teachers can motivate students' effort and concentration by engaging them intellectually and encouraging them to formulate questions and hypotheses, process information, and evaluate temporary solutions (Amin & Sumendap, 2022). Teacher motivation is very important and very influential in improving students' abilities. This is in line with the opinion of (Apriliyani et al., 2023) which states that the role of the teacher is very important to be a facilitator and motivator for students who make efforts by providing additional tutoring, arranging the seating of students, and providing motivation to learn to read to students.

The results of this study strengthen the statement made by Hidayana et al. (2021) which states that the DRTA model has a significant effect on reading comprehension skills in fourth grade students of SD Negeri 11 Limboto. Research conducted by Putri (2023) stated that Directed Reading Thinking Activity (DRTA) learning assisted by picture media had an effect on the reading comprehension ability of grade V elementary school students. Thus, it can be

concluded that the DRTA learning model affects the reading comprehension ability of fifth grade students of Purwadadi 1 Elementary School in Subang Regency.

Conclusion

Based on the results of the study, it can be concluded that there is a significant difference between students' reading comprehension ability in the experimental class that learns with the DRTA (Direct Reading Thinking Activity) model and the control class that uses conventional learning. The average reading comprehension ability of students in the experimental class is 76.50, which is higher than the control class which has an average of 64.00. The results of the independent sample t-test showed a significance value of 0.016 (< 0.05), which means that the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. This proves that the DRTA learning model is more effective in improving reading comprehension skills compared to the conventional method.

The results of *paired sample t-test* in the experimental class showed a t-count value of -8.074 with a significance level of < 0.001 (< 0.05), which indicated that there was a significant effect of learning with the DRTA model on improving students' reading comprehension skills. In addition, from the N-Gain analysis, it is known that the average improvement of students' reading comprehension ability in the experimental class is 0.5146, while in the control class is 0.3782. Although both are in the medium category, learning with the DRTA model produces a higher improvement than the conventional method.

This study has some limitations, namely that it was only conducted at one grade level and involved a limited number of samples, so the results cannot be generalised to a larger population. Therefore, it is recommended that future studies expand the sample range, test the effectiveness of the DRTA model at different educational levels, and integrate this learning with digital technology to improve student learning outcomes more effectively.

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The Rebirth of Shadow Education: An Analysis of the Changes in Students' Participation in Xi'an Under the Double Reduction Policy

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Abstract

Amid escalating concerns regarding excessive peer pressures and the proliferation of shadow education in China, the Double Reduction Policy emerged, which fostered a more balanced educational ecosystem. This study delves into the transformation of student participation in private tutoring services in Xi'an City, subsequent to the implementation of this policy. To conduct this research, we designed comprehensive questionnaires tailored to Xi'an's primary and secondary schools and employed a stratified random sampling method to select 300 educators and 300 parents from the compulsory education system. Utilizing SPSS 26.0 software and employing a variety of quantitative analysis methods, such as Analysis of Variance to identify trends and significant changes. A profound transformation was found in Xi'an's educational landscape post-policy implementation. A notable 33% decrease in the total number of educational institutions was observed, with academic tutoring institutions experiencing a steeper decline of 37%, while non-academic, interest-driven institutions surged by 33%. This shift also altered the proportion of academic-focused institutions decreasing from 94% to 88%. Notably, approximately 70% of parents reported a substantial reduction in stress and anxiety related to their children's education. The results highlight the importance of promoting a more diverse and balanced educational ecosystem that prioritizes students' holistic development, while also acknowledging the shared perspectives among teachers and parents regarding the policy's impact. However, the study's scope was confined to Xi'an City. Future research could expand the geographical scope, incorporate objective measures, and investigate the long-term impacts of the Double Reduction Policy on student outcomes and educational equity.

Keywords: shadow education, Double Reduction Policy, triangulation analysis, private tutoring

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Introduction

Shadow education is widely viewed as a potential issue by governments worldwide, often creating a "win-lose" scenario with public education (Bray, 2010; Du, 2024; Park et al., 2016). In East Asia, influenced by the "imperial examination" culture, exams are crucial for selection and social stratification in China. The limitations of public education in addressing academic competition have led to the growth of private tutoring and a substantial shadow education sector (Jansen et al., 2023). This sector includes private tutoring, remedial learning, cram schools, and online courses (Kim, 2013; Ma et al., 2022). The expansion of shadow education intensifies competition with public education, increases academic and financial burdens, and prompts government intervention. Policies such as banning or restricting shadow education often fall short of meeting students' needs and achieving immediate results (Byun et al., 2018; Lee et al., 2010; Liang et al., 2022; Zhang & Bray, 2020). Despite efforts by countries like Japan and South Korea to curb its growth, the rise of online learning during the COVID-19 pandemic has accelerated shadow education's expansion (Piao & Hwang, 2021).

Addressing shadow education requires a new approach. On April 26, 2021, China's Ministry of Education issued the "Opinions on Further Reducing the Burden of Homework and Off-campus Training for Students in the Period of Compulsory Education" (the Double Reduction Policy). This policy aims to regulate private tutoring institutions by enhancing public education quality, signaling a challenge to shadow education. However, the policy also allows for private institutions to address specific needs, such as developing interests or comprehensive abilities, by focusing on non-academic subjects. This approach does not entirely ban shadow education but encourages its transformation, permitting the growth of tutorials in areas like art and sports, while phasing out those focused solely on academic subjects.

Three years after implementing the Double Reduction Policy, China's shadow education has evolved into a complement to public education, with both sectors reinforcing each other. This study explores whether shadow education has "regained its vitality" by examining its changes before and after the policy's introduction. Using Jacques Lacan's theory of the "Other," which considers the Other as a reference frame encompassing the linguistic and symbolic system influencing self-recognition (Le Séminaire de Jacques Lacan, Livre III, 1981), this research goes beyond analyzing private tutoring and students in Xi'an. It also includes teachers and parents, investigating their perspectives on the Double Reduction Policy as "Others" to provide a comprehensive view of the changes in China's shadow education.

Method

Our research focuses on students, teachers, and parents in the compulsory education sector in Xi'an City, conducting an empirical study to explore the situations before and after the implementation of the Double Reduction Policy. Leveraging sample data and employing econometric statistical methods, we have unveiled the transformations and implications of shadow education within the region under the Double Reduction Policy. In terms of methodology, we adopt a triangulation approach, which entails utilizing three distinct research methods to arrive at consistent findings. Specifically, the primary research methods employed in this study are as follows:

(A) Data Analysis of Existing Statistical Resources: We conducted data analysis on statistical resources such as Xi'an's basic education database and the statistical yearbook of the Shaanxi Provincial Department of Education. This approach provides a quantitative foundation for our investigation.

(B) In-Depth Interviews With Relevant Stakeholders: Based on information gathered from private tutoring institutions, we categorized them into large, medium, and small sizes according to their standard areas. From each category, one institution was randomly selected, and we conducted in-depth interviews with ten individuals associated with these institutions. These interviews aimed to capture the changes in each sampled institution before and after the implementation of the Double Reduction Policy.

(C) Questionnaire Survey on Attitudes Towards Shadow Education: We utilized a questionnaire survey to investigate the attitudes of 300 teachers and 300 parents from primary and secondary schools in Xi'an's compulsory education stage towards shadow education. This method allowed us to gather a broad range of perspectives and insights into the impact of the policy on stakeholders directly involved in the education system.

Result

Overview of Shadow Education in Xi'an Before and After the Implementation of the Double Reduction Policy

Based on the official statistics from Shaanxi Province and Xi'an City, prior to the introduction of the Double Reduction Policy, the total number of private tutoring institutions stood at 54, among which 51 were subject-based and 3 were non-subject-based. Following the implementation of the policy, the total count of private tutoring institutions decreased to 36, comprising 32 subject-based institutions and 4 non-subject-based ones. According to current statistical data, shadow education in Xi'an is predominantly comprised of subject-based private tutoring institutions, which are thus the primary focus of regulatory efforts. Consequently, as the number of non-subject-based private tutoring institutions continues to rise, an overall declining trend is observed in the total number of shadow education entities. Specifically, the overall growth rate of private tutoring institutions is -33%, with a -37% decline in subject-based institutions and a 33% increase in non-subject-based institutions. The proportion of subject-based private tutoring institutions has consequently dropped from 94% to 88%.

To delve into the regulatory response to subject-based shadow education post-policy implementation by the Xi'an Education Bureau, we have analyzed the compliance situation as presented in Table 1. All subject-based private tutoring institutions are found to be in compliance with the stipulated information disclosure requirements, with an 82.3% registration rate. The cancellation rates for subject-based and non-subject-based institutions are respectively 17.6% and 0.

Table 1: Changes in Subject-Based Shadow Education Institutions in Xi'an After the Introduction of the Policy

Regulatory Type	Number	Comprehensive Approach	Number	Complaint Channels	Number	Resolution Methods	Number
Closure and Rectification	51	Violations	5	Mayor's Hotline	4	Refund of Tuition Fees	0
Information Gathering	42	Interviews	13	Reports	2	Refund of Rental Fees	0
Re-registration	1	Cancellation	7				
		Automatic Cancellation	2				

As can be seen from Table 1, after the policy was issued, significant changes have occurred in shadow education in Xi'an. The proportion of subject-based private tutoring institutions decreased from 94% to 88%, while the number of non-subject-based private tutoring institutions increased by 33%. These results indicate that while the number of subject-based private tutoring institutions has decreased, the number of non-subject-based private tutoring institutions has increased, marking a transformation of shadow education in Xi'an to a certain extent.

Behavioral Choices of Parents and Subject-Based Private Tutoring

According to the sample survey results from various schools in Xi'an, as detailed in Table 2, after the implementation of the Double Reduction Policy, the SSAI (School-based After-School Activity Institution) transformed from a subject-based training institution offering Chinese, mathematics, and English courses to a non-subject-based institution, and it is the only educational institution that has successfully undergone this transformation. However, its student enrollment and teaching staff have both shown a marked downward trend. Meanwhile, the number of students and teachers in non-subject-based institutions is zero, indicating that they have ceased operations.

Table 2: Sample Survey Data of Subject-Based Institutions

Institution Name	Operating Status	Teachers & Students Before,		Teachers & Students under the Double Reduction Policy,	
		Teachers	Students	Teachers	Students
SSAI	Transformed into Non-Subject-Based Training	22	100	12	23
XXW	Ceased Operation	12	70	0	0
SG	Ceased Operation	7	30	0	0

As evident from Table 2, since the implementation of the Double Reduction Policy, shadow education institutions have suffered significant setbacks, with a sharp decline in the number of teachers and students, leading to a marked reduction in institutional profitability. Even those institutions attempting to transform face immense challenges, and few have managed to successfully complete the transition. For those that have succeeded, the number of teachers

and students has still decreased significantly, making it difficult for these institutions to survive and ultimately leading to the possibility of cessation of operations. This demonstrates that one of the primary objectives of the Double Reduction Policy – to reduce the burden of extracurricular training on students – has been largely achieved.

Changes in Fees for Sample Subject-Based Institutions

This paper adopts the method of field research to collect data on fees before and after the implementation of the Double Reduction Policy, and conducts a statistical analysis of fees across different classes, as detailed in Table 3. Taking grades as the unit of analysis, we investigate the changes in tuition fees for various subject-based institutions in District X. For junior high school students enrolled in one-on-one classes, tuition fees have increased by 66.7%. Among all, the fees for after-school tutoring classes for primary school students have seen the largest increase, reaching 300%. Moreover, after the implementation of the Double Reduction Policy, there have emerged "contract classes" and "one-on-one classes" with extremely high tuition fees.

Table 3: Xi'an City Discipline Private Supplementary Education Institutions Charge Statistics

Grade	Double subtraction front			Double subtraction		
	One-to-one	The bottom class in a kindergarten	Evening auxiliary shift	One-to-one	Agreement class	Evening auxiliary shift
Junior high school	60/h	--	--	100/h	200/h	--
Primary school	--	500/m	500/m	70/h	240/h	200/h

After the implementation of the Double Reduction Policy, as evident from the results in Table 3, private tuition fees for academic disciplines surged dramatically, accompanied by the emergence of novel tutoring methodologies. This surge in fees might stem from the fact that these institutions are brazenly defying the policy, taking significant risks, and engaging in potentially illegal activities. Despite the state's explicit directive to shut down private remedial institutions, they persist in offering remedial classes, altering their approaches to circumvent the stipulated regulations.

According to the data presented in Tables 2 and 3, the initial impact of the Double Reduction Policy in Xi'an City is discernible. Although the number of extracurricular remedial institutions has decreased, extracurricular training has adapted and evolved into alternative forms, such as "one-on-one" tutoring and "homework assistance," with prices escalating several folds. However, it's important to note that the aforementioned figures solely capture subject-specific charges and fail to encompass non-subject-related expenses. Consequently, the full extent of how the Double Reduction Policy has influenced the evolution of cram schools and its implications for Xi'an's primary and secondary school students warrants further investigation and exploration.

Empirical Analysis of Primary and Secondary Schools Participating in Extracurricular Activity Classes in Xi'an City Under the Policy of the Double Reduction Policy

This study takes primary and secondary schools in a certain area of Xi'an City as the research object, and investigates the extracurricular activities carried out in primary and secondary schools. Using the questionnaire method, this paper investigates the implementation of the "double reduction" policy in Xi'an City, including public, private, urban area, development zone, rural, urban-rural integration schools, etc. A total of 400 questionnaires were distributed and 300 were recovered, with an effective rate of 75%.

An analysis of variance, also known as an "analysis of variance" or "F-test," is a significant test for the mean difference between two or more samples. The essence of variance analysis is to test a hypothesis when the variance of several normal populations is the same. On this basis, the variance analysis of variables is divided into single variance analysis and multi-factor variance analysis. In this paper, "identity" is the only variable, and "identity" includes "teacher" and "parent." Therefore, one-way ANOVA was used in this paper.

Conditions for Use of One-Way ANOVA. A prerequisite for using one-way ANOVA is that the sample meets normality and variance consistency.

Normality means that a set of observed data is normal, and its characteristics are normal. Therefore, Kolmogorov-Sminov method is selected in this paper, because the number of samples is greater than 50, and the normality test results of each variable are shown in Table 4. When the significance is 0.05, the significance degree of each variable exceeds 0.05, and each variable can be considered to conform to the normal distribution.

Table 4: Kolmogorov-Sminovtest

Observed variables	Statistics	Degree of freedom	Significance
Teacher	0.076	120	0.200
Patriarch	0.058	120	0.090

It can be seen from Table 4 that at the significance level of 0.05, since $0.200 > 0.05$ and $0.090 > 0.05$, the significance level exceeds 0.05, indicating that both observed variables meet the conditions of normal distribution.

The test for homogeneity of variance tests whether the total variance observed for a test factor at two or more levels is the same. Moreover, because this article uses the single factor horizontal design plan, therefore uses the F test method, as shown in table 5.

Table 5: Test for Homogeneity of Table Variance

Levin statistics	DOF 1	Degree of Freedom 2	Significance
1.661	1	119	0.179

As shown in Table 5, at the significance level of 0.05, since $0.179 > 0.05$, it can be considered that the variances of the test factors are equal at both levels, satisfying the prerequisite requirements for the use of one-way ANOVA. In conclusion, the sample data were tested for normality and variance, and the sample data met the preconditions for using ANOVA, so one-way ANOVA could be performed.

Table 6: One-Way ANOVA

	Square sum	Degree of freedom	Mean square	F	Significance
Between groups	0.734	1	0.734	0.961	0.252
Intra-class	90.948	119	0.764		
Aggregate	91.682	120			

Analysis of variance (ANOVA) was performed using SPSS26.0 software. The final test analysis results show that the P value of the difference between teachers and parents is greater than 0.05, so it can be considered that there is no significant difference between teachers and parents, that is, whether parents or teachers show consistency in the questionnaire data, indicating that these two groups have the same attitude towards the questionnaire survey, and we regard them as one group for analysis.

Multiple Regression Analysis. In this paper, multivariate regression is used to further process the data where is the regression coefficient to be estimated and is the random error term.

$$Y = \beta_0 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \varepsilon \quad (1)$$

Firstly, the influencing factors before the implementation of the Double Reduction Policy are analyzed. X_1 is the time of subject tutoring before the Double Reduction Policy, X_2 is the time of non-subject tutoring before the Double Reduction Policy, X_3 is the comparison of family expenses before the Double Reduction Policy, X_4 is whether parents feel anxious about education problems before the Double Reduction Policy, and the dependent variable Y is the degree of understanding of the Double Reduction Policy.

Table 7: Regression Analysis Results

	Denormalization coefficient	t	p-value
Constant (quantity)	2.079		
Subject Duration	-0.021	-0.499	0.618
Non-discipline duration	-0.019	-0.448	0.655
Charge against revenue	0.086	1.947	0.045
Anxiety	0.055	1.320	0.188

Table 8: Model Summary

R	R ²	Adjusted R ²	Model Error RMSE	DW value
0.134	0.018	0.005	0.452	1.941

Table 9: ANOVA

	Square sum	df	Mean square	F	p-value
regression	3.234	4	0.809	1.407	0.0232
residual	175.866	296	0.575		
aggregate	179.100	300			

As can be seen from the table above, at the significance level of 0.05, only household expenditures affect the understanding of the Double Reduction Policy. The formula of the model is: Understanding degree = $2.079 - 0.021 \times \text{Duration of attending discipline tutorial classes before the Double Reduction Policy} - 0.019 \times \text{Duration of attending art activity classes before the Double Reduction Policy} + 0.086 \times \text{Proportion of your family expenses before the Double Reduction Policy} + 0.055 \times \text{Whether you are anxious about your children's education problems before the Double Reduction Policy}$. The square value of R of the model is 0.018, which means that the time spent on subject tutoring classes before the Double Reduction Policy, the time spent on art classes before the Double Reduction Policy, the proportion of your family expenses before the Double Reduction Policy, and whether you are anxious about your child's education before the Double Reduction Policy can explain the 1.8% change in your understanding of the Double Reduction Policy. When F-test is performed on the model, it is found that the model passes the F-test ($F = 1.407$, $p = 0.0232$ 0.05), that is, the length of time you participate in subject tutoring classes before the Double Reduction Policy, the length of time you participate in art activity classes before the Double Reduction Policy, the proportion of your family expenses before the Double Reduction Policy, and whether you are anxious about your children's education before the Double Reduction Policy will have an impact on your understanding of the Double Reduction Policy.

Secondly, it analyzes the influencing factors after the implementation of the Double Reduction Policy, which is the subject tutoring time after the Double Reduction Policy, T_2 is the non-subject time after the Double Reduction Policy, T_3 is the comparison of family expenses after the Double Reduction Policy, T_4 is whether parents feel anxious about education problems after the Double Reduction Policy, and the dependent variable Y is the degree of understanding of the Double Reduction Policy.

Table 10: Regression Analysis Results

	Denormalization coefficient	t	p-value
Constant (quantity)	1.853		
Subject Duration	0.016	0.363	0.032
Non-discipline duration	-0.071	-1.570	0.048
Charge against revenue	-0.027	-0.603	0.046
Anxiety	0.006	0.147	0.044

Table 11: Model Summary

R	R ²	Adjusted R ²	Model Error RMSE	DW value
0.098	0.032	0.016	0.755	1.977

Table 12: ANOVA

	Square sum	df	Mean square	F	p-value
Regression	1.721	4	0.430	0.742	0.046
Residual	177.379	296	0.580.		
Aggregate	179.100	300			

It can be seen from the above table that under the condition of significance level 0.05, the four variables will affect the degree of understanding of the Double Reduction Policy, namely,

the length of time to participate in subject remedial classes after implementation, the length of time to participate in art activity classes after implementation, the proportion of your family expenses, and whether you feel anxious about your children's education problems after the Double Reduction Policy. Take these factors as independent variables, and take your understanding of the Double Reduction Policy as dependent variables, so as to conduct linear regression analysis. As can be seen from the above table, the formula of the model is: your understanding of the Double Reduction Policy = $1.853 + 0.016 \times$ the time spent on subject remedial classes after the Double Reduction Policy $-0.071 \times$ the time spent on art activity classes after the Double Reduction Policy $-0.027 \times$ the proportion of your family expenses after the Double Reduction Policy $+ 0.006 \times$ whether you feel anxious about your child's education problems after the Double Reduction Policy. The square value of the model R is 0.032, which means the time spent on subject remedial classes after the Double Reduction Policy, the time spent on art activity classes after the Double Reduction Policy, the proportion of your family expenses after the Double Reduction Policy, whether you feel anxious about your child's education problems after the Double Reduction Policy, which can explain the 3.2% change in your understanding of the Double Reduction Policy. When F-testing the model, we found that the model passed F-test ($F = 0.742$, $p = 0.046 < 0.05$), that is to say, the time spent in subject tutoring classes after the Double Reduction Policy, the time spent in art classes after the Double Reduction Policy, the proportion of family expenses after the Double Reduction Policy, and whether you feel anxious about your children's education problems after the Double Reduction Policy will have a certain influence on your understanding of the Double Reduction Policy.

Through the above analysis, it can be seen that after the implementation of the Double Reduction Policy, students' remedial time for subjects has decreased significantly, while the remedial time for non-subjects has increased significantly, while the proportion of family expenses has also changed, and the proportion of professional training expenses has decreased significantly. Moreover, after the implementation of the Double Reduction Policy, most parents' anxiety has been alleviated. It shows that after the implementation of the Double Reduction Policy, the situation of primary and middle school students participating in extracurricular activities has changed obviously, and the Double Reduction Policy has played a positive role.

Analysis of Changes in Extracurricular Activity Classes in Primary and Secondary Schools in Xi'an City. According to the questionnaire data, statistical analysis was carried out and the following conclusions were drawn:

Table 13: Difference Comparison of the Impact of the Double Reduction Policy

	(N = 143)	(N = 157)		
	Double subtraction	After double	t	P
	(M + SD)	subtraction (M + SD)		
Subject-based	17.63 ± 5.44	20.76 ± 7.3661	2.235	0.039
Non-academic category	18.88 ± 4.92	17.98 ± 5.5887	2.298	0.024
Extracurricular activity class	36.51 ± 10.36	38.74 ± 12.9248	2.463	0.008

It can be seen from the above table that, under the condition of significance of 0.05, the Double Reduction Policy has a significant effect on both subject and non-subject courses ($P < 0.05$), and the total score after the Double Reduction Policy is higher than that before the "double minus" policy. This may be related to the fact that the subjects of the study are

primary and middle school students. First, primary and secondary school students are not mature enough to feel the pressure of further education and do not realize the importance of education. Therefore, once the state stipulates that they should reduce homework or even complete homework, they will immediately cooperate. Second, many primary and secondary school students attend tutorial classes because of pressure from their parents, who show little interest in them. Under the Double Reduction Policy, many students switch from professional tutorial classes to non-professional tutorial classes. Third, in childhood, primary and secondary school students prefer their childhood to be happy, because they do not want to be occupied by heavy homework and endless tutoring, so under this system, their scores are higher than before.

On the whole, the Double Reduction Policy has a great impact on students “academic performance, and after the implementation of the Double Reduction Policy, students” comprehensive scores are higher than before the Double Reduction Policy, indicating that *The Double Reduction Policy* has achieved a relatively good burden reduction effect.

Correlation Analysis Between the Double Reduction Policy and Family Education Expenditure Type. Pearson correlation: A measure of the relationship between two variables, between -1 and 1. The result is the quotient of the covariance and standard deviation of the two variables. The covariance between two sets X, Y is calculated as:

$$COV(X, Y) = \frac{1}{n-1} \left[\sum_{i=1}^n (X_i - \bar{X})(Y_i - \bar{Y}) \right] \quad (2)$$

Formula for Pearson correlation coefficient:

$$COV(X, Y) = \frac{COV(X, Y)}{\sigma_X \sigma_Y} = \frac{\sum_{i=1}^n (X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum_{i=1}^n (X_i - \bar{X})^2 \sum_{i=1}^n (Y_i - \bar{Y})^2}} \quad (3)$$

Table 14: Correlation Analysis of Each Dimension of Household Expenditure

	Number of households	Double-subtraction policy impact correlation coefficient	P
Subject-based	300	-0.0478	0.000
Non-academic category	300	0.0367	0.000
Recreational activities	300	0.0483	0.000
Family dinner party	300	0.0289	0.000

From the data in Table 14, it can be seen that at the significance level of 0.05, all household expenditures are significantly correlated with the Double Reduction Policy, while only the correlation coefficient between subject expenditures and the Double Reduction Policy is -0.0478. It can be seen from the data of subject expenditure that parents and primary and secondary school students pay more attention to the Double Reduction Policy, and under the policy of the Double Reduction Policy, the number of subjects participating in remedial

courses is obviously reduced. Moreover, there has been a marked increase in the number of participants in non-academic training courses, which indicates that parents are paying more and more attention to their children's education and hope that their children can obtain all-round development and no longer be limited to textbook knowledge. Moreover, from the current situation, entertainment consumption and family dinner consumption are related to the Double Reduction Policy, which means that after the implementation of the Double Reduction Policy, primary and secondary school students have more spare time and can have more time to participate in some leisure activities and family dinners.

The analysis revealed that among parents of lower primary school students (Grades 1-3), a significant 54.3% expressed a sentiment of "mixed relaxation and heightened worry," believing that while children are able to complete their homework in school, this still elicits much concern. A further 22.5% manifested more pronounced anxiety, asserting that they "dare not adopt a laid-back attitude," while 17.6% expressed a sense of relief, noting that "the burden on their children has been alleviated." This anxiety among lower-grade parents primarily stems from concerns over the development of their children's study habits, fearing that homework completion in school may lead to procrastination and an increased number of errors. Transitioning to upper primary school (Grades 4-6), a notable 59.8% of parents echoed a sentiment of "convenience amidst persistent worry," with this proportion exceeding the overall average by 5%. Here, 20.4% continued to grapple with anxiety, admitting they "dare not relinquish their vigilance," while 14.8% welcomed the change, reporting a "genuine sense of joy as their children's burden lightened." High-grade parents' concerns shifted towards "insufficient homework volume," fearing their children might fall behind, lacking insight into their learning methods, and observing a perceived decline in academic performance.

During the junior secondary school phase, parental sentiments evolved, with 43% reporting a blend of "relaxedness and residual anxiety," acknowledging their children's ability to finish homework at school but still harboring significant worries. Notably, the proportion of parents who confessed to feeling "anxious and hesitant to adopt a passive stance" rose to 30.3%. Some parents commented on the extended time their children spent on homework upon returning home, further underscoring the complexities of this educational transition. These findings are summarized in Table 15.

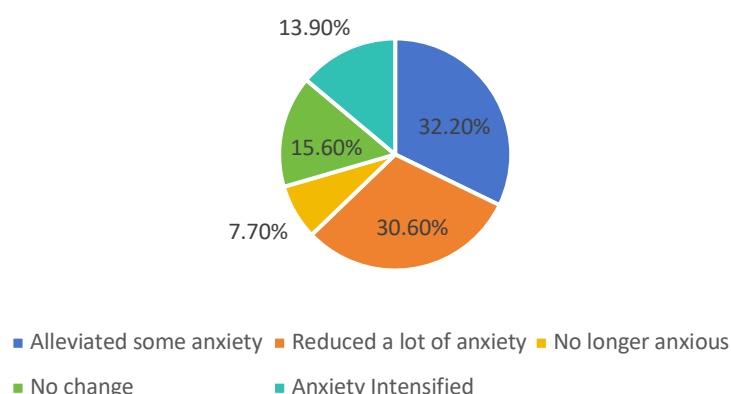
Table 15: Different Grades' Feelings Towards the Double Reduction Policy

Lower grades (1-3)		Senior grades (4-6)		Junior high school	
Easy	54.3%	easy	59.8%	easy	43.0%
Anxiety	22.5%	anxiety	20.4%	anxiety	30.3%
Feel happy	17.6%	feel happy	14.8%	feel happy	26.7%

The implementation of double minus policies has indeed alleviated parental anxiety to varying degrees. Specifically, 32.2% of parents reported experiencing partial relief from their anxiety, while 30.6% stated that they felt a significant reduction in their worries. Furthermore, a promising 7.7% of parents declared that they were no longer anxious, testament to the positive impact of these measures. However, it is worth noting that 15.6% of parents expressed an increase in anxiety, highlighting the need for continued monitoring and support. As depicted in Figure 1, the effectiveness of double subtraction in mitigating anxiety appears to be more pronounced among parents of elementary school students compared to those of

junior high school students. This observation underscores the importance of tailoring educational interventions to the unique needs and challenges faced by different age groups.

Figure 1: Parents' Anxiety Response to the Double Reduction Policy



Conclusion

This study's mixed-methods analysis of Xi'an's educational landscape reveals significant policy-induced transformations in shadow education dynamics, with convergent evidence from educators, parents, and quantitative data. Key findings emerge as follows:

Structural Shift in Extracurricular Offerings

A pronounced diversification of after-school activities accompanies the decline in traditional academic tutoring. While subject-based institutions declined by 37%, non-academic entities expanded by 33%, with arts, sports, and cultural programs emerging as popular alternatives. This shift aligns with the policy's objective to foster well-rounded development, as evidenced by the 38.8% of primary school students now engaged in artistic pursuits and 22.4% of secondary students participating in extracurricular cultural activities.

Financial Reprioritization and Domestic Well-being

Household expenditure patterns demonstrate strategic reallocation: academic tutoring budgets decreased substantially, while investments in non-subject enrichment rose correspondingly. Concurrently, 7.7% of parents reported complete alleviation of educational anxiety, with 54.5% expressing relief and 16.9% noting measurable improvements in family life quality. This financial pivot underscores a broader societal recalibration toward balancing scholastic achievement with holistic child development.

Pedagogical and Lifestyle Transitions

The policy's "double reduction" mechanism effectively curtailed after-school academic sessions, prompting a 33% overall decline in shadow education institutions. Qualitative insights reveal that 59.8% of primary school parents and 43% of secondary school parents perceive mixed benefits—relief from homework burdens yet lingering concerns about learning gaps. Meanwhile, increased green space engagement and family bonding time reflect emergent lifestyle adaptations conducive to child welfare.

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Systematic Review of Student Engagement Instruments in Higher Education: Evaluating Reliability, Applicability, and Comprehensive Coverage Across Diverse Factors

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Abstract

Numerous student engagement instruments have been introduced in higher education (Heilporn et al., 2024), yet selecting an instrument that effectively addresses the key areas of student engagement, including behavior, cognitive, emotions, social interactions, and active participation remains a challenge. This paper aims to examine the recent research on student engagement instruments in higher education, identifying their strengths and weaknesses using PRISMA guidelines. A literature search conducted in the Scopus database resulted in the inclusion of 23 articles. These articles traced back 17 different types of instrument questionnaires to their original sources, which were then examined. The findings reveal that all instruments exhibit high reliability and are suitable for both male and female students. Additionally, most instruments, specifically 78% are appropriate for university-level education and 61% of the instruments are appropriate for any course. However, significant weaknesses were identified. 78% of the instruments are not applicable across all course modalities, 61% are not suitable for all age groups, and 61% percent do not apply to all faculties. Among the reviewed instruments, one stands out for its inclusiveness and high reliability. It effectively supports students of all ages, genders, subjects, faculties, and course modalities at the university level while comprehensively covering the five dimensions of student engagement. This review highlights the need for more inclusive and adaptable instruments in higher education to ensure comprehensive measurement of student engagement across diverse contexts.

Keywords: multi-dimensional student engagement, student engagement instrument, higher education

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Introduction

In the complex journey of academic learning, students engage in both academic studies and various extracurricular activities. This experience enriches their educational journey, fostering overall development, growth, and economic advancement (Buckley & Lee, 2021; Heilporn et al., 2024; Munir et al., 2023; Reschly & Christenson, 2022). Achieving academic excellence is needed for students to position themselves in the favorable position in the job market and make meaningful contributions to society (Karim et al., 2016). Academic performance acts as a gauge of a student's readiness to face the challenges of the professional world and succeed in their chosen endeavors. However, while academic performance remains a critical indicator of success, it alone does not fully capture the complexities of a student's potential. This broader understanding of success necessitates a deeper exploration of factors like student engagement, which plays a pivotal role in shaping academic and life outcomes.

Student engagement, which encompasses cognitive (thinking), emotional (feeling), behavioral (acting), social (interacting with peers), and agentic (contributing actively) dimensions, is essential for enhancing academic achievement (Heilporn et al., 2024). It is a significant predictor of students' academic performance and plays a crucial role in assessing the quality of teaching and learning processes (Iter & Salhab, 2024). Research has increasingly highlighted that the importance of student engagement, demonstrating its strong connection to student education outcome such as student learning, academic achievement, satisfaction, persistence, sense of community, high dropout rates, high level of student boredom and disaffection (Adams et al., 2020; Cents-Boonstra et al., 2021; Hart et al., 2011; Heilporn et al., 2024a; Li & Xue, 2023; Niittylahti et al., 2019). Thus, student engagement emerges as a key predictor of academic achievement and behavior, offering valuable insights for shaping effective educational practices.

Numerous student engagement models and measurement scales have been developed to assess engagement levels, enriching the field (Maroco et al., 2016; Reeve & Tseng, 2011; Zhoc et al., 2019). However, although many types of student engagement instruments have been introduced over the past several years, there remain a need to evaluate their reliability and usability across different educational contexts. A systematic review is essential to determine whether these instruments are suitable for all ages of students, useable across various faculties and courses, and compatible with different modalities of learning. The systematic review also examines the reliability of these instruments in accurately measuring student engagement within the context of higher education.

This study systematically reviews student engagement measures in higher education in terms of age, genders, course modalities (e.g. face-to-face, online and blended learning), across various faculties and university levels. This study follows the PRISMA guidelines and seeks to answer the following questions:

1. Which student engagement instruments are most frequently used in recent academic research?
2. What validated instruments are recommended for measuring student engagement?

Literature Review

Student engagement is identified as a complex and multidimension concept (Abbasi et al., 2023; Heilporn et al., 2024; Huang et al., 2022; Luan et al., 2020). The facets of student engagement is behavioral (acting), cognitive (thinking), and emotional (feeling)—is broadly

recognized within scholarly literature (Abbasi et al., 2023; Gladstone et al., 2022; Heilporn et al., 2024; Huang et al., 2022; Reschly & Christenson, 2022). Nonetheless, scholars have proposed the expansion of the framework to incorporate additional dimensions, such as social engagement, agentic engagement, collaborative engagement, and psychological engagement (Choong Foong et al., 2022; Linnenbrink-Garcia et al., 2011; Reeve & Tseng, 2011; Yulia et al., 2020).

Behavioral engagement refers to the observable actions and commitment that students demonstrate in the learning session activities. It involves participation in learning activities such as participation in classes, completing assignments, engaging in group discussions, and asking questions (Abbasi et al., 2023; Heilporn et al., 2024; Marôco et al., 2020; Ramírez Hernández et al., 2024). Focusing on behavioral engagement enables educators to tackle the challenge to student participation and adopt effective strategies to facilitate active learning and enhance academic performance (Heilporn et al., 2024; Liu et al., 2023).

Cognitive engagement, which significantly impacts students' ability to process and understand complex knowledge, refers to the mental investment and effort that learners put into understanding and mastering challenging learning materials (Abbasi et al., 2023; Marcionetti & Zammitti, 2023). This requires the use of cognitive and metacognitive strategies, as well as deep processing, in order to reach a higher level of knowledge understanding (Abbasi et al., 2023; Heilporn et al., 2024; Liu et al., 2023; Yuyun, 2023). Students who are cognitively engaged are motivated to go beyond merely understanding basic knowledge gained from the learning session. They will employ deeper cognitive strategies and showing persistence when faced with difficulty in mastering more complex skills (Han & Huang, 2022; Marcionetti & Zammitti, 2023).

Emotional engagement refers to students' emotional response of student toward school, teachers, and peers (Abbasi et al., 2023; Choong Foong et al., 2022; Han & Huang, 2022; Roy et al., 2023; Ze & Molinari, 2021; Yau & Shu, 2023; Yulia et al., 2020). Emotional engagement comprises students' positive (enthusiasm, pride, interest, enjoyment in school) and negative (boredom, frustration, anxiety, disinterest) feeling towards their teachers, institution, and peers (Abbasi et al., 2023; Adams et al., 2020; Fredricks et al., 2004; Han & Huang, 2022; Hart et al., 2011; Okla et al., 2023).

Social engagement offers the advantage of distinguishing itself from emotional engagement, as some more introverted students may be emotionally engaged in a course without interacting or bonding with their peers (Heilporn et al., 2024). The most fitting definition for this study describes social engagement as students' positive interactions with peers and their sense of belonging within the group (Heilporn et al., 2024).

Agentic engagement, recognized as the fourth aspect of student engagement, refers to the constructive contributions students make to the flow of their learning session. It encompasses what students say and do to enhance their own learning environment, such as offering input, expressing preferences, and seeking out interesting and engaging activities (Reeve & Jang, 2022). Students who shape and enrich the quality of their learning experience through the exercise of autonomy and proactiveness often contribute to more effective teaching and engaging activities during learning sessions, as well as gain access to more resources. The concept of agentic engagement is essential, as it focuses on students' proactive role in shaping both the content and context of their learning (Heilporn et al., 2024; Reeve & Jang, 2022; Reeve & Shin, 2020).

Methodology

Information Sources

An extensive search was conducted on 1st May 2024 via the Universiti Malaysia Pahang Al-Sultan Abdullah (UMPSA) e-Resource Library system (exprozy) to obtain articles concerning student engagement in higher education from the Scopus databases.

Search Strategy

There were two primary search terms: "student engagement" and "higher education". However, to refine the search and ensure a direct connection with student engagement, priority was given to articles with "engagement" in their titles. To refine the search and ensure a direct focus on student engagement, priority was given to articles that contained the word 'engagement' in their title. To broaden the search scope and to encompass other relevant literature, other words that relate to engagement were also added to the search terms in an attempt to widen the scope of the research. The search keyword used in Scopus database is ("student engagement" OR "learner engagement") AND ("higher education" OR university OR college).

Eligibility Criteria

To ensure the quality of the literature collection, articles were selected based on specific criteria. Only articles published between 2020 and 2024, written in English, and with open access accessibility were included. Conference papers, book chapters, reviews, and books were excluded from consideration.

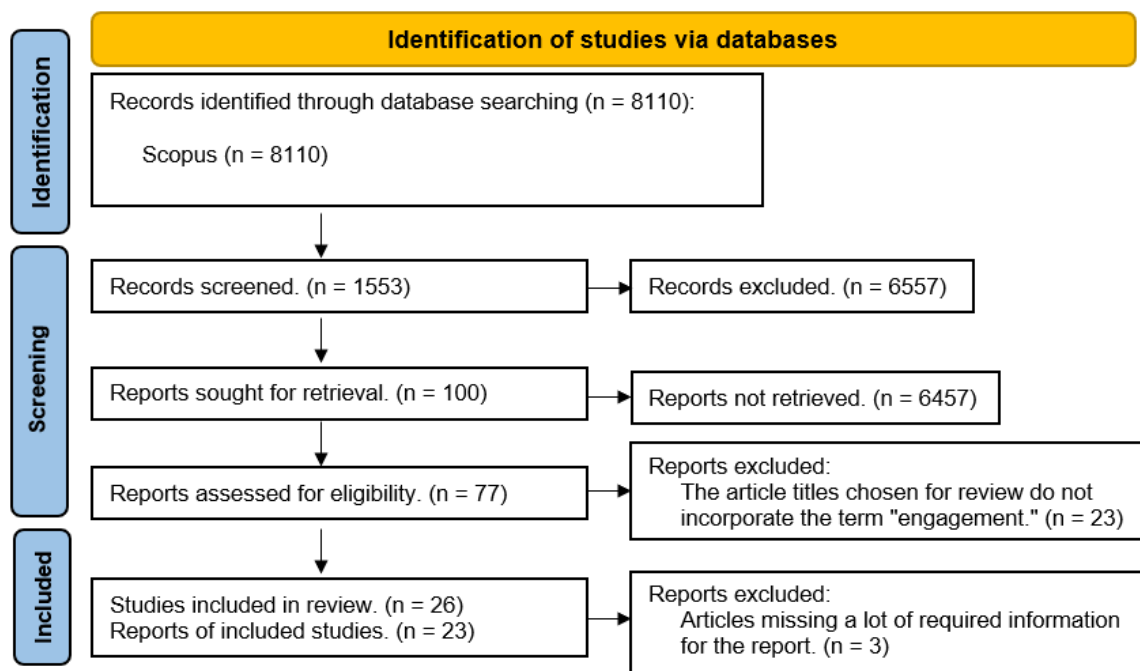
Screening Process

The article retrieval process through Scopus began with the identification phase, generating 8,110 articles based on specified keywords. The screening phase involved three sub-steps. Initially, 6,557 articles were excluded through applied filters, reducing the count to 1,553. From these, the top 100 most relevant articles were selected for further screening, and 23 articles that did not include the term "engagement" in their titles were removed, leaving 77 eligible articles.

In the inclusion phase, abstracts and full texts of the remaining 77 articles were reviewed, resulting in 26 initially suitable articles. However, three articles were excluded due to missing information, leading to a final selection of 23 articles. The screening process evaluated articles based on their titles, abstracts, and full texts against the inclusion criteria. A total of 51 articles were excluded as they did not measure any of the five types of student engagement: behavioural, cognitive, emotional, social, and agentic, or lacked the use of student engagement questionnaires in higher education contexts.

This rigorous selection process ensured the inclusion of only relevant articles, meeting the specified criteria. The details of the screening process are presented in Figure 1.

Figure 1: PRISMA Diagram - Article Retrieval Process



Results

1. Which student engagement instruments are most frequently used in recent academic research?

Out of the 17 student engagement instruments reviewed, the University Student Engagement Inventory (USEI) was the frequently adopted instrument where it is being featured in five studies. Following USEI, the Higher Education Student Engagement Scale (HESES) and the Student Engagement Questionnaire (SEQ) were the second most commonly used with each appearing in three studies. Alternatively, other instruments, such as the Online Classroom Engagement Questionnaire (OCEQ) and the Multidimensional Scale of Student Engagement in Higher Education (MSSEC), were only employed once. The employment of these instruments, in order of their frequency, is presented in Figure 2. Figure 3 illustrates that USEI accounts for 21.7% of all instrument usage, highlighting a significant gap between the top three instruments and the rest.

Over the past five years, the usage of the USEI has been marked by ups and downs. It was utilized only once in 2020, had no recorded uses of it in 2021, was utilized twice in 2022, marking an increase, and then declined slightly to a single use in both 2023 and 2024. The high rate of adoption of USEI can be attributed to its well-established reliability and broad coverage of engagement facets, which form the basis of the multidimensional student engagement concept, including behavioral, cognitive, and emotional engagement (Maroco et al., 2016; Marôco et al., 2020). Besides, USEI has also been tested for measurement invariance by fields of study and gender, reliability, and factorial validity but only with Portuguese-speaking students (Marôco et al., 2020).

USEI is more commonly used in European studies whereas HESES and SEQ are more prevalent in Asian studies. While HESES is not as widely used as USEI, it remains relatively utilized, with two studies uses. Its frequent use is attributed to its high reliability, as reflected

in the Cronbach's α values ranging from 0.70 to 0.87 across all the dimensions. HESES demonstrates strong reliability in measuring student engagement with Cronbach's $\alpha = 0.914$. One of the major strengths of HESES is its applicability in online learning environments, making it a flexible tool for measuring student engagement in virtual contexts. In addition, unlike most other engagement measures, HESES has four distinct dimensions: academic, cognitive, emotional, and social engagement (with teachers and peers) (Zhoc et al., 2019).

SEQ, although not as widely utilized as the others, demonstrates superb internal consistency with Cronbach's $\alpha = 0.97$ (Reeve & Tseng, 2011). This instrument assesses four engagement dimensions: behavioral, agentic, cognitive, and emotional engagement. While other instruments, such as SES-4DS/HEV, also assess these four dimensions, SES-4DS/HEV has a lower reliability score of $\alpha = 0.82$, making SEQ a more robust choice in this category.

Despite their strengths, some instruments have seen limited adoption. OCEQ and MSSEC, though methodologically sound, have not been widely implemented, likely due to their recent development. OCEQ was introduced in 2023, and MSSEC was introduced in 2024, which may explain their lower adoption rates. OCEQ is based on the multidimensional engagement framework, covering behavioral, cognitive, and emotional engagement, but it contains 54 items, making it significantly longer than many other instruments (Abbasi et al., 2023). Any questionnaire exceeding 30 items is generally considered long, and lengthy instruments tend to have a higher nonresponse rate (Sharma, 2022). This can lead to challenges such as missing data, data trimming, or data imputation, depending on the extent of the missing responses (Sharma, 2022). Furthermore, OCEQ is designed specifically for English as a Foreign Language (EFL) course, limiting its applicability to a broader range of subjects.

MSSEC, being the most recent instrument, has yet to gain widespread recognition, as it was introduced only in 2024. However, given its design and potential applicability, it may become a more frequently used tool in the future as more studies assess its validity and reliability.

Overall, while USEI remains the most widely used student engagement instrument, HESES and SEQ are also frequently implemented due to their high reliability and multidimensional engagement frameworks. Meanwhile, newer instruments such as OCEQ and MSSEC hold promise but require further validation and adoption in research studies.

Figure 2: The Most Frequently Used Instruments In Recent Academic Research Sorted by Usage

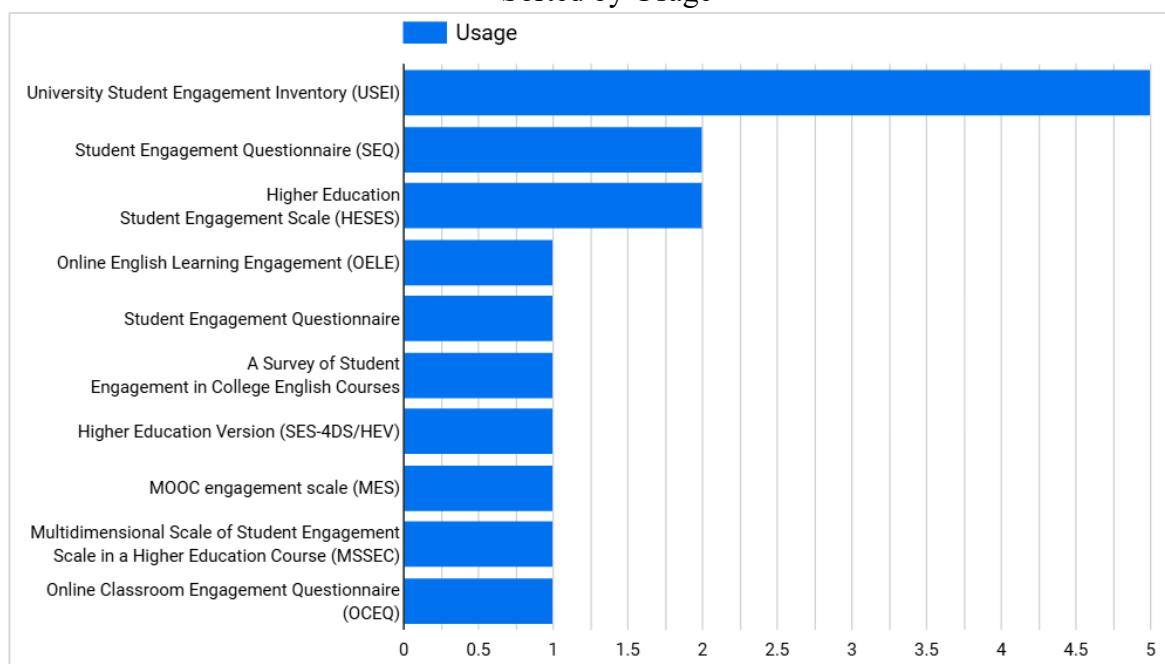
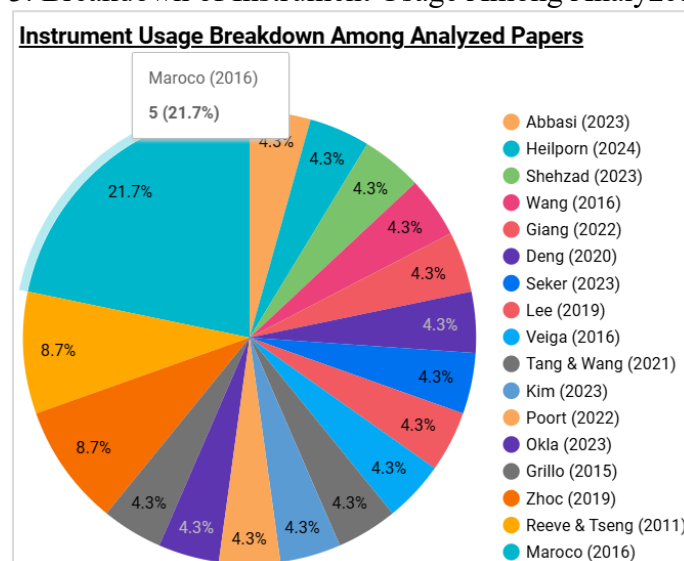


Figure 3: Breakdown of Instrument Usage Among Analyzed Papers



2. What validated instruments are recommended for measuring student engagement?

Among the 17 student engagement instruments analyzed, MSSEC demonstrated the highest reliability across multiple dimensions, with Cronbach's α values ranging from 0.86 to 0.95 (see Table 2). It is also the only instrument applicable across course modalities. MSSEC is well-suited for university-level education, adaptable across various learning modalities such as face-to-face, online, and blended learning. It is applicable to all courses and faculties, inclusive of all age groups and genders, and demonstrates high reliability. Table 1 presents a comparative analysis of widely used student engagement instruments, highlighting their applicability across different factors. As shown, MSSEC is the only tool that meets all key criteria. Furthermore, Table 3 outlines the limitations of the 17 analysed student engagement

instruments, where MSSEC stands out as the only instrument without notable constraints. This further highlights its robustness and versatility in diverse educational settings.

MSSEC is the first instrument designed to measure student engagement in a higher education course while incorporating the five well-known dimensions of engagement: behavioural, cognitive, emotional, social, and agentic. Validity evidence has been provided across various course modalities, faculties, and university levels. The instrument can be used at any time during a semester to assess student engagement, allowing instructors to adjust their teaching strategies accordingly. Additionally, MSSEC offers a detailed assessment of the stability of its factor structure across different university levels, genders, age groups, and course delivery methods.

Among the analyzed instruments, the MSSEC stands out as the shorter and comprehensive instrument for measuring student engagement. This is because it is the only instrument that covers all five dimensions with only 27 questionnaire items. Educators benefit from their efficiency as it can provide valuable insights into students' learning experiences from the perspective of student engagement dimensions while requiring only a few minutes for students to complete the questionnaire. It can therefore be termed as a practical tool to be applied. MSSEC demonstrates strong reliability, as indicated by high Cronbach's alpha values across all dimensions. Table 4 presents the reliability (Cronbach's α) of MSSEC by engagement dimensions, highlighting its good internal consistency.

One more distinguishing characteristic of MSSEC is its generalizability across course modalities including face-to-face, online, and blended modes of learning. Among all the tools that have been reviewed, MSSEC is the only one capable of measuring student engagement efficiently in all these various types of learning environments. Other instruments, for instance HESES, USEI, SEQ, and OCEQ are valuable but less adaptable and not as widely generalizable across faculties as MSSEC.

MSSEC's construct validity has been evidenced through confirmatory factor analyses, internal consistency, and multi-group comparisons. A first-order model with four correlated factors appeared to be the best fitting model to the data, with good internal consistency for all engagement dimensions. Multi-group confirmatory factor analyses also confirmed the partial invariance of the scale across gender, age (non-traditional and traditional students), university levels (undergraduate and graduate), and course modalities (face-to-face, blended, and online).

From a multidimensional psychological perspective, the improved version of MSSEC offers a robust and reliable tool for measuring student engagement in higher education courses. It provides detailed and meaningful insights for researchers, educators, and students alike, making it a valuable instrument for enhancing learning experiences. While other engagement instruments offer some useful features, MSSEC stands out as the most comprehensive and adaptable tool for assessing student engagement across diverse educational settings.

Table 1: Comparative Analysis of Student Engagement Instruments Among the Most Frequently Used Tools

	MSSEC	HESES	USEI	SEQ	OCEQ	OELE	SES-4DS/HEV
Appropriate for University Level Education	Y	Y	Y	N	Y	N	N
Usable Across Course Modalities	Y	Y	N	N	N	N	N
Appropriate for Any Courses	Y	N	Y	Y	N	N	N
Suitable for All Faculties	Y	Y	N	N	N	N	N
Applicable to All Age Group	Y	N	N	N	N	N	N
Applicable to All Genders	Y	Y	Y	Y	Y	Y	Y
High Reliability	Y	Y	Y	Y	Y	Y	Y

Note: Y (Yes), N (No).

Table 2: Reliability and Item Distribution of the MSSEC Across Engagement Dimensions

Dimension	Behavioral	Cognitive-Emotional	Social	Agentic
Number of Items	6	9	5	7
Cronbach's α	0.91	0.95	0.91	0.86

Table 3: Limitations of Analyzed Student Engagement Instruments

No.	Instrument Name	Authors	Limitations
1	Online Classroom Engagement Questionnaire (OCEQ)	(Abbasi et al., 2023)	<ul style="list-style-type: none"> • Not usable across course modalities • Not applicable to all age groups. • Not suitable for any courses • Not suitable for all faculties. • Questionnaire length exceeds 30 items
2	Multidimensional Scale of Student Engagement Scale in a Higher Education Course (MSSEC)	(Heilporn et al., 2024)	<ul style="list-style-type: none"> • None
3	Student Engagement Questionnaire (SEQ)	(Reeve & Tseng, 2011)	<ul style="list-style-type: none"> • Not usable across course modalities. • Not appropriate for university-level education. • Not applicable to all age groups. • Not suitable for all faculties.

No.	Instrument Name	Authors	Limitations
4	Student Engagement Questionnaire (Unnamed)	(Grillo & Damacena, 2015)	<ul style="list-style-type: none"> • Not usable across course modalities. • Not suitable for all faculties.
5	MOOC Engagement Scale (MES)	(Deng et al., 2020)	<ul style="list-style-type: none"> • Not usable across course modalities. • Not appropriate for university-level education. • Not suitable for all faculties.
6	Higher Education Student Engagement Scale (HESES)	(Zhoc et al., 2019)	<ul style="list-style-type: none"> • Not applicable to all age groups. • Not suitable for any courses • Questionnaire length exceeds 30 items
7	Online English Learning Engagement (OELE)	(Wang et al., 2016)	<ul style="list-style-type: none"> • Not usable across course modalities. • Not applicable to all age groups. • Not suitable for any courses • Not appropriate for university-level education. • Not suitable for all faculties. • Questionnaire length exceeds 30 items
8	Student Engagement Questionnaire (Unnamed)	(Okla et al., 2023)	<ul style="list-style-type: none"> • Not usable across course modalities. • Not suitable for all faculties.
9	Student Engagement Questionnaire	(Giang et al., 2022)	<ul style="list-style-type: none"> • Not usable across course modalities. • Not suitable for all faculties.
10	University Student Engagement Inventory (USEI)	(Maroco et al., 2016)	<ul style="list-style-type: none"> • Not usable across course modalities. • Not applicable to all age groups. • Not suitable for all faculties.
11	Student Engagement Questionnaire (Unnamed)	(ŞEKER, 2023)	<ul style="list-style-type: none"> • Not usable across course modalities. • Not applicable to all age groups. • Not suitable for any courses • Questionnaire length exceeds 30 items
12	Student Engagement Questionnaire (Unnamed)	(Shehzad & Charles, 2023)	<ul style="list-style-type: none"> • Not usable across course modalities. • Not suitable for any courses

No.	Instrument Name	Authors	Limitations
13	Higher Education Version (SES-4DS/HEV)	(Veiga, 2016)	<ul style="list-style-type: none"> • Not usable across course modalities. • Not applicable to all age groups. • Not appropriate for university-level education. • Not suitable for all faculties. • Not suitable for any courses
14	A Survey of Student Engagement in College English Courses	(Teng & Wang, 2021)	<ul style="list-style-type: none"> • Not usable across course modalities. • Not suitable for any courses • Questionnaire length exceeds 30 items
15	Student Engagement Questionnaire (Unnamed)	(Kim et al., 2023)	<ul style="list-style-type: none"> • Not usable across course modalities. • Not applicable to all age groups.
16	Student Engagement Questionnaire (Unnamed)	(Poort et al., 2022)	<ul style="list-style-type: none"> • Designed to assess engagement in group work
17	Student Engagement Questionnaire (Unnamed)	(Lee et al., 2019)	<ul style="list-style-type: none"> • Not usable across course modalities. • Not suitable for any courses • Questionnaire length exceeds 30 items

Conclusion

The findings indicate that the University Student Engagement Inventory (USEI) is still the most frequently utilized instrument for measuring student engagement at the university level. It is frequently used, likely to be attributable to its high reliability and widely established validity on a range of dimensions, more in European contexts. The widespread adoption of the USEI is attributed to its ability to holistically measure the key dimensions of student engagement: behavioural, cognitive, and emotional. Nevertheless, since its validation is confined to Portuguese-speaking populations, its applicability to other academic context remains constraints. Despite that, HESES and SEQ have been widely adopted in Asian studies. HESES is unique in its flexibility to measure engagement particularly for the social interaction with teachers and peers regardless of the basis of student engagement dimension, whereas SEQ excel in measuring agentic dimension even though it measures the basis of student engagement dimension, along with the fact that it also possesses a significantly second highest reliability score, being Cronbach $\alpha = 0.967$, which makes it a strong option for measuring student engagement. In spite of their strengths, these instruments have certain limitations; for instance, HESES do not have agentic involvement, while SEQ do not encompass social involvement. This is a limitation of both HESES and SEQ, as increasingly more evidence is demonstrating that student engagement also encompasses an agentic aspect and social involvement (Gladstone et al., 2022).

Less developed instruments, such as OCEQ and the MSSEC, have yet to see extensive use, primarily due to their recent development. The OCEQ, introduced in 2023, offers a multidimensional engagement measure; yet it consists of 54 items, making it longer than other measures, which is something that may contribute to reduced response rates. Furthermore, OCEQ is specifically intended for EFL learning, which hinders its widespread adoption. On the other hand, MSSEC, introduced in 2024, is a promising instrument due to its flexibility across various course modes, faculties, and student groups. The ability of the instrument to assess behavioral, cognitive, emotional, social, and agentic aspects of engagement makes it one of the most comprehensive measures of engagement. Nevertheless, as it is still in its early phase, additional studies are necessary to confirm its efficacy in various academic and cultural contexts.

Among the evaluated instruments, MSSEC is the most recommended measure for measuring student engagement in higher education. It has notable strengths over existing instruments because of its high reliability, ranging from Cronbach's α of 0.86 to 0.95, its versatility across various modes of course delivery, including face-to-face, online, and blended courses, as well as due to its wide applicability across various faculties and student groups. In comparison to the USEI that is not fully validated across various learning modalities, the MSSEC is a more comprehensive measure of engagement, thus being a valuable tool for both teachers and researchers. Further, the brevity of MSSEC (27 items) offers a better chance of response than longer questionnaires such as OCEQ. This enhances practicality while also making it more student-friendly, helping to minimize survey fatigue and reduce non-response rates.

The findings offer valuable information for educators and researchers in selecting a suitable student engagement instrument to measure the student learning experience. Given its adaptability, the MSSEC can serve as a more widely marketed substitute, especially for institutions providing courses in multiple formats. Policymakers and higher education institutions can integrate the MSSEC instrument into learning sessions by encouraging students to engage in self-reflection after each session. This approach enables institutions to gain valuable insights through the collection of real-time learning experience data. Based on these insights, institutions can develop strategies to enhance the student learning experience and thereby limit dropout rates. There are several limitations of this research that must be acknowledged. The research was restricted to published articles, meaning that unpublished research, institutional reports, or corporate studies may reveal other patterns not evident here. Further, the number of studies included was restricted to 17 instruments, and they may not epitomize the whole scenario of all the existing student engagement measuring instruments. Some instruments can also be underreported due to the language barrier, since papers printed in a non-English language were excluded.

Future research should examine some key areas to enhance the understanding of instruments used to measure student engagement. In addition, future research should emphasize comparing the performance of student engagement tools in different educational settings, including those related to STEM versus humanities fields and online versus face-to-face instructional environments. Additionally, more validation studies are needed to evaluate the MSSEC in different countries and educational contexts, confirming its broader relevance and reliability.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

During the preparation of this work the author(s) used Chat GPT in order to improve readability and language of the work. After using this tool, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

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Translanguaging Practices of Multilingual Teachers and Students During Face-to-Face and Online Mathematical Discourse: A Comparative Analysis

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Abstract

Hybrid learning is predicted to be the future trajectory of mathematics education. It is therefore imperative that mathematics educators reflect on current teaching and learning practices in mathematics and establish practices that will support quality mathematical discourse, whether classes are delivered in-person, virtually, or via a combination of both. To gain an in-depth understanding of how face-to-face and online mathematical discourse unfolds in class, this study borrowed a theory from the discipline of communication called translanguaging. It is the fluid, dynamic, and creative use of an individual's multilingual, multisemiotic, and multimodal repertoires as resources for communication and meaning-making. Guided by this lens, this multiple-case study investigated the resources constituting the translanguaging practices of Filipino multilingual teachers and students at the senior high school level as they engaged in mathematical discourse. Both face-to-face and online classes were observed, recorded, and transcribed using Mondada's multimodal transcription convention. A multimodal conversation analysis was subsequently performed to identify emerging translanguaging practices. Results showed that multilingual, multisemiotic, and multimodal resources were present in both face-to-face and online mathematical discourse. The languages spoken in the two settings were similar, but there were differences in the multisemiotic and multimodal resources mobilized, such as the use of body language signals by teachers and students during face-to-face mathematical discourse and the use of virtual gestures during online mathematical discourse. The findings of this study could serve as a guide for identifying and leveraging the translanguaging capacities of teachers and students to help facilitate quality mathematical discourse in both environments.

Keywords: hybrid learning, mathematical discourse, translanguaging

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Introduction

Hybrid learning is predicted to be the future trajectory of mathematics education. As Borba (2021) emphasized, the COVID-19 pandemic has changed the agenda of mathematics education, especially with the emergence of digital technology. It is therefore imperative that mathematics educators reflect on current teaching and learning practices in mathematics and establish practices that will support quality mathematical discourse, whether classes are delivered in-person, virtually, or via a combination of both. To gain an in-depth understanding of how face-to-face and online mathematical discourse unfolds in class, this study borrowed a theory from the discipline of communication called translinguaging.

Translinguaging as a Theoretical Lens

Translinguaging is the fluid, dynamic, and creative use of an individual's multilingual, multisemiotic, and multimodal repertoires as resources to communicate, make meaning, and support his or her learning process (Tai, 2022; Tai & Wei, 2020; Wei, 2018; Wei & Ho, 2018). The concept of translinguaging as a communication practice can be traced back to the Welsh revitalization program, which is an initiative led by the Welsh government in its attempt to revive the Welsh language by mandating its use as a medium of instruction in schools across Wales (Williams, 1994, as cited in Wei, 2018). Welsh is the native language of Wales, but English has become the dominant language through the years. Williams observed that despite the teacher instructing the class in Welsh, the majority of the students' responses would be in English. There were also instances when the students would read the material in Welsh, but the teacher would use English to elaborate on what the students had read. This practice of switching languages is not only unique to the Welsh context but is also common among bilingual and other linguistically diverse populations. Originally termed *trawsieithu*, translinguaging was then coined as a pedagogical term to refer to the natural ways multilingual individuals utilize their languages as they make sense of the social world (Marrero-Colon, 2021; Wei, 2018).

As a pedagogical practice, translinguaging deepens engagement and makes any rigorous learning content accessible and comprehensible to multilingual learners because it allows them to communicate and construct meaning across languages (Garcia, 2013; Vogel & García, 2017). Similarly, Baker and Wright (2021) argued that translinguaging helps learners in bilingual classrooms achieve a deeper understanding of a subject matter through linguistic reprocessing. For instance, in content areas such as mathematics, translinguaging is said to support the construction of mathematical understanding of bilingual students by fostering a flexible mathematical learning space, where they can engage in mathematical discourse using their full linguistic repertoire (Garza, 2017). However, as previously stated, translinguaging also includes the use of semiotic and modal resources in its scope. This suggests that, in addition to the languages constituting one's linguistic repertoire, it is also important to recognize the role that semiotic and modal resources play in communication and meaning-making.

Even with the growing body of research on translinguaging, Canagarajah (2011) argued that the majority of studies published so far focus on face-to-face oral interactions and not much on other modalities of communication. As this study aims to investigate both face-to-face and online mathematical discourse from a translinguaging lens, it may therefore contribute to this gap in the literature. In addition, building on the ideas discussed so far, adopting a translinguaging perspective may shed light on how multilinguals, such as Filipino teachers

and students, leverage their diverse resources for communication and learning of content areas such as mathematics in both face-to-face and online classrooms. In order to do so, this study seeks to compare the translanguaging practices of Filipino teachers and students during face-to-face and online mathematical discourse. In particular, it seeks to determine the similarities and differences in their use of their multilingual, multisemiotic, and multimodal resources as part of their translanguaging practices in the two settings.

Methodology

This study followed a multiple-case study design to investigate the translanguaging practices of Filipino teachers and students. The data gathering was carried out at a private senior high school in the National Capital Region (NCR) of the Philippines. Three class sections were invited to participate in the data gathering. The first class consisted of 18 students, the second had 36 students, and the third had 33 students. Both face-to-face and online mathematics classes were observed and recorded for nine (9) weeks, with each week consisting of three (3) face-to-face classes and one (1) online synchronous class. The video recordings were then transcribed using Mondada's multimodal transcription convention, taking into account all resources that emerged during the mathematical discourse. Lastly, the transcripts were examined using a multimodal conversation analysis to compare the translanguaging practices of the participants in the two settings.

Results and Discussion

The discussion that follows highlights key translanguaging practices of the teachers and students, as observed in both face-to-face and online mathematical discourse.

Face-to-Face Mathematical Discourse

Based on the analysis of the transcripts from the observation of face-to-face mathematical discourse, it was determined that both teachers and students utilized English, which is the mandated language of instruction in mathematics, and Tagalog, which is their mother tongue, as their linguistic resources for communication. They also frequently used Taglish, which is the fusion of these two languages, as a language variant. The emergence of these languages proved that even if English was the language used in the instructional materials, both teachers and students still relied on their first language to communicate with each other. This practice reflects a translanguaging approach, specifically the tendency of multilingual individuals to tap into the languages available in their repertoire to support their communication and learning.

For the multisemiotic and multimodal repertoires, both teachers and students were observed to use mathematical representations in the form of symbols, notations, and equations, among others, to represent mathematical concepts. These representations were conveyed through various modalities, such as through speech, writing, or gestures. For example, as the teachers wrote equations on the physical board, they would concurrently read the equations aloud, thereby blending visual and auditory modes of communication. Another example was their use of hand gestures while speaking, which demonstrates their simultaneous use of verbal and gestural resources. These practices were also observed among the students when they were called on to recite, highlighting the tendency of multilingual individuals to go beyond their linguistic resources and draw on non-linguistic resources as well to facilitate communication.

Online Mathematical Discourse

Based on the analysis of the transcripts from the observation of online mathematical discourse, it was determined that both teachers and students also utilized English, Tagalog, and Taglish as their languages for communication. This observation suggests that regardless of the setting, the tendency of multilingual individuals to leverage their full linguistic repertoire remains. However, one interesting observation that was not present in the face-to-face mathematical discourse was the use of the built-in chat box by the students to convey their messages in written form. Unlike in face-to-face settings, where mathematical discourse predominantly occurs through speech and writing on a physical board, the chat box provided an alternative space for students to express their ideas in writing. This additional mode of communication allowed the students to participate in the mathematical discourse even without speaking and having access to a physical board, highlighting how digital tools can expand the multimodal repertoire in online settings. Another interesting observation was the use of a virtual board by the teacher for writing, which was shared with the students through the share-screen feature of the video conferencing platform. The virtual board functioned much like a physical whiteboard, allowing the teacher to write equations and draw illustrations during the online mathematical discourse. This digital tool served as another mode of communication and as a central point of reference for both teachers and students, allowing them to integrate written and visual resources to enhance their communication and learning.

As for the multisemiotic repertoire, both teachers and students continued to use mathematical representations to refer to mathematical concepts, which they conveyed through speech and writing. They also used virtual gestures to deliver other types of information, such as the thumbs-up gesture or the heart reaction to relay their agreement. These virtual gestures may be characterized as both a semiotic and modal resource, as they functioned as signs through which the students' messages were delivered. The emergence of these virtual gestures is another example of how digital tools can support online discourse by offering an alternative mode of communication to engage the students in the discourse.

Similarities and Differences Between Face-to-Face and Online Mathematical Discourse

Table 1: Comparison Between Face-to-Face and Online Mathematical Discourse

Repertoire	Face-to-face Mathematical Discourse	Online Mathematical Discourse
Multilingual	English, Tagalog, Taglish	English, Tagalog, Taglish
Multisemiotic	Mathematical Representations	Mathematical Representations
	Physical Gestures	Virtual Gestures
Multimodal	Speech	Speech
	Writing on Physical Board	Writing on Virtual Board and Chat Box

Table 1 summarizes the similarities and differences between face-to-face and online mathematical discourse. In summary, multilingual, multisemiotic, and multimodal resources were present in both face-to-face and online mathematical discourse. The languages spoken in the two settings were similar, but there were differences in the multisemiotic and multimodal resources mobilized, such as the use of body language signals by teachers and students during face-to-face mathematical discourse and the use of digital tools, including the chat box, virtual board, and virtual gestures, during online mathematical discourse.

Conclusion

Based on the discussion, it can be concluded that both teachers and students utilized their multilingual, multisemiotic, and multimodal repertoires as resources to communicate and make meaning in both face-to-face and online mathematics classrooms. This means that regardless of the setting, multilingual individuals instinctively rely on the resources that are available to them to support their learning of mathematics. This supports the claim of Wei and Ho (2018), who stated that multilingual learners naturally leverage and orchestrate their diverse resources during their process of learning.

Considering the role that translanguaging plays in facilitating mathematical discourse, the next step of the authors then is to determine whether or not an association exists between the translanguaging practices of the students and their learning outcomes in mathematics. The purpose of this is to determine whether the use of translanguaging impacts students' academic performance, and if so, to gain insights into how translanguaging may enhance their learning processes and outcomes, as well as to identify potential strategies for its effective integration in both face-to-face and online classrooms. This study is therefore a subset of a larger, ongoing investigation into translanguaging in mathematical discourse. The findings presented in this paper reflect the results of the initial stage of the research.

Finally, as hybrid learning continues to grow in demand, the authors hope that the insights offered by this research could serve as a guide for identifying and leveraging the translanguaging capacities of teachers and students to help facilitate quality mathematical discourse in both face-to-face and online environments.

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Prevalence of Knowledge on the Silent Global Health Epidemic: *Hikikomori* Among Indian Stakeholders

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Abstract

Hikikomori or severe social isolation is a growing issue related to mental health across the globe for which the modern generation of teenagers and young adults belonging to both industrialised and emergent nations are severely victimised. For a quantitative study using the random sampling method, a survey was conducted with around 200 participants, who were Indian stakeholders. They were ensured to have regular correspondence with high-school and collegiate students. The analysed data and its consequent results obtained from the survey stated that many were not aware of this rising issue. The silent global health epidemic is now becoming a Gordian knot in the Indian sub-continent as well albeit it is not yet a colossal issue in India. This snag affects the youngsters indirectly hindering the development of society. Further, the study explores the knowledge these participants have on *hikikomori* based on its medically tested causes, that were included in the questionnaire. This inquiry also aims to reflect the necessity of giving knowledge to academics and parents about *hikikomori*, its causal nexus and the need for an education to the targeted groups on how to treat those who possess symptoms of *hikikomori*, as a safety measure. The outcomes additionally inform that many educationists are interested in taking up specialised training aids to assist learners with *hikikomori* for an early diagnosis instead of leaving them to squander. This evaluation also recommends a further outlook for designing a training curriculum that encompasses both theoretical and practical sessions to equip oneself for assisting *hikikomori*.

Keywords: growing generation, *hikikomori*, Indian stakeholders, mental health, silent global health epidemic

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Introduction

The well-known *hikikomori* syndrome or the severe social isolation, is a serious problem that has been silently spreading across the globe that ended up to be called a ‘silent global health epidemic’ by researchers and doctors. “Although this syndrome was originally described in Japan, over the course of last few years it has been documented in several parts of the world, spreading like a silent epidemic” (Silić et al., 2019). This problem is characterized by extreme isolation and researchers state that this problem can also occur in childhood and even in adolescents based on various constructs. “The study of children’s and adolescents’ solitary and withdrawn behavior has been associated with such constructs as shyness, behavioral inhibition, isolation and rejection, social reticence, passivity, and peer neglect” (Rubin et al., 2008). This issue was initially reported in the 1990s and became popular after publications were made on the issue.

Hikikomori became widely used as a noun in the latter half of the 1990s when a Japanese psychiatrist, T. Saito, published ‘*Hikikomori – Adolescence Without End.*’ This issue was not a domestic problem of Japan but it is considered as a global social health issue that can be called a silent global health epidemic. (Kato et al., 2019)

Earlier research says the issue was not just a Japanese problem but a global issue termed the global silent epidemic, “The hikikomori phenomenon was not a domestic Japanese social problem, but a global social and health issue or a global silent epidemic” (Takefuji, 2023). Research studies have also disclosed the prevalence of *hikikomori* syndrome not only in Japan but also across the globe, especially in urban areas, through surveys and researches. “The participants felt that people with *hikikomori* syndrome were seen in all countries and that they are more frequently seen in urban areas” (Kato et al., 2011).

Aim

The aim of this paper is to reflect the necessity of giving knowledge to academics and parents about *hikikomori* in the Indian region. Also, it aims to help the stakeholders know *hikikomori*’s causal nexus and the need for an education to the targeted groups on how to treat those who possess symptoms of the above stated problem. As an important objective, this paper presents this study as a safety and preventive measure.

Methodology

The systematic methodology was employed in the study. Initially, a literature review was conducted, which was used for development of a questionnaire. Two questionnaires were created to target specific stakeholder groups: one for parents, grandparents, siblings, neighbours and cousins, and another for teachers and academicians. The questionnaires comprised seven sections with a total of 68 questions, excluding the demographic data. The demographic questions varied based on the subgroup classification. Sections 2 to 8 addressed personal factors, behavioural traits, family dynamics, social influences, environmental stressors, observable social withdrawal and the need for awareness and training. Participants were Indian stakeholders from various regions of the country, with around 200 respondents targeted but with a total of 235 responses collected via Google Forms. A 5-point Likert scale was employed and data was gathered through a random sampling method.

Literature Review

This paper studies an 18-year-old Indian with *Hikikomori* and his inability to take the cognitive behavioural therapy instigated due to his inability to attend regularly (Sunil et al., 2024). The research article suggests how India faces growing loneliness crisis suggesting that community building, mental health awareness, and supportive policies are required (Reddy, 2023). The study investigates the prevalence and epidemiology of *hikikomori* focusing on its origins in urban areas, indicating potential biochemical, cultural and environmental factors (Kato et al., 2011). The research article addresses loneliness as significant issue in the elderly population that can lead to mental health issues, maladaptive behaviours, and increased risk of physical illnesses, emphasizing the need for proper diagnosis and management (Tiwari, 2013). A study at Yenepoya University revealed that 26% of post-graduate students have Facebook addiction, with a strong correlation between addiction severity and loneliness (Shettar et al., 2017). A systematic review of 1290 studies in India found a high burden of loneliness, particularly among the elderly suggesting multipronged interventions to address loneliness's risk factors (Hossain et al., 2020). A study suggests that increasing *hikikomori* trend in India is a result of rising population, resource depletion, lack of employment, and excessive technology reliance (Tripathi, 2022). A study among medical undergraduates found a significant association between internet and gaming addictions and *hikikomori* traits, with insomnia being the most common determinant (Solanki et al., 2023). A study of 36 participants from India, Japan, Korea, and the US found high levels of loneliness, limited social networks, and moderate functional impairment (Teo et al., 2014). A study involving 102 participants says that India's lockdown has led to severe social withdrawal, causing a lack of interest in socializing (Singh Chauhan et al., 2020). A study using *Hikikomori* Questionnaire has shown robust psychometric properties and diagnostic accuracy in a sample of 399 participants, indicating potential for further research in clinical assessment (Teo et al., 2018). This study explores *hikikomori*, among health-related students and professionals with results showing varying perceptions (Tateno et al., 2012b). This study investigates the prevalence and characteristics of *hikikomori* in China with a total of 1,066 youth participants through online survey (Hu et al., 2022). A study involving the review of the CHIME framework suggests it could guide *hikikomori* care, but additional dimensions could be added alongside stating that further research is needed to improve *hikikomori* care (Yung et al., 2021). A research studies *hikikomori*'s link to avoidant personality disorder and reveals *hikikomori*-related traits and lower serum cholesterol levels (Hayakawa et al., 2018). A study reveals that COVID-19 pandemic has led to increased isolation among office workers in Japan, with *hikikomori* being a risk factor using an online survey (Kubo et al., 2022). A study finds that *Hikikomori* syndrome (HS) is linked to digital technology use, overuse, and addictive behaviours with a systematic review of 17 studies (Sales-Filho et al., 2023). A study reveals how *hikikomori* affects 1.2% of the population using a survey with parents of middle school students with *hikikomori* as participants (Hamasaki et al., 2020). A new study states that *hikikomori* is not well-understood by psychologists by the analysis of survey data from 3,287 participants aged 15-39 from 200 different urban and suburban municipalities across Japan (Young, 2019). Another study analyses the factors contributing to *hikikomori* as academic stress, unemployment, and changing family structures with an observation that current interventions are insufficient, requiring comprehensive, multi-faceted solutions (Matsushita et al., 2023). A research study shares the study of two Japanese university students with *Hikikomori* experiencing improvements in social withdrawal behaviour after a structured intervention called Human Movement Consultation (HMC) (Yokoyama et al., 2023). The study reveals that therapeutic intervention for *hikikomori* is challenging, but a multidimensional approach centred on family support is generally recommended whose goal

is to alleviate loneliness and develop favourable conditions for increased social interactions and sociability (Ferrara et al., 2020). The study explores the in-depth experience of individuals with *hikikomori* in a non-clinical setting, arguing that it is an anomic response to a situation they feel powerless to change (Yong & Kaneko, 2016). This study analyses family factors related to social withdrawal syndrome in 190 cases. The results of which show high rates of dysfunctional family dynamics, family psychiatric history, and childhood maltreatment (Malagón-Amor et al., 2020). A study on *hikikomori* found that patients with *hikikomori* had higher blood metabolic signatures, including bilirubin, arginine, ornithine, and serum arginase (Setoyama et al., 2021).

Research Gap

After a detailed survey of literature, the research gap obtained from this survey were: i) very less experimental researches and publications on *hikikomori* pinned to Indian region were found; ii) the researches conducted were based on already established questionnaires and no new questionnaire establishment was made focusing on the knowledge of *hikikomori* for Indian stakeholders like teachers and parents; iii) there were no regionalized preventive measures prescribed or published so far.

Discussion

The following Table 1 represents the questions asked in the demographic profile of the participants

Table 1: Demographic Profile of the Participants

S.no	Parents/siblings/cousins/ grandparents/neighbours	Teachers and academicians
1	Name (optional)	Name (optional)
2	What is your age	What is your age
3	Relationship with the child/children	What is your gender
4	Are you a single parent	How many years of teaching experience do you have
5	Are you a working parent	What subject(s) do you primarily teach
6	Who goes for work in the family	Classes Handled
7	Do you have a caretaker for the child/children at home	What type of school/ College/ University do you work in
8	Number of child/children in your family	On average, how many students are there in your class
9	Number of members (including the taker) in the family	Approximately how much time do you spend interacting with individual students daily
10	Do the child/children in your family live with grandparents	Where is your institution located
11	The child/children in the house are a hosteller/day-scholar	
12	The child/children in the family study school/college	

Results

The results of the data collected are discussed herewith. The stakeholders show through their responses that the issue of *hikikomori* is not addressed well post the pandemic. Moreover, the stakeholders wanted specialised training aids to assist prevention and approach towards the rising issue of severe social isolation. Alongside, the respondents feel that identification on initial levels will help for prevention of this silent health issue from becoming severe which will indirectly offer a helping hand towards development of a better society for the upcoming generation. Detailed descriptions of the data are represented sections-wise diagrams. Section one bearing the demographic data are represented in the pie chart followed by discussions upon it. The Figures 1A – 1K represent the responses from the questionnaire given to parents, siblings, cousins, grandparents and neighbours.

Figure 1A represents that out of 166 respondents, 62 respondents belonged to 16 to 18 years, 83 belonged to 18 to 25 years, 5 people belonged to 26 to 35 years, 7 belonged to 36 to 45 years and 9 respondents belonged to the above 45 years category. Figure 1B represents the respondents' relationship with their child or children. Of which 8 were fathers, 15 were mothers, 1 was a guardian, 35 were siblings, 3 were cousins and 104 respondents did not wish to reveal their relationship. Figure 1C represents that only 164 respondents attended this question and of these 38 were not single parents, 4 were single parents and 122 were not interested to disclose their status. Figure 1D represents that out of 166 respondents 15 were working parents, 14 were not going for work, 4 were self-employed, 133 were not interested to disclose and no one was working from home. Figure 1E represents that in 103 respondents' families only the father goes to work and in 6 families the mother alone goes to work whilst in 57 families both the fathers and mother go to work. Figure 1F represents that out of 166 respondents 145 families have no caretakers and 21 families had caretakers for their children. Figure 1G represents that 42 families had 1 child alone at their homes, 109 families had 2 children, 11 families had 3 and 4 families had more than 3 children. Figure 1H represents the total number of persons in their families including the respondent; the results were 3 had 2 members alone, 27 had 3 members, 90 respondents had 4 members 31 respondents had 5 members and 15 of them had more than 5 members in their family. Figure 1I represents the data survey result that out of 166 respondents, only 57 of them have their child or children living with their grandparents and the remaining 107 do not live with their grandparents. Figure 1J represents that out of 166 respondents, 77 children were hostellers and 89 were day scholars. Figure 1K represents the survey result that out of 166 respondents, 118 have college going children at their homes and 48 have school going children in their homes.

Figure 1A: Age of the Participants

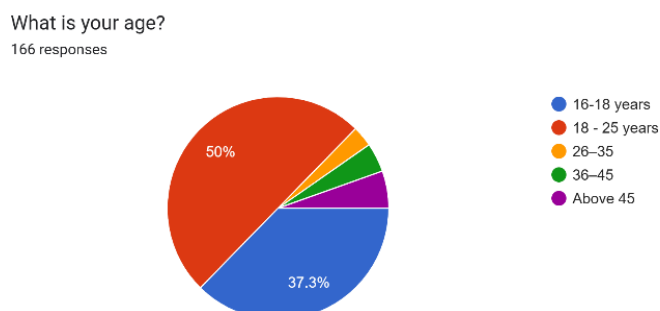


Figure 1B: Relationship With the Child

Relationship with the child

166 responses

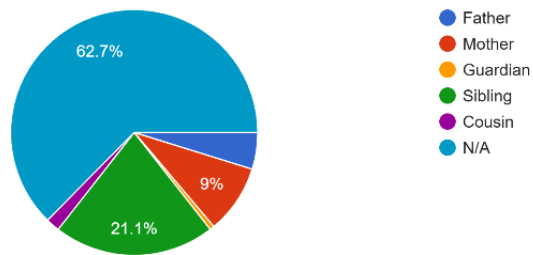


Figure 1C: Parents' Marital Status

Are you a single parent?

164 responses

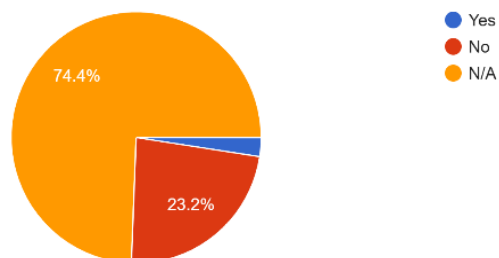


Figure 1D: Parents' Work Status

Are you a working parent?

166 responses

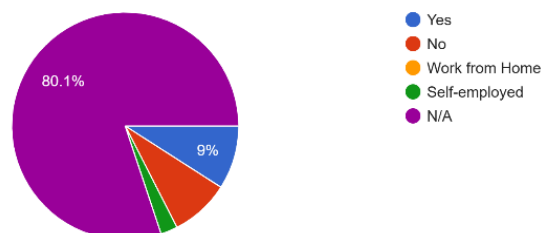


Figure 1E: Income Earner in the Family

Who goes for work in the family?

166 responses

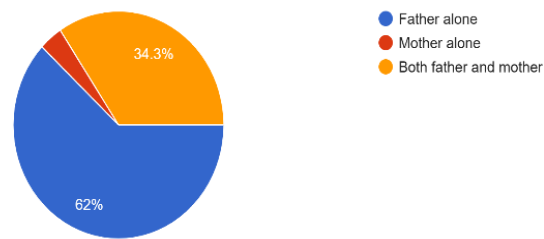


Figure 1F: Availability of Caretaker at Home

Do you have a Caretaker for the child/children at home?

166 responses

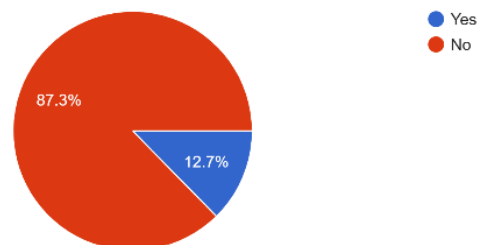


Figure 1G: Number of Children in Family

Number of Children in your family

166 responses

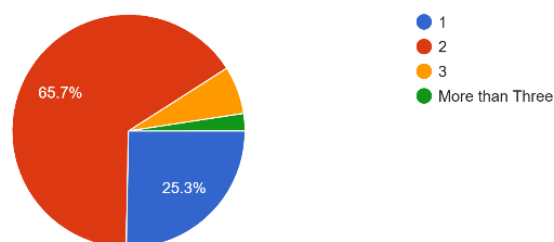


Figure 1H: Number of Members in Family

Number of members (including you) in the family

166 responses

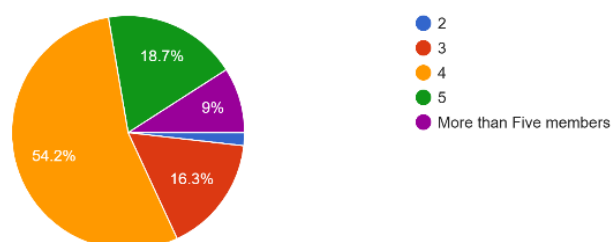


Figure 1I: Living With Grandparents

Do the child/children in your family live with grandparents?
166 responses

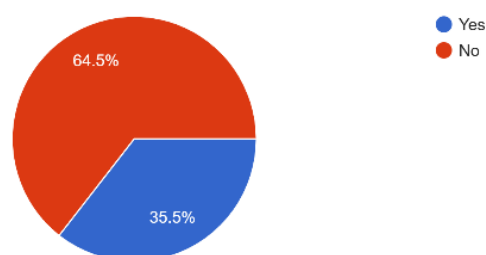


Figure 1J: Hosteller/Day Scholar

The child in your house is a
166 responses

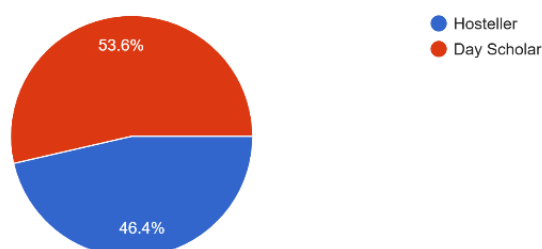
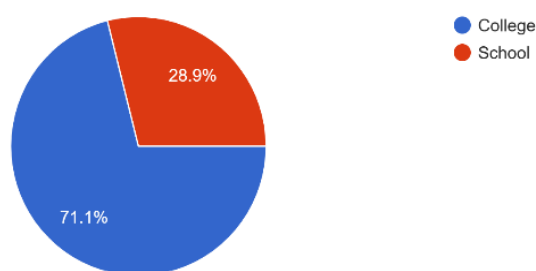


Figure 1K: College/School

The Child in your house studies
166 responses



Figures 2A – 2I represent the responses from the questionnaire given to teachers and academicians. Figure 2A represents 69 respondents who are teachers and academicians of whom 20 respondents were below 25 years, 25 belonged 26 to 35 years, 14 belonged to 36 to 45 years, 7 belonged to 46 to 55 years and 3 respondents were above 55 years. Figure 2B represents that of the respondents, 14 were male teachers and 55 were female teachers and academicians. Figure 2C represents the teaching experiences of the 69 teachers and academicians who participated in this survey; 19 respondents have experience less than one year, 20 have 1 to 5 years of experience, 8 have 6 to 10 years of experience, 9 have 11 to 15 years of experience and 13 respondents have more than 15 years of experience. Figure 2D represents the subjects primarily taught by the respondents of which, 1 respondent in each of Physical Science, Social Science, Management, Literature, Mathematical Sciences, English and Programming Language subjects, 2 in each of Technical Education, Physical Education

and Teacher Training subjects, 3 in Life Sciences and Law fields, 7 teachers from Education fields, 8 respondents from mathematics, 15 are Engineering faculty and 43 respondents are Language teachers. Figure 2E represents the classes handled by the respondents of which 13 are elementary school teachers, 17 are middle school teachers, 22 are high school teachers, 48 teach undergraduate courses, 28 handle graduate courses, 9 teach technical courses and there were no respondents from technical and legal courses. Figure 2F represents the type of institution the respondents work; 47 were employees of private institutions, 18 belong to public institutions and 1 from each aided, deemed university, public school and online teaching. Figure 2G represents the data of number of students in each respondents' class; 2 respondents have less than 20 students in their classrooms, 8 have 21 to 30 students, 14 have 31 to 40 students and 45 respondents have more than 40 students in their classrooms. Figure 2H represents the number of hours the respondents spend interacting with students every day; 36 respondents spend less than 1 hour, 17 respondents spend 1 to 2 hours, 10 spend 3 to 4 hours and 6 respondents spend more than 4 hours. Figure 2I represents the data representation of the location where the respondents' institutions are; it states that 34 respondents work in institutions placed in urban area, 19 from the suburban and 16 respondents work in institutions located in rural area.

Figure 2A: Age of the Participants

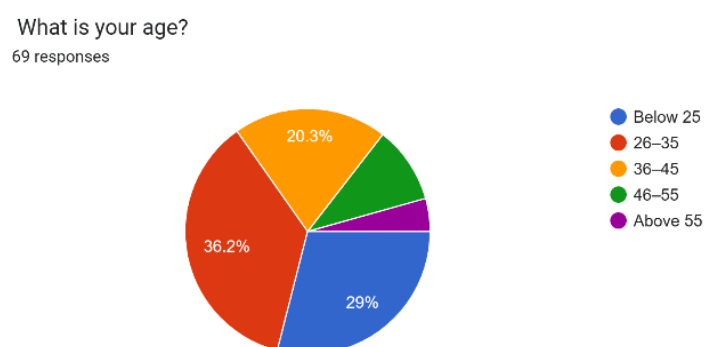


Figure 2B: Gender of the Participants

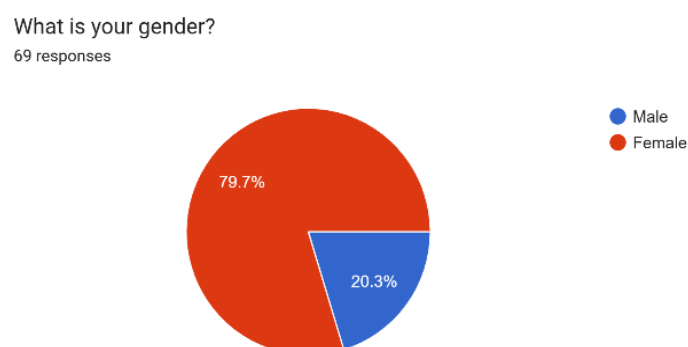


Figure 2C: Teaching Experience

How many years of teaching experience do you have?

69 responses

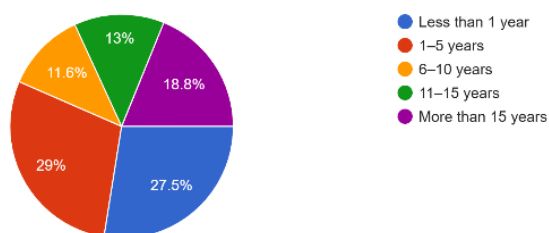


Figure 2D: Subjects Primarily Taught by the Participants

What subject(s) do you primarily teach?

69 responses

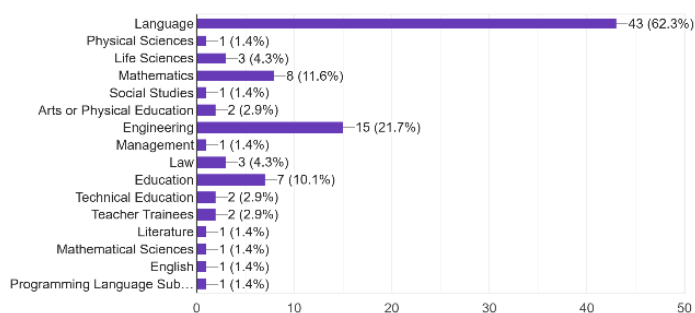


Figure 2E: Classes Handled by the Participants

Class Handled

69 responses

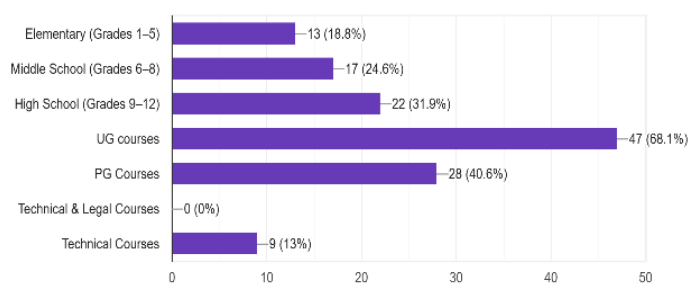


Figure 2F: Type of School/College/University

What type of school/ College/ University do you work in?

69 responses

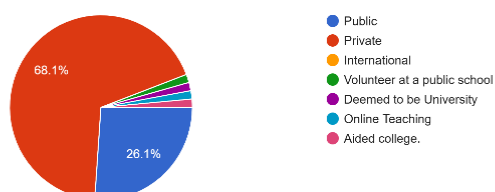


Figure 2G: Number of Students in the Participants' Class

On average, how many students are there in your class?

69 responses

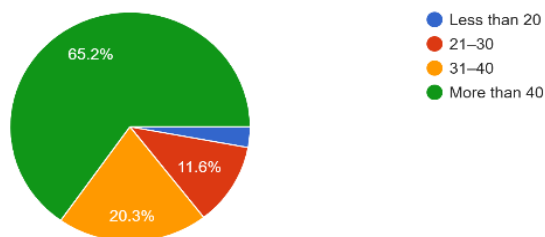


Figure 2H: Time Spent Interacting With Students Daily

Approximately how much time do you spend interacting with individual students daily?

69 responses

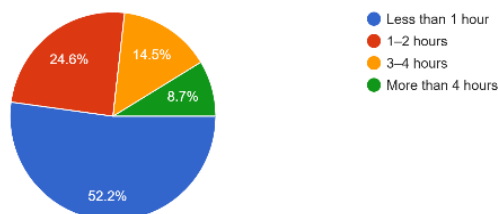
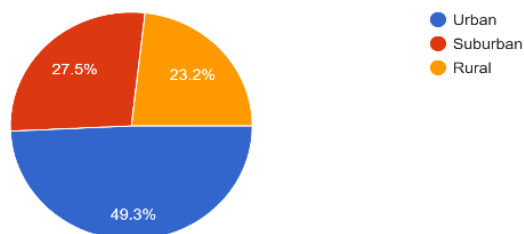


Figure 2I: Location of the Institution

Where is your institution located?

69 responses



Further, the analysis of the responses from sections 2 to 8 are represented and discussed below.

Figure 3A: Parents Group – Self-Esteem

Section 2

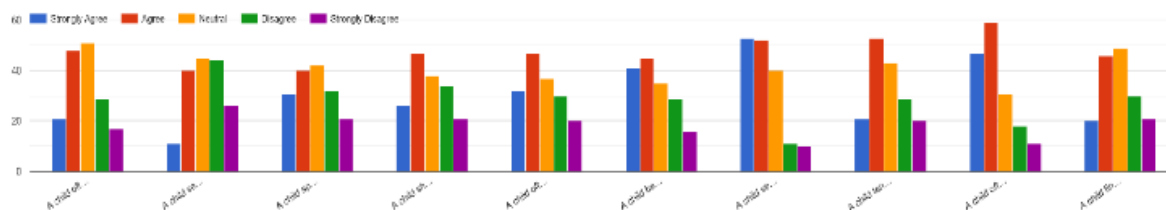
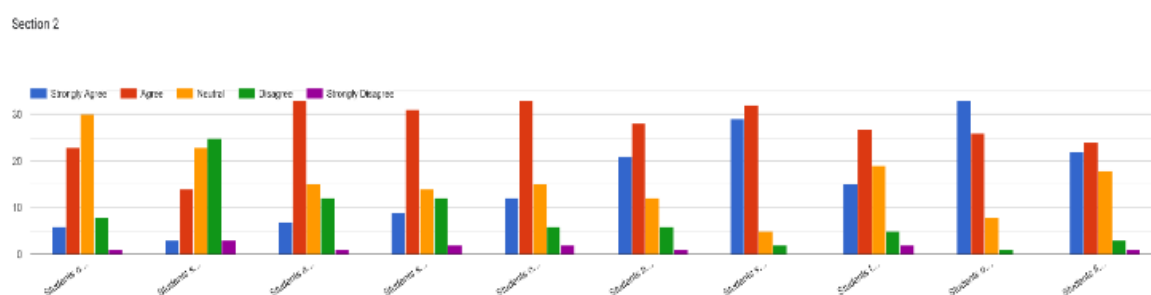


Figure 3B: Teachers Group – Self-Esteem



Figures 3A and 3B represent the responses from parents and teachers groups respectively from the section 2 questions on self-esteem. Most of the responses stated agree and neutral and strongly agree than the disagreements. The respondents agreed that the children and students felt inadequate to their peers, uncomfortable accepting praise or compliments, thoughts of others having low opinion of them, anxiety when interacting with others, excessive worry of how others perceive them, nervous in new or unfamiliar situations, uncomfortable when criticised, avoid confronting problems by withdrawing from them, distract themselves into using gadgets when stressed and find it difficult to tackle challenges head-on, preferring to avoid them.

Figure 4A: Parents Group – Behavioural Traits

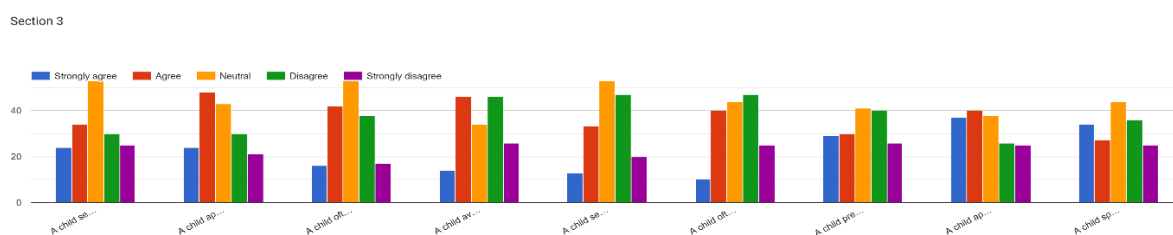
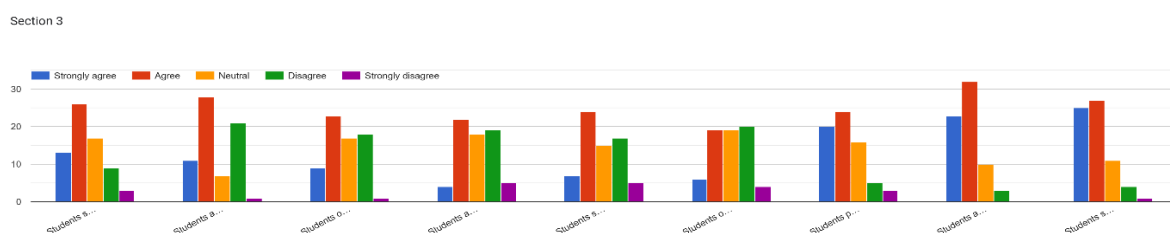


Figure 4B: Teachers Group – Behavioural Traits



Figures 4A and 4B represent the responses from parents and teachers groups respectively from the section 3 questions on behavioural traits. The parent group respondents were neutral on questions on children and students being alone in even group settings, withdrawing from others and more time in virtual interaction; agreements were on more comfortable isolated than while socialising, avoidance to attend social events and group activities and comfortable expressing themselves through writing or digital communications. The disagreements were spread-about for questions on preferring face to face conversations and often making excuses to attend social gatherings. Whist the teacher groups mostly agreeing in their responses to the questions in section 2.

Figure 5A: Parents Group – Family Dynamics

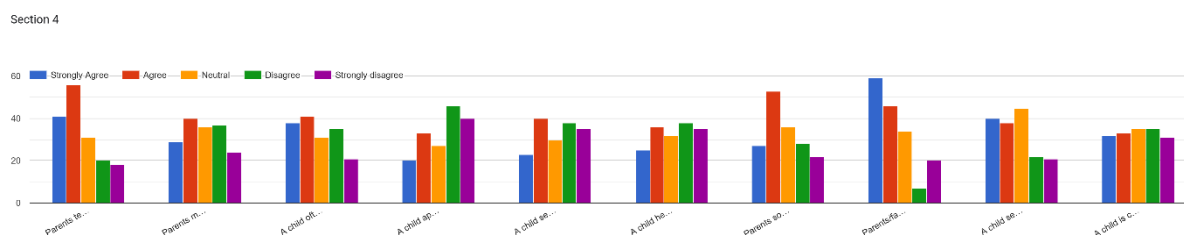
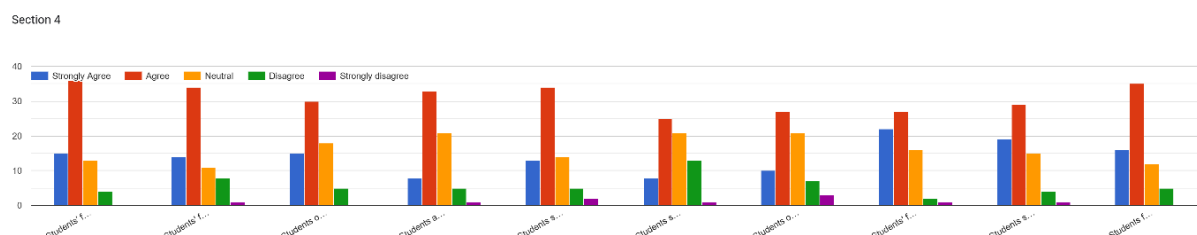


Figure 5B: Teachers Group – Family Dynamics



Figures 5A and 5B represent the responses from parents and teachers groups respectively from the section 4 questions based on Family dynamics. The parents group strongly agreed and agreed to and high amount of responses from teachers group agreed to questions from this section to questions on over protection from family, decisions made by family for the children and students, students unable to make their own decisions due to family control, emotionally distant from parents, difficulty communicating with their parents, seeming to be unsupported by the family in stressful situations, often misunderstood by parents, high academic or career expectations, pressured by family to achieve beyond capabilities and constant judgement based on performance.

Figure 6A: Parents Group – Social Influences

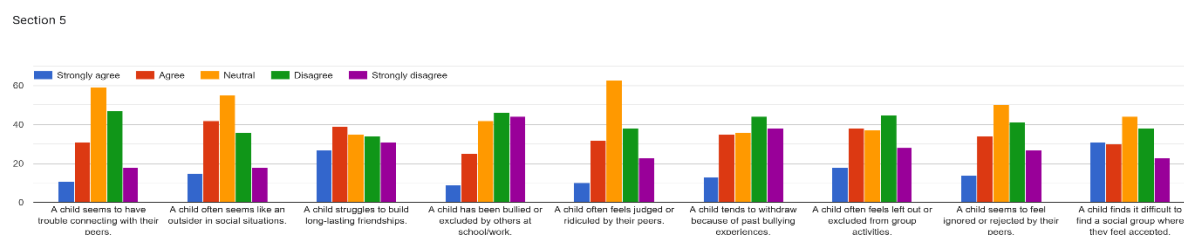
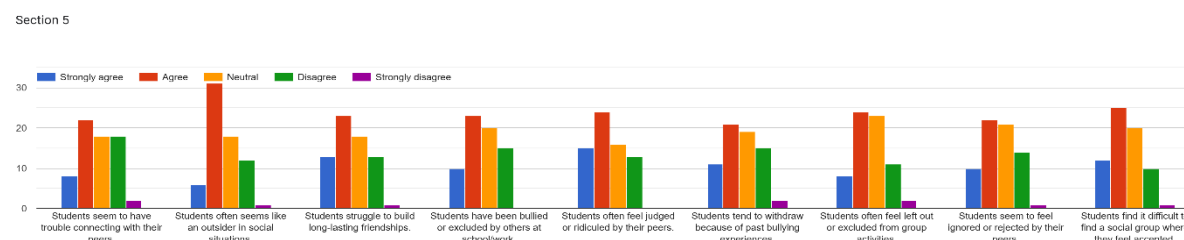


Figure 6B: Teachers Group – Social Influences



Figures 6A and 6B represent the responses from parents and teachers groups respectively from the section 5 questions based on Social influences. A contrast in the parents-group responses and teachers-group responses could be seen in this section. The parents have mostly responded neutral and the selection of agreement is less while on the other hand, the

teachers have agreed to all the questions on students' trouble on connecting with their peers, feeling like an outside in social situations, struggling to build long-lasting relationships, being bullied or excluded, feeling judged or ridiculed by peers, withdrawing because of past experiences, often feeling excluded from group activities, feeling ignored or rejected by peers and difficulty in finding a suitable social group.

Figure 7A: Parents Group – Environmental Stressors

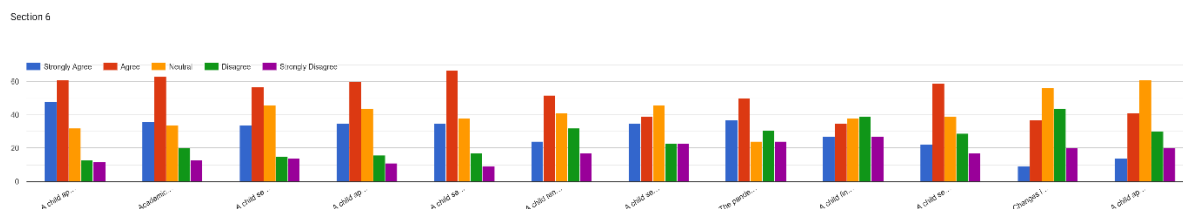
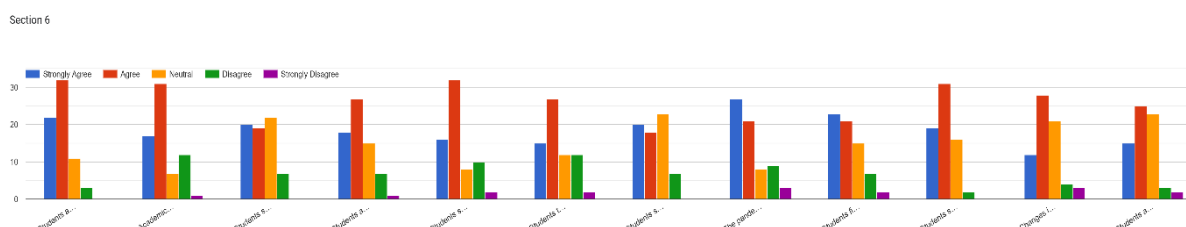


Figure 7B: Teachers Group – Environmental Stressors



Figures 7A and 7B represent the responses from parents and teachers groups respectively from the section 6 questions based on environmental stressors. This section has most answers strongly agreeing and agreeing than disagreeing to the factors. Both the group of respondents has agreement to the questions on overwhelming academic pressures, academic demands causing withdrawal from social activities, students' or children's inability to meet the expectations, struggle with academic work, seeming exhausted or drained after school or college causing withdrawal, avoiding to socialise due to stress, comfortable with solitude since the pandemic, pandemic making students or children more isolated than before, difficulty to re-engage in social activities post pandemic, struggle with and withdrawal due to sudden change of environment and being unsettled by changes to routine or environment.

Figure 8A: Parents Group – Observable Social Withdrawal Behaviours

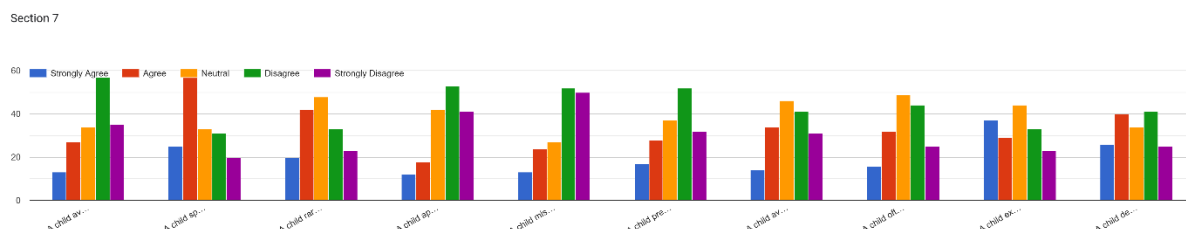
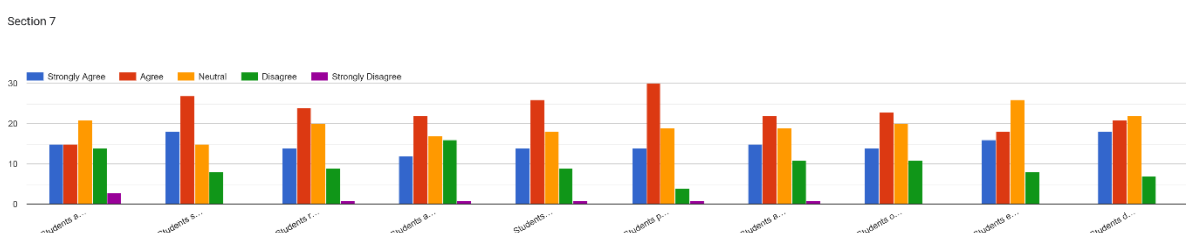


Figure 8B: Teachers Group – Observable Social Withdrawal Behaviours



Figures 8A and 8B represent the responses from parents and teachers groups respectively from the section 7 questions on observable social withdrawal behaviours. The responses are diverse from both the groups. The questions were on avoidance of face-to-face interactions with family and friends, spending excessive time in own rooms or private spaces, rare participation in in group activities or social events, disinterest in forming or maintaining friendships, frequent missing of class without any valid reasons, preference to virtual interactions, avoiding eye contact and discomfort in social interactions, emotionally detached or unresponsive in group settings, exhibiting reluctance to leave home unless necessary and demonstrating noticeable decline in academic or extracurricular activities. The parent-group respondents mostly chose disagree and a few neutral as choices but the teachers had most of their choice as agree and a few neutrals.

Figure 9A: Parents Group – Awareness and Need for Training

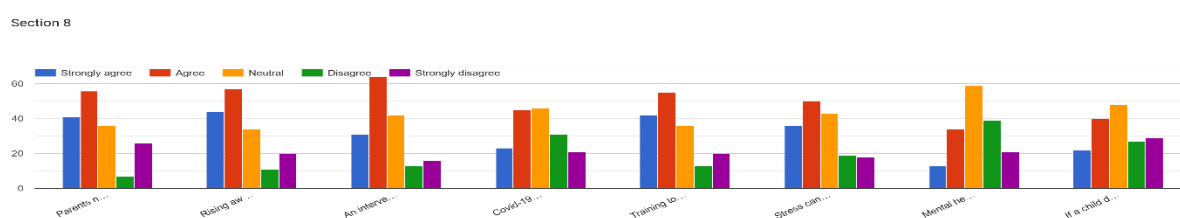
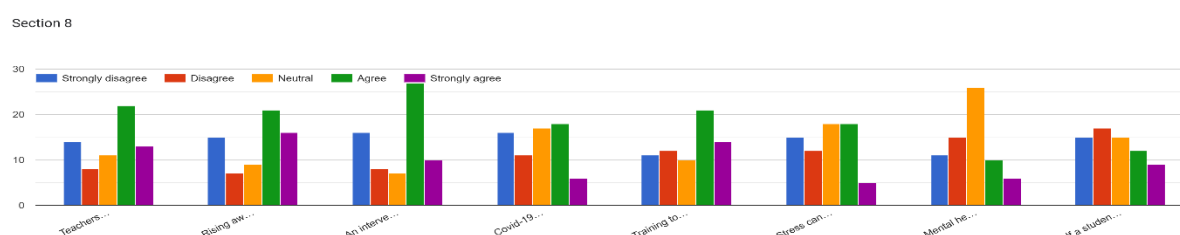


Figure 9B: Teachers Group – Awareness and Need for Training



Figures 9A and 9B represent the responses from parents and teachers groups respectively from the section 8 questions on awareness and need for training to handle the rising *hikikomori* situation in India. Most of the respondents from both the groups agree and express their need for training and awareness to help, prevent and assist students or children who are on the verge of becoming *hikikomori*. Questions like teachers and parents needing and awareness of this issue, rising awareness to help recognise symptoms of mental health problems, intervention programmes and training to handle students with *hikikomori* and related problems in academic institutions. The respondents also rightly disagreed to questions like pandemic and lockdown not being the cause of *hikikomori*, stress cannot lead to *hikikomori*, such problems not having chances to become prevalent in India and if students or children do not socialise it can be considered that he or she is an introvert.

Observations

Maximum participants agreed that the problem is silently and rapidly rising in India in a masked form. This is because the stakeholders were not aware that *hikikomori* or symptoms of *hikikomori* were a serious problem to be addressed and the fact that such problems can arise in countries like India. Additionally, the stakeholders were not aware that they as well were subtly and unknowingly contributing to the rise of this problem. Finally, they agreed

that they were in need of training and intervention programmes to effectively approach and handle situations in order to prevent *hikikomori* rise in India.

Recommendations From this Study

A further outlook for designing a training curriculum based on each culture and region, that encompasses both theoretical and practical sessions to equip oneself for assisting and preventing *hikikomori* can be implemented.

Conclusion

Thus, this paper suggests that *hikikomori* or the silent global health epidemic is a serious issue that has to be looked into. No matter which country has the maximum effects but with a focus on safeguarding the young growing generation with a sense of unity is necessary. This will also contribute to the development of the peaceful growth of the generations to come which further provides a world with a better society.

Acknowledgements

My sincere thanks to Dr P Suganthi, Assistant Professor, for her significant support and help in bringing out this survey-based research successfully.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

No use of AI and AI-assisted technologies were used in the writing process.

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Psychosocial Impact on Refugee Children's Mental Health: Exploring SDG 3 in Rosemary McCarney's *Where Will I Live?*

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Abstract

The humanitarian crisis has been a significant menace to the world for the past few decades. Each crisis has repercussions, and civilians become victims of horrendous crises like wars and other catastrophes. Each crisis invariably leaves an impact on the lives of vulnerable populations like refugees and migrants, especially in the lives of refugee children. Refugee children are exposed to wars, violence, poverty and hunger at a tender age, which invariably takes a toll on their mental health. The United Nations has formed Sustainable Development Goals to cater to vulnerable people's needs. SDG 3: Good Health and Well-being focuses on providing mental health support to affected people. The paper examines the psychosocial factors that affect the mental health of refugee children through the work *Where Will I Live?* by Rosemary McCarney. The work *Where Will I Live?* is a non-fiction that captures the horrific experiences of refugee children in refugee camps. The work divulges the stories of refugee children who seemed to be robbed of a better future due to conflicts. The study introspects the traumatic stress theory that prevails in the lives of refugee children, which curbs the progress of SDG 3. The paper further focuses on providing mental health care for refugee children through Narrative Exposure Therapy. Narrative Exposure Therapy is a treatment to cure prolonged traumatic disorders. The paper aims to offer solutions for the mental health crisis that prevails in refugee children and also to contribute to SDG 3: Good Health and Well-Being.

Keywords: mental health crisis, SDG 3: good health and well-being, refugee children, narrative exposure therapy

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Introduction

Wars have been causing economic distress across the globe. It leads to economic, social and psychosocial decline in the lives of vulnerable populations. Especially children are paying the price for an unprecedented crisis. Wars imperil the mental health of refugee children, whereas economic and social demolition seems to be comparatively less intense. Poverty, hunger, loss of loved ones, pre-migration and post-migration are the other social determinants of mental health (External Stressors). Most of the refugee population is combating mental health issues and psychological disorders. Especially refugee children, are mostly diagnosed with anxiety issues due to multiple traumas. War traumas and war exhaustion weaken the mental health and well-being of refugee children.

Children who are exposed to traumatic events like bombardments and shellings might lose their ability to cope with stress. Stress responses towards traumatic events can be categorised into two types such as acute stress and chronic stress. Acute stress occurs when a threat or stressful event activates adrenal glands to release fight/flight hormones; it lasts only for a momentary period. Whereas chronic stress occurs when an individual undergoes prolonged stress that often incites constant fears and anxiety. Failure to control emotions and cope with chronic stress leads to psychological disorders such as Depression, Major Depressive Disorder (MDD), Post-Traumatic Stress Disorder (PTSD), Attention Deficit/ hyperactivity Disorder (ADHD) and other anxiety disorders.

The stressful events and horrible visuals affect the brain development of refugee children. It impairs the cognitive ability of refugee children. It leads to behavioural changes that invariably hinder learning ability in education. Refugee students with less cognitive ability and emotional stability are struggling to adapt to learning activities due to war trauma.

Literature Review

Kribakaran et al. (2023) emphasised the trauma caused by migrations. The research focused on migrant families from Haiti, Mexico and Central America. It further delved into neurobiological factors and mechanisms that are involved in trauma caused by tedious migrations. The research has suggested possible policies and recommendations to provide holistic mental health care for migrant families besides highlighted the importance of KIDNET (Narrative Exposure Therapy for Children and Adolescents) and the Neurocognitive theory of traumatic memory for war-affected refugee children. The research discussed the NET intervention strategies and effective treatment for children who are diagnosed with PTSD.

Kangaslampi et al. (2015) focused on immigrant children who were diagnosed with PTSD due to wars. The research has compared the efficiency of Cognitive Behavioral Therapy (CBT) and Narrative Exposure Therapy. The research has taken a quantitative approach to rest the case that NET seems to be more effective than CBT as it gives resilience for war-affected immigrant children. The study was conducted with immigrant children from 9- 17. Hart (2009) discussed child refugees' trauma. Multiple experiences like migrations and post-migrations affect the education of several refugees. The research has taken an interactionist and systematic approach to comprehend the hardships of refugee children.

Driver and Beltran (1998) dealt with long term exposure of trauma faced by refugee children and how it impacts their occupational performance. The research has identified that refugee

trauma affects their academic performance and occupational performance as well. The research further discussed the vital role of occupational therapies to meet the needs of the children. Arash et al. (2021) emphasised how various experiences like displacements and resettlements play a vital role in shaping the mechanism of resilience. Children who are diagnosed with PTSD have multiple layers of trauma depending upon their situations. The study was conducted with Syrian and Arab immigrant families.

Effect of External Stressors on Mental Health

There are a wide range of stressors that endanger brain development and cause psychological disorders in refugee children. External stressors and social factors become the root cause of chronic and acute stress. Stressors like homelessness, emotional bereavement and survivor's guilt curb the ability to regulate emotions. External stressors of refugee children can be seen in Rosemary McCarney's book *Where Will I Live?* Rosemary McCarney was born on 5th October in 1953. She is an award-winning humanitarian business leader, established author and renowned public speaker. She has donned several hats in various disciplines, including becoming Canada's first executive director and the U.S. Law Institute.

McCarney has served as a board member of numerous organisations. She has been receiving commendations for being a dynamic advocate for human rights and human rights defenders. Her laurels escalated when she became the permanent UN Ambassador of Canada in 2005, and she also became the CEO of Plan Canada International, which is alleged to be one of the largest charities in Canada. She has gained multiple accolades for her partnership with International Economic Development, the World Bank, foreign governments, and various UN bodies.

McCarney has left a remarkable imprint in the field of writing. Her writings have amassed international recognition. Her series of children's books deals with social justice and the prevailing refugee crisis. Her other works include *Every Day Is a Malala Day* (2013), *The Way to School* (2015), *Because I am a Girl* (2014), *Dear Malala We Stand with You* (2014), *Being Me* (2016), *Where Will I Live?* (2017) and *Tilt Your Head Roise Your Red* (2015).

The book *Where Will I Live?* was published in 2017. This book is a paragon of refugee war fatigue. It is a picture book with an amalgamation of visual and verbal narratives. It consists of long, heart-wrenching images and painful sentences of refugee children. This book exemplifies every life of refugee children in war zones and what it is like to be a refugee child. They are stripped of permanent residence, basic needs, they lose their loved ones, living without food and shelter. They often feel stranded in the middle of the road due to harsh events.

McCarney vividly reveals the intricate complexities of refugee children in this work. It begins with the sentence "Sometimes scary things happen to good people" (McCarney, 2017). This book carries a picture of a parent carrying a child in his arms as they walk from war zones. Others in the picture were carrying luggage on their back with despair and disbelief. McCarney has exhibited a picture that depicts the uncertainty of a refugee's life. There are sentences in the book where a child says "When a soldier's fight or danger comes, families must pack their things and search for a place to live" (McCarney, 2017). This clearly expresses how the war threat affects them psychologically.

Refugee children are too young to understand the word threat, but wars made them live with it. They are way more immature to utter heavy words like "But Where I Live? Will it be down the road, Past this fence, across the sea?" (McCarney, 2017). It can be vindicated that the refugee children's lives are enamoured with unanswered questions. All these stressors not only give them war fatigue but also complete detachment. The exhaustion of wars can be seen in every weary eye of children in this book; it can be seen in a picture where a small boy tightly clutches the hands of his parents while processing horrific events that are happening around him. The boy appeared scared and terror filled his eyes due to neurochemical changes in his brain. Though many adults surrounded the boy, he seemed to be smothered by acute stress with fight/flight hormones.

The book contains myriads of distressful images and external stressors that weaken the well-being of refugee children. Each question that the children raised did not reflect their innocence but wore-out voices due to intense trauma. In a world where everyone is battling for good health and economic status, there are hundreds of children who are forced to live as refugees, relinquishing the life they always dreamed of.

The children in the book asked questions like "Will I be able to sleep in the same place every night? Will my new bed be just for me? Or will I have to share?" (McCarney, 2017). McCarney has inserted an image in which children looked through fences with tears, fears and hunger. Not only do distressful events affect the brain's cognitive and emotional ability, but socio-economic factors like hunger and lack of sleep also cause neurochemical changes in the brain. The refugee children who are pictured in the book belong to an age where they should intake healthy food and grow up in a peaceful environment, but they were forced to live in limbo. The children said "They have to ride, walk, hoping to find a peaceful place" (McCarney, 2017).

There are also gut-wrenching images in the book in which children were sleeping under the stairs and in the middle of the road. They were shivering in the cold, carrying empty cans to fetch water, walking miles to find shelter and crossing the sea. The children are exposed to harsh conditions that intensify the external stressors. Each child seemed to be frozen in terror, appearing distressed. They seemed to be at the gateway of developing neurotic disorders due to chronic stress. It can be seen when they ask questions like "Will I live under a carpet or stairs, in a tent or in a city of tents?" (McCarney, 2017).

McCarney concluded the book with a melancholic statement given by refugee children, saying "I hope someone smiles and says welcome home; I hope that someone is you" (McCarney, 2017). The lives of refugee children are filled with complex emotions. They have been carrying emotional baggage in their hearts. Stressors like running on a harsh road, sleeping in a poor sanitation environment, and praying for a safe place smother their mental health. These stressors and acute stress responses result in psychological and neurological disorders as they grow up. Their emotional and cognitive ability seems to be dormant due to their traumatic experiences.

Anterior Cingulate Cortex in the Brain Region

According to neuroscience, even distressful images and dreadful war pictures of victims can affect a normal functioning human brain. People who are not victims of wars or those who have never been on the battlefield can experience a certain level of pain and sadness as the actual war victim has experienced. Pictures of shellings, gunfire and bloodshed can induce

distress in a normally functioning brain because of the presence of the anterior cingulate cortex. ACC is known as the empathy region of the brain, which allows an individual to empathise with others' pain. When individuals see stressful events and sufferings of another person, they tend to develop empathy towards them because ACC gets activated and enhances an ability to feel others' pain.

The human brain is way more sensitive to negative stimuli and the environment. A single grim picture of war can evoke strong emotions in the brain. Even when grim pictures can induce emotional hormones in ACC, it is hard to imagine the actual pain and stress that refugee children are going through in warfare. It invariably impacts their mental health and brain stimulus.

McCarney's picture book *Where Will I Live?* is an emotional tribute to refugee children in warfare. The author has taken the pictures from the United Nations High Commission for refugees in the book to address the crisis. Every child in the book looked weary and depressed due to negative stimuli and the environment. Each picture in this book has a profound message. Every child in the picture conveys a powerful message to readers. This book serves as a wake-up call to respond to refugees' prayers and hopes. This picture book has the ability to activate the ACC of readers to empathise and to have a contextual understanding of war traumas.

Repercussions of Acute Stress in Neurodevelopment of Refugee Children

Refugee children across the globe are living under chronic stress. Children at a very young age are enduring more extreme emotional stress than they are capable of. War trauma is not just a common psychological illness; prolonged stress in refugee children poses a threat to neurological disorders. Chronic stress affects the Hippocampus, Amygdala and Prefrontal Cortex. It leads to cognitive impairment, emotional instability and other disorders like PTSD and MDD (Major Depressive Disorder). Horrible events like bloodshed, airstrikes and bomb blasts affect the neurodevelopment of refugee children, resulting in significant cognitive and behavioural changes.

The amygdala is highly responsible for releasing fight/flight hormones, which is also known as hyperarousal, resulting in anxiety disorders. The hippocampus is widely known as a learning centre of the brain region that controls learning ability, and the Prefrontal cortex plays a key role in personality behaviours, complex thinking and cognition. Excess production of stress hormones from the amygdala during traumatic events can affect the hippocampus and prefrontal cortex. Poor functioning of the hippocampus and prefrontal cortex leads to cognitive impairment, poor decision making and other psychological illnesses.

Brain development in children is immature compared to that of adults. Adults are more capable of coping with stress and regulating emotions because their brain functions are way more effective and different from children's. Adults are less likely to develop neurotic disorders compared to vulnerable children. Children's brains are sensitive; even minor distress can have a massive impact on brain development because they are in the initial stage of brain development. Children at a young age will be in the process of attaining complete brain development; thus, they require critical care until they reach a certain age.

Impact of War Trauma on Education

Trauma-affected refugee children at school may suffer from cognitive difficulties. They might find it challenging to learn and recall what they have learnt. Since refugee children are facing stressors and trauma exposure at a young age, the amygdala makes them either stay hypervigilant or inactive in the classroom. Refugee students often lack concentration and lose interest in learning due to impaired hippocampus (learning centre). They often seem zoned out or bored and might refuse to participate in classroom activities. They tend to seclude themselves from others when it comes to socialising. Impairment of the hippocampus will make them perform poorly in academics. Refugee students tend to act up, throw tantrums, show aggression or disobey the rules because they lose the ability to regulate emotions. They prefer to live in isolation as they navigate their traumatic experiences. They will find it hard to adapt to a new environment. Inclusive education requires trauma-informed teaching for refugee students. In order to acquire formal education and to excel in academics, there must be proper emotional regulation and less production of stress hormones. The performance of the prefrontal cortex, hippocampus and amygdala should be remodified for proper emotional regulation. Students' performance and learning ability will be enhanced only if mental health support is provided.

Narrative Exposure Therapy (NET) for Refugee Children

Narrative Exposure Therapy is a psychological treatment, also known as psychotherapy, to treat people who have endured traumatic experiences in their lives. The therapy came into existence in early 2000. Psychotraumatologists like Frank Neuner, Maggie Schauer and Thomas Elbert introduced this therapy through their work *Narrative Exposure Therapy: A Short-Term Treatment for Traumatic Stress Disorders*. This therapeutic intervention was identified to treat people who are battling with chronic stress and PTSD; it was mainly introduced as a treatment for war-affected refugees. NET is one of the effective therapeutic interventions for treating emotional dysregulation.

NET allows individuals to reconstruct and deconstruct their traumatic memories into coherent narratives. The process of NET requires people to separate the problem from themselves. Problems must be viewed as objective, not as subjective; this process is known as externalisation, externalising the traumatic events from current life. In NET, the trauma-affected refugees will be asked to detach themselves from their traumatic experiences; they are asked to be the observer of their traumatic memories rather than considering themselves as a central part of those memories. The significant part of the NET is to narrate the traumatic events in a coherent order without losing connection to the here and now (Present), when they reframe their memory, they will shift from being a victim to survivor. People are made to believe that their traumatic memories are just the outcome of negative stimuli; they are allowed to realise that it is only a situation that constitutes a problem but not the one who experiences it.

Narration plays a vital role in the healing process; it is considered to be one of the best ways to heal the affliction. Narration is alleged to be a healthy outlet for trauma-affected people. Refugee children will always look for someone who loves to listen to their stories. They tend to long for people to share their traumatic experiences instead of burying them within themselves. It gives them emotional relief and helps them heal in the way they desire.

NET focuses on narrating the traumatic memories in a coherent order and reframing as well. They are asked to relive those traumatic experiences and to observe the event in a contextual fact (Cold Memory) rather than in an emotional point of view (Hot memory). Dual representation theory aims to connect hot and cold memories contextually. People are encouraged to narrate the story not from an emotional point of view but in a contextual way; when they focus on contextual facts, hot memories will lose their impact on traumatic incidents.

Reliving those memories will reactivate emotional responses towards traumatic events. Repeated exposure to traumatic memories reduces emotional response to negative experiences. When narrating and reframing the incidents contextually, they will add new perspectives and emotions to their fragmented memories. Constant exposure to adverse experiences will reduce the response to fear and lead to healthy emotional regulation. The process of retrieving hot memories from traumatic events and focusing on cold memories will help reduce the stress hormones released by the amygdala. NET will alleviate the emotional imbalance that was caused by war traumas. It will eventually repair the functioning of the hippocampus, amygdala and prefrontal cortex. It will help trauma-affected refugees to gain cognitive and emotional stability and prevent them from developing other psychological disorders.

Refugee children often succumb to war traumas because their brains are sensitive to negative stimuli. They all belong to an age where their behaviours and habits are more manipulative and vulnerable. Though they are gullible to negative stimuli, they are capable enough to rebuild themselves. In the initial stage of their childhood, they have higher cognition and learning skills. They are highly capable of learning new things and of reforming themselves. Their brain can repair emotional dysregulation due to the high functioning of neuroplasticity. Pharmacological or non-pharmacological intervention for trauma should be given in early childhood since they will be in their postnatal period of brain development and will have a higher capability towards repairing mechanisms.

SDG 3: Good Health and Well-being

The United Nations has formed SDG 3: Good Health and Well-Being to provide mental health care systems for all age groups. Each member country is expected to cater to afflicted people's needs and alleviate psychological disorders. Especially when it comes to the refugee mental health crisis, host countries are expected to integrate proper mental health care systems in all fields. According to WHO, only 49 countries, which means 25% of WHO member states, have integrated primary health care systems. According to a report by the Mental Health Atlas, it is estimated that 88% of member states have framed strategies to achieve mental health. Implementation of the mental health care system in all fields is inevitable in order to create a safe and healthy environment for trauma-affected refugees. Especially proper mental health care systems should be integrated into the education system. Mental health of refugee students plays a critical role in attaining holistic education and shaping bright future.

Psychosocial Education System for Refugees

Education is indispensable in everyone's life, and a healthy learning environment is critical to the education system. The education system must invariably cater to the needs of students not only based on equality but entirely on equity. War-affected refugee students require great

psychosocial support in educational settings. Refugee students who are suffering from neurotic disorders due to wars must be treated with psychological support. Regardless of several therapies that have been introduced, the education curriculum must potentially provide resilience and mental health support for war-affected refugee students.

Refugee students must be made to believe that they are also one among other non-refugee students, and they must be treated equally, though they are struggling with psychological disorders. In an attempt to recover students from trauma, they should not feel marginalised. Providing special trauma-informed education in separate places and separating them from other non-refugee students will worsen their mental health and might cause them to feel cornered. Teachers must recover them from trauma in a heterogeneous classroom setting. The teacher shall ask students to draw by asking How is your mental state right now? Teachers can identify trauma-affected students through their distressful drawings compared to drawings of other students in a healthy mental state.

Weekly, thrice, students must have mental health and well-being sessions handled by professional clinical psychologists as a part of their curriculum. In those sessions, both refugee and non-refugee students must be made to watch animated videos that deal with stories of war survivors and stories of resilience. Inclusive textbooks and syllabi must be framed in context with war traumas and resilience under the guidance of a professional psychiatrist and must be prescribed for all ranges of students.

Industrial visits must be integrated into the curriculum, and both categories of students must be taken to mental health care clinics to witness how therapy can heal afflicted people. They must be allowed to interact with war survivors and to carry out projects based on resilience. All these factors will help them to detach themselves from their trauma, and they will begin to normalise the traumas. They will begin to understand that they are not the only ones who have gone through wars and become victims; it is happening across the globe.

Conclusion

The mental health and well-being of refugees are as pivotal as materialistic needs. Refugee children in war zones are struggling with neurotic disorders, which impact their brain development, cognition and education. Children are considered the beacon of hope across the globe, and early childhood plays a vital role in brain development. A healthy and safe environment must be created for war-affected refugees to cope with external stressors. Proper mental health systems and inclusive opportunities in health care access leads to formative growth in the lives of refugee children.

Psychosocial support for refugees will make them self-sufficient both psychologically and economically. Chronic stress and external stressors alter the brain structure of refugee children, which has long-term effects on their mental health. These stressors threaten the entire development of children and also affect living standards. Therapeutic intervention in both health sectors and education will hinder the diagnosis of psychological disorders like ADHD, MDD, depression, mood and anxiety disorders.

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Changes in Gender Wage Gap by Educational Level in Japan

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Abstract

Although the gender wage gap in Japan has become increasingly narrower, it remains large compared to that in other developed countries. To address this situation, the government enacted the Act on the Promotion of Women's Active Engagement in Professional Life in 2016. This study investigates how the gender wage gap has changed during this period using data from 2016 to 2022. The main findings show that the presence of children contributed in the opposite direction; specifically, in 2022, the presence of children slightly decreased the wages of highly educated females but increased the male wage premium at every educational level, thus widening the wage gap.

Keywords: gender wage gap, child wage premium, age, length of service

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Introduction

Although the wage gap between men and women in Japan has become narrower, it is still large compared to that in other developed countries. In light of this situation, the Act on the Promotion of Women's Active Engagement in Professional Life came into effect in 2016. This study examines how the gender wage gap changed during this period using individual data from 2016 to 2022. Our findings show that the presence of children contributes to the opposite direction trend, making the wage gap between men and women excessive. Specifically, although the existence of a child does not reduce wages for women in 2022, it increases the wage premium for men, thereby widening the gap.

The remainder of this paper is organized as follows: Section 2 reviews the literature on the wage gap between men and women, Section 3 describes the data and methods used in our analysis, Section 4 presents the results of the analysis, and Section 5 summarizes our results and discusses future issues.

Previous Literature

In Japanese studies, Nozaki (2005), using data on full-time employees from 2000 to 2002, shows that the gender wage gap tends to narrow with higher education. However, she notes that men and women differ markedly in their evaluation of aging. Abe (2005) points out that the effects of years of experience and length of service on wages differ between men and women. Additionally, he points out that the difference in the evaluation of aging between men and women is a major factor in the disparity. Hori (2008) analyzes the gender wage gap from the perspective of gender job segregation using data from 2000. Consequently, he finds that differences in the distribution of industries and occupations by gender have little effect on the wage gap between men and women. Furthermore, Okui et al. (2017), using 2014 data for their analysis, note that the gender wage gap in management positions narrowed as one moved up the job ladder, inferring that this is due to the elimination of statistical discrimination. Using data from 1992 to 2001, Sano (2005) points out that part of the wage gap between men and women in Japan is due to discrimination based on employer preferences. However, Kawaguchi (2007) argues that only a small portion of the gap is due to employer discrimination and that most of the wage gap between men and women is based on differences in productivity between men and women.

Hirsch (2013), using matched employer-employee data from Germany, finds that an increase in female managers contributed to narrowing the gender wage gap. However, using US data, Mitra (2003) finds that the gender wage gap in large firms is large because of unequal access to and returns to supervisory jobs for women. Grund (2015), using data from Germany, finds that the gender wage gap is larger in higher positions and more pronounced for women with children.

Furthermore, there is a strong link between the presence of children and the gender wage gap. If women take parental leave and their wages decrease as a result of the child-rearing burden placed on women rather than on men, the gender wage gap widens. Budig and Hodges (2010) argue that the maternity penalty is greater for women with lower wages. In contrast, Killewald and Bearak (2014) find no evidence that the childbearing penalty is greater for women with lower wages.

In a recent study, Budig et al. (2021) reveal that equalizing wage returns to education would reduce gender pay disparities. Gallen et al. (2019) highlight a decline in the average earnings gap between men and women in Denmark from 1980 to 2020, which could be explained by a shrinking wage gap due to differences in education and experience. Furthermore, some studies investigate the effects of policies on gender pay gaps. Cruz and Rau (2022) estimate the effect of the Chile's 2009 Equal Pay for Equal Work Law on the firm pay premiums and find that this law reduces the firm premium gender gap. Abudy et al. (2023) investigate the effect of the UK-Equality-Act in 2017 and report that the gender pay gap disclosure reduced the pay gap over time.

In Japan, Kawaguchi (2005) confirms the marriage and childbearing premium for men and the marriage and childbearing penalty for women based on data from 1993 to 2000. However, no studies in Japan explicitly analyze the relationship between the effects of marriage and childbearing on wages and the factors that have reduced the recent wage gap between men and women. Grund (2015) finds that more experienced employees in higher positions with children face significant gender wage differentials in certain industries. Barth et al. (2021) point out that marriage also plays a crucial role in increasing the gender wage gap.

Therefore, this study examines the effects of marriage and childbearing on narrowing the wage gap between men and women using recent individual data.

Data and Method

We use data from the Recruit Works Research Institute's National Employment Survey, which has been conducted since 2016. The data are provided by the SSJ Data Archive of the Institute of Social Science at the University of Tokyo. The survey is conducted annually in January among men and women aged 15 years and older nationwide; sample allocations are made by sex, age group, employment status, region, and educational background based on the Labour Force Survey conducted by the Statistics Bureau of the Ministry of Internal Affairs and Communications. These data capture individuals' employment statuses, annual earnings, and individual/family attributes. Questionnaires are administered regarding the conditions of the previous year. Our analysis is limited to full-time employees, those under 59 years of age to account for retirement age, and those with at least one year of service in the same company to account for the decline in wages after changing jobs.

Using individual data from 2016 and 2022, this study examines how the gender wage gap changed during this period. To examine the wage (annual earnings) gap between men and women, we first estimate the wage function for men and women separately using the ordinary least squares (OLS) method for each of the two time points, with annual earnings as the dependent variable. Specifically, the survey inquired about the annual earnings in the previous year. We convert Japanese yen into US dollars for 2015 and 2021 for annual earnings. Thirteen variables are used as explanatory variables: age, age squared, tenure years, tenure squared, educational dummies for university and postgraduate degrees, the marital status dummy, having a child dummy, the large company dummy, the public officer dummy, and the position dummies for section chief, section manager, and department director or higher.

Analysis Results

Table 1 shows the sample size used for the analysis by education level. The sample size is larger in 2022 for both men and women, with the largest proportion of those with less than a

college degree, especially among women; approximately 70% of women are classified as less educated in 2016, and approximately 65% of women are classified as less educated in 2022. Table 2 shows the average annual earnings in 2016 and 2022 for each education level. While the average annual earnings for all males increases from 42.770 in 2016 to 48.231 in 2022, the male average annual earnings increases the most for those with higher education levels. This trend is also true for women; for all three of the educational subgroups, the increases in average annual earnings are greater for women than men. The largest increase is observed among women with postgraduate degrees, where the average increases by 8.165 points, from 39.901 to 48.065. In other words, we can confirm that the gender wage gaps narrow for all education levels, with female higher education graduates contributing strongly to this trend.

Table 1: Sample Size by Gender and Educational Level in 2016 and 2022

Sex	M en		W om en	
Year	2016	2022	2016	2022
Less than Un ivers ity	6617	7062	3686	3987
Un ivers ity	4050	5518	1436	1959
G raduate	665	1032	86	151
Total	11332	13612	5208	6097

Table 2: Average Earnings by Gender and Educational Level in 2016 and 2022

Sex	M en		W om en	
Year	2016	2022	2016	2022
Less than Un ivers ity	40.004	44.378	26.263	31.137
Un ivers ity	45.359	50.633	30.135	36.269
G raduate	54.527	61.756	39.901	48.065
O verall Average	42.770	48.231	27.555	33.205

Note: Earnings are in thousands of U.S. dollars

Figures 1 and 2 show the coefficients of marriage and childbearing for men and women in 2016 and 2022, respectively. The tables present the overall results as well as the results divided into three by educational background. Overall, the marriage premium for men and the child penalty for women are large. The same is true for those with less than a university degree and those with a university degree, but the coefficients for those with a graduate degree appear to be larger due to the smaller sample size. Thus, considering the results for the overall group, undergraduates, and university graduates along with the results from the previous section, both the marriage and child premiums for men increase in 2022, especially the child premium. In contrast, the coefficient for marriage for women is almost equal to zero, while the child penalty increases in 2022 for university graduates. Since the child penalty is large for postgraduates, whose sample size is small, offsetting the marriage premium, it can be inferred that the particularly large penalty for highly educated female employees is an obstacle to narrowing the gender wage gap.

In Japan, the childcare leave rate for women is 84.1%, whereas that for men is 30.1% in 2023 (Ministry of Health, Labour and Welfare, 2024). Therefore, women bear a heavy burden of childcare, and their annual earnings decrease when they take childcare leave; furthermore, their careers after returning to work may be separated from those of their male counterparts. Due to

these circumstances, the child penalty may be greater for highly educated female employees with higher annual earnings.

Figure 1: Coefficients of Married and Child Dummy by Educational Level for Men

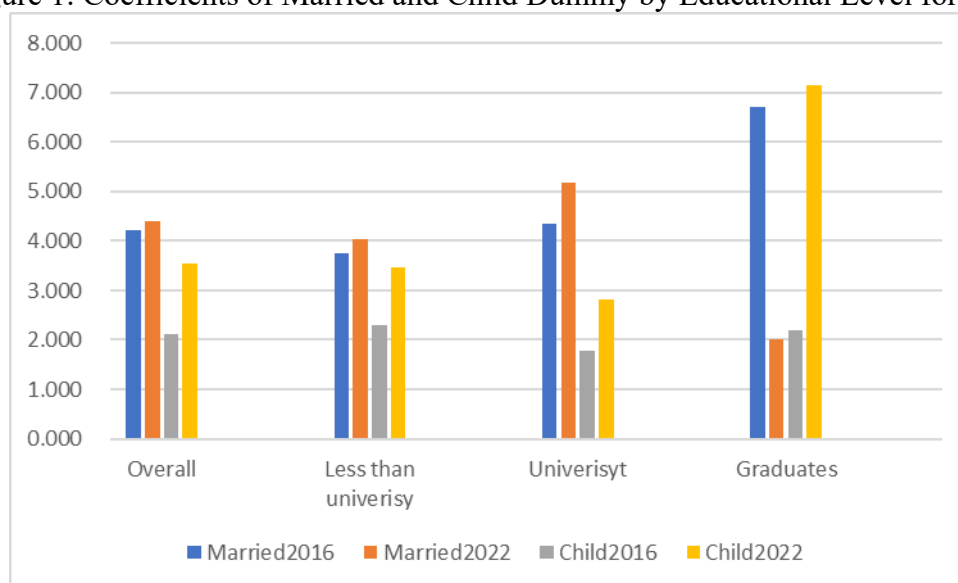
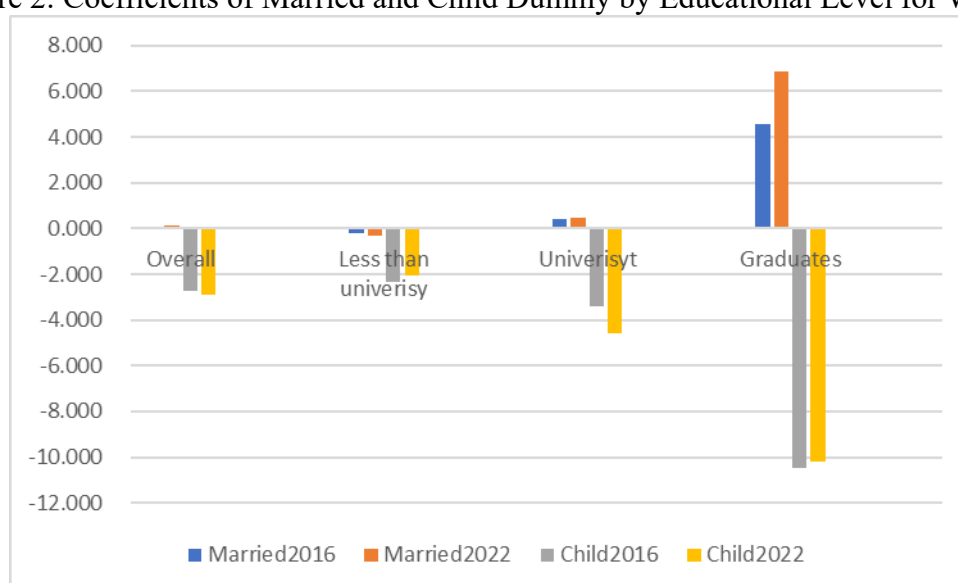


Figure 2: Coefficients of Married and Child Dummy by Educational Level for Women



Conclusion

This study examines trends in the gender earnings gap for full-time employees under the age of 59 using Japanese individual data for 2016 and 2022. Our analysis shows that having a child widens the earnings gap between men and women. A possible reason for this is that the reduction in the female child penalty is negligible, while the male child premium increases more than it used to in 2016.

Our findings suggest that political measures aimed at reducing the female child penalty, especially those targeting individuals with higher education, are indispensable for narrowing the gender wage gap in Japan.

Finally, one remaining issue for this study is that the 2022 data we used may have been affected by the COVID-19 pandemic (ex. da Costa Silva & Shinkoda, 2021). It will be necessary to confirm whether the results of this study are warranted based on ongoing post-COVID-19 data. Additionally, because the minimum number of variables are treated in this study and the coefficient of the intercept is largely negative, it would be important to check whether the results of the analysis would change by adding other covariates.

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Evaluating Usability in Co-designed Game-Based Learning: Insights From the Young Students

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Abstract

Not many studies believe that perspectives and ideas of children can be helpful in designing game-based learning, especially if designers involve them from the beginning to the end of game design process. Previously, we developed a package of game-based learning as a result of co-design workshop with teachers and primary school students in Indonesia. We believe that designs created by children need to be tested with children, as they will be the end users. This study aims to evaluate the usability of co-designed game-based learning to determine the children's gaming experiences and to identify any challenges that may arise during play. We employed the modification of Game Experience Questionnaire (GEQ) to capture students' reactions during learning and playing. The participants were 16 primary school students from Malang, Indonesia who were considered capable of easily understanding board games and cognitively suited for this activity. The result shows a wide range of responses from the young students, which provide insights into researchers and game designers about the potential benefits of involving children in the design process and in the evaluation phase. This study contributes to the growing body of literature on game-based learning, particularly in the context of co-design and usability evaluation.

Keywords: co-design, game-based learning usability, primary school student, games experience

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Introduction

In recent years, co-designing Game-Based Learning (GBL) with children has gained appreciation (Agirbas et al., 2022; Gennari et al., 2019; Leitaio et al., 2019; Walsh et al., 2012), although some people remain sceptical about its usefulness. It seems that many have yet to realize the importance of empowering children by valuing their insights and creativity (Kennan et al., 2021; Shier, 2022). Adults often perceive children as inexperienced or incapable of contributing meaningfully to the design process (Druin, 1999). Children do have limitations in articulating their thoughts and opinions, and at times, their ideas can be difficult to comprehend (He, 2016). However, numerous studies (Druin, 1999, 2001; Guha et al., 2005) encounter these assumptions by demonstrating that children can contribute valuable ideas and perspectives that lead to the creation of more relevant and engaging learning experiences. According to Druin's four types of children's role in the design of new technology (Druin, 2001), if children possess as design partner, they should be considered as equal stakeholders in the design of new technologies. Although they may not have the same capabilities as adults, they should be given equal opportunities to contribute to the design process in ways that align with their abilities (Guha et al., 2005; Irgens et al., 2022).

The technology designed by children for children also needs to be evaluated for its usability to ensure the game is not only playable but also engaging and motivating. In the case of GBL, it needs to evaluate the effectiveness in achieving learning outcomes. Designing with children does not replace the need to test with children. Usability testing ensures that co-designed tools are effective, understandable, and accessible to a wider range of children. Children may have helped design a tool, but their ability to judge ease-of-use or predict unintended consequences is still limited (Guha et al., 2011; McNally et al., 2018). We observed that usability evaluation in the co-designed GBL for children by children remains rare in current research literature. Therefore, this study offers a valuable contribution to the game design field.

This study is part of doctoral research about co-designing GBL for waste awareness in Indonesia. After facilitating co-design workshops with groups of primary school teachers and students, we visualized their ideas, resulting in sets of high-fidelity GBL. This study aims to evaluate the usability of these co-designed GBL to determine the children's gaming experiences and to identify any challenges that may arise during play. Most existing research, as mentioned above, and other studies on GBL, (da Silveira et al., 2021; López-Faican & Jaen, 2020) have focused on testing the usability of digital technology. However, in this study, we evaluate the usability of non-digital games. We began this doctoral study with an openness to the final game genre, as we involved children and other key stakeholders from the beginning. After a long data collection journey, we found that Indonesian teachers are more comfortable teaching with non-digital games, and Indonesian parents preferred that children have limited exposure to digital gadgets. Moreover, considering the position of environmental education within the primary school curriculum in Indonesia, where it is integrated into existing subjects, non-digital GBL proved to be more time efficient. Nevertheless, we modified digital technology evaluation tools, such as the Games Experience Questionnaire (GEQ), for the use in this study.

Methods

Prior Co-design Workshop Activity

Before conducting the usability evaluation, we held five co-design workshop sessions at a primary school in Malang, Indonesia, attended by 20 primary school students from grades 4 to 6 and 5 teachers who had prior experience teaching environmental topics. As design partners, we gave the students the freedom to create GBL alongside their teachers. Additionally, we (the research and design team) served as facilitators and visual designers throughout the entire co-design process. Once all the groups completed their work, we moved into an iterative process of visual design and playtesting, refining the games based on feedback from a broader group of stakeholders, including other primary school teachers, university students, and GBL experts. In the end, these activities resulted in five high-fidelity non-digital games.

The GEQ Instrument Design

The GEQ was originally published by IJsselsteijn and colleagues in 2007, and was later refined in 2013 (IJsselsteijn et al., 2013). It was frequently used to evaluate new games or interactive systems, as well as to evaluate the player experience of popular and commercially successful games (Law et al., 2018). The GEQ has a modular structure, consisting of (1) the core questionnaire, (2) the social presence module, and (3) the post-game module, all administered immediately after the game session. Modules 1 and 2 assess players' feelings and thoughts during gameplay, while module 3 evaluates their experience after playing. The core module evaluates user experience across seven components: Immersion, Flow, Competence, Challenge, Positive Affect, Negative Affect, and Tension. The social presence module includes Psychological Involvement: Empathy, Negative Feelings, and Behavioral Involvement. The post-game module measures Positive Experience, Negative Experience, Tiredness, and Returning to Reality. However, since the games are non-digital, we excluded the Returning to Reality component.

We agree with (Als et al., 2005; Hafit et al., 2011), who emphasized the importance of tailoring usability evaluation methods to the unique needs and behaviors of children. In each GEQ component, we asked only one question, instead of the 4-5 questions in the original version, make it 13 questions in total. We reduced the number of questions, as children may become bored and lose focus with too many questions. We also modified the traditional approach to filling out the questionnaire, where participants typically read the questions and answer on a sheet/form. Instead, we adapted the process to better suit children's characteristics. During the session, we read the questions aloud to the children, and they responded on color-coded answer sheet we provided. Each response was based on a 5-point Likert scale, ranging from 0 to 4 (not at all – extremely), as outlined in the original GEQ (IJsselsteijn et al., 2013). In our modified GEQ, we included both positive and negative questions to ensure that the participants paid more attention when the questions were read aloud. Moreover, before conducting the GEQ session with the real participants, we tested it on five young students of various age ranges to assess whether the questions were understandable or needed revisions. Therefore, we were able to avoid potential misunderstandings or confusion during the actual data collection process.

The Research Design: Usability Evaluation

The usability evaluation process began with the five teachers' participants trying to teach waste management concepts with their own games. Each teacher was assigned to one class and was tasked with teaching using their co-designed GBL over a 2-hour lesson (2x35 minutes). Prior to the teaching sessions, we sent the high-fidelity co-designed GBL to the teachers to allow them to study and practice at home, ensuring they were comfortable when utilizing it in the classroom. Each class had an average of 26-28 students, ranging in age from 9 to 12 years old (grades 4 and 6). We ensured that all the students from the five classes in this phase were not the same students who had participated in the co-design workshop. We prepared eight sets of each game: one set for the teacher and seven sets for the students. Each class followed the same treatment, with the class divided into seven groups, which consisted of four students who would play together. The difference lay in the game types, as five different games were developed from the co-design workshop. Thus, each teacher utilized the game that their group had created during the workshop, so that each class played a different game.

About 20 minutes before the teaching session with the games finished, we asked each teacher to select four students (two boys and two girls) who will join us to have the GEQ session. A total of 16 students from four classes participated in the usability evaluation, as one class was unable to complete the session as planned because they could not complete the usability testing due to the teacher's unavailability. Over four separate sessions, these 16 students were asked to answer 13 GEQ-based questions. During the GEQ session, we also secretly observed the answers written by the children. If any answers seemed extreme, we gently asked the students to clarify their responses, ensuring that the approach was non-judgmental. Before we ended the GEQ session, we asked the children what they had learned from the play activity, which allowed us to gain deeper insights into their gaming and learning experiences.

Findings

We employed a mixed-methods approach in this study, and in this chapter, we present the research findings in two sections, the questionnaire session and the short discussion after play. Figure 1 displays the color-coded answer sheet from the GEQ session, along with pictures of the 16 student participants from different classes.

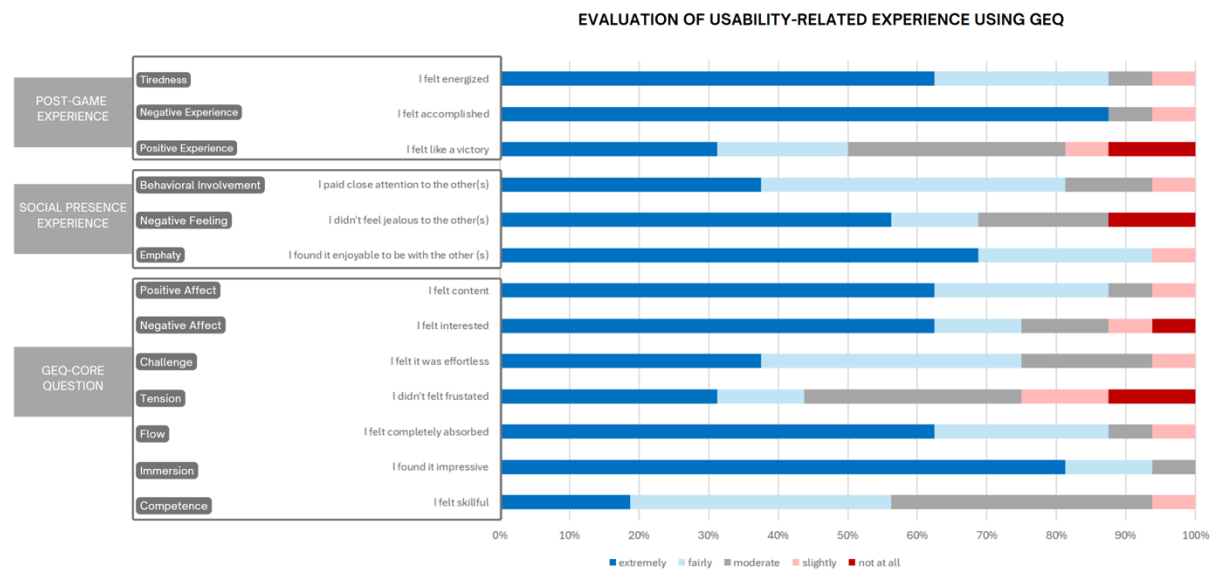
Figure 1: Usability Testing Session With Primary Students Using Color-Coded GEQ Strips



The Questionnaire Session

Descriptive analysis was used to assess how players evaluated usability based on the GEQ dimensions. We utilized SPSS software to calculate the means and standard deviations. Figure 2 illustrates the evaluation of usability-related experiences using the GEQ.

Figure 2: Visualization of Usability-Related Experiences Reported by Primary School Students Using the Game Experience Questionnaire (GEQ)



In the GEQ Core Question module, there are negative questions in the Negative Affect and Tension sections; in the Social Presence module, negative questions appear in the Negative Feelings section; and in the Post-Game Experience module, negative questions are found in the Negative Experience and Tiredness sections. Before analysis, we reversed the negative responses to positive ones to ensure directional consistency in scoring. Table 1 shows the result from the GEQ session.

Table 1: Descriptive Analysis of Game-Based Learning Usability Using the GEQ

Module	Components	Mean	SD
GEQ Core Questionnaire	Competence	2,69	2,48
	Sensory and Imaginative: Immersion	3,75	4,96
	Flow	3,44	3,66
	Tension	2,38	1,47
	Challenge	3,06	2,48
	Negative Affect	3,19	3,43
	Positive Effect	3,44	3,66
Social Presence	Psychological Involvement: Empathy	3,56	4,17
	Psychological Involvement: Negative Feelings	3,00	3,06
Post-game Experience	Behavioural Involvement	3,13	2,79
	Positive Experience	2,50	1,60
	Negative Experience	3,69	5,42
	Tiredness	3,44	3,66

Within the GEQ Core Questionnaire module, the component with the highest mean score was Sensory and Imaginative Immersion ($M = 3.75$, $SD = 4.96$), indicating that many students enjoyed the game and found it exciting. This aligns with the visual data where a large number of participants rated Immersion as “extremely” or “fairly.”. Flow ($M = 3.44$, $SD = 3.66$) and Positive Affect ($M = 3.44$, $SD = 3.66$), also received a relatively high score, reflecting that many children felt absorbed and focused during gameplay and they had generally pleasant emotional responses. The Negative Affect ($M = 3.19$, $SD = 3.43$) scored moderately, suggesting that while most of the children found the game interesting, a few children experienced slight boredom during play. The component of Challenge ($M = 3.06$, $SD = 2.48$) indicates that the game was perceived as moderately demanding, not too difficult and still quite easy, since most children finding it effortless while a few faced difficulties. In the Competence component ($M = 2.69$, $SD = 2.48$), which evaluates whether the children felt skilled or capable during gameplay scored lower. This might be because they only play once and did not carefully read the games instructions in the packaging, or the children might need clearer instructions from their teacher. Interestingly, Tension ($M = 2.38$, $SD = 1.47$) received the lowest score in this module, indicating that the some children feel significantly frustrated or stressed during the play.

In the Social Presence module, the results show that students felt a strong sense of Empathy ($M = 3.56$), indicating they enjoyed playing together with their peers. Behavioural involvement ($M = 3.13$, $SD = 2.79$), indicating attentiveness to others, also scored relatively high, reinforcing that the children were actively engaged with their group members and not only focused on individual goals. It can also indicate that the children paid attention to how the other children play the trick, so they can learn from each other. However, Negative Feelings ($M = 3.00$, $SD = 3.06$), which measure social discomfort such as jealousy or competitiveness, show a more mixed response. The visual data indicates a wider spread across the scale, implying that while many children did not feel socially pressured, some may have experienced jealousy with others’ successfulness.

The Post-Game Experience module presents more nuanced findings. Positive Experience received one of the lowest Mean and SD scores ($M = 2.50$, $SD = 1.60$), suggesting that while certain moments during the game were engaging, some of the children did not feel like a champion, so they might feel incompetent. In contrast, Negative Experience had a relatively high Mean ($M = 3.69$, $SD = 5.42$), because most of them did not feel any guilt after playing the games. Tiredness ($M = 3.44$, $SD = 3.66$) had a relatively high score, with only a small number reported feeling somewhat fatigued during play. It shows that the children did not feel exhausted during play, indicating that this co-designed GBL is highly suitable for implementation in the classroom.

The Short-Discussion Post-gaming Session

During the GEQ session, we discreetly observed the young students' responses. When we noticed that some of them provided extreme answers, we asked them directly for clarification. From the quantitative analysis above, we identified four components with extreme responses. In the Tension component, one student expressed frustration at the beginning of the game due to unfamiliarity with the rules. When we asked if he was still struggling after trying again, the student replied that she was able to understand but still needed time to adapt. She mentioned that her friend in her group was helping to explain the game’s rules. In the Negative Affect component, one student reported finding non-digital games somewhat boring, as he used to play digital games. However, when we observed that student during the class play session, he

appeared to enjoy the game. Moreover, in the Negative Feelings component, two students said feeling jealous of their friends who won several times or when they saw other groups finish the game first. Similarly, in the Positive Experience component, which had a low score, one student noted that they consistently lost during the play sessions and did not feel like a winner when the game ended. Another student added that they did not feel sad about losing but she needed to feel proud of being the most skilled player in the game.

Furthermore, we continued this brief discussion by asking the children what they remember from the co-designed GBL activity. Based on our observations of the 16 students across four sessions, most of them still remember the educational content about waste awareness after playing, though not in a deep detail. We gave each student an opportunity to answer our questions without making them feel judged if they struggled to respond. One student seemed to forget about the waste content, and when we guess that perhaps he was too focused on the game, he nodded shyly. When we shifted the conversation to the graphic design of the co-designed GBL, almost all the student's expressed admiration. They even asked if they would have the opportunity to create their own games like this in the future. When we asked whether they recognized the images of waste in the game, some of them replied that they did not because they never see that in real life. Before concluding the activity, we asked about different types of waste, and most of the students were still able to recall them.

Discussions

The usability evaluation of the co-designed GBL provides valuable insights into how young students engage with a game created by their peers. When children interact with technologies co-designed by their peers, they show greater engagement and empathy. Students not only enjoyed using the co-designed GBL but also appreciated their peers' contributions. The high levels of immersion and enjoyment suggest that the children viewed the co-designed GBL as an engaging tool for learning about waste management in school. Many students expressed admiration for the visual design and the idea that other children had contributed to its creation. Some even questioned whether they could create their own games in the future, indicating a deeper connection with the design process and a recognition of their peers' creative abilities. This awareness fostered a sense of respect and curiosity, enhancing the play experience and supporting the educational value of co-design, not only as a development method but also as a tool for empowering learners.

The challenges occurred with the co-designed GBL, such as initial difficulty in understanding the game and feelings of incompetence during play, are to be expected. We identified several factors that could improve its usability, including longer and more frequent play sessions, which would allow students to interact more extensively with the game. This extended playtime would also benefit teachers, providing them with more opportunities to prepare and build confidence in using the GBL in their teaching. On the other hand, to increase good usability in the co-designed GBL, we still need to ensure that future users can complete tasks efficiently, with minimal frustration and errors, while feeling satisfied when interacting with the games. Nevertheless, the insights from the young students regarding the co-designed GBL are crucial, as they provide valuable feedback for refining the game to better meet their learning needs and preferences.

Conclusion

Our work explored the insight of young students regarding the usability of co-designed GBL by their peers. This study revealed that children found the game enjoyable, immersive, and socially engaging, while also identifying areas for improving instruction clarity and longer play time. Their reflections demonstrated appreciation for peer-created content and a desire to contribute creatively. This expanded understanding of how children experience and value co-designed GBL supports the development of educational tools that are both meaningful and empowering. Our results offer practical insights for designers and educators aiming to create participatory learning experiences that resonate with children as both learners and design partners.

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Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

We used ChatGPT to assist with formulating and refining academic language, and improving clarity in several sections of the text. Additionally, we employed Scispace AI to find relevant scholarly articles to support the literature review. All intellectual content, critical analysis, and final editorial decisions were made by the author.

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Design Thinking in Higher Education: A Pedagogical Approach

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Abstract

Many universities offer design thinking courses as part of their graduation programs which involve hands-on learning, interdisciplinary approach and international collaborations. In India, “Design Thinking”, as a subject has been included in the curriculum of engineering and allied courses through the National Education policy (NEP 2020). The pedagogy for this course, must consider modern teaching methodologies, real-world applications, and tools that focus on engaging students and enhancing interaction. This paper focuses on suggesting a structure that guides students through the design thinking process while engaging them in practical environment that enhance interactive & innovative learning experiences. It also aims to evaluate the pedagogical effectiveness of the course based on students’ perceptions and feedback. The conclusions are based on mapping of course outcomes and thematic analysis from the responses of with positive feedback from 232 first year undergraduate students of engineering. Findings reveal that student engagement, creativity, and interdisciplinary collaboration is fostered through the course indicating pedagogical effectiveness. Use of interactive & creative teaching-learning tools, faculty traits and real-world applicability further promote conducive environment for an innovative and satisfactory learning experience for the students, while increasing contact hours and additional structured assignments were suggested as possible betterment of the course.

Keywords: design thinking, pedagogy, engineering, higher education

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Introduction

Design thinking has emerged as a pivotal approach in addressing complex problems across various sectors, particularly in education. Defined as a human-centered, iterative process that emphasizes creativity, collaboration, and empathy, design thinking facilitates a deep engagement with challenges, thereby fostering innovative solutions through exploration and experimentation. In the context of outcome-based education, the integration of design thinking has gained momentum to promote inquiry-based and student-centered learning. Early advocates like Clive Dym emphasized the necessity for engineering students to be trained as designers, advocating for the incorporation of design studies into curricula through project-based learning. The pedagogical implications of design thinking extend beyond mere creativity and critical thinking. The relevance of design thinking in educational contexts has been particularly pronounced during crises, such as the COVID-19 pandemic, where it has served as a catalyst for innovation in addressing complex educational challenges. This study aims to explore the integration of design thinking into engineering education under the National Education Policy (NEP) 2020 in India, focusing on its impact on student engagement, creativity, and the interdisciplinary approach to learning. By evaluating the pedagogical effectiveness of design thinking courses and assessing student perceptions, this research seeks to identify areas for improvement and enhance learning outcomes in engineering education.

Literature Review

Design thinking is a human-centered, iterative process used to solve complex problems by emphasizing creativity, collaboration, and empathy. This approach encourages students to engage deeply with challenges, fostering an environment where innovative solutions can emerge through exploration and experimentation. Brown (2009) introduced design thinking as a structured approach that fosters innovation in business and society, advocating for solutions that balance desirability, feasibility, and viability. Norman (2008) explored the user perspectives in design highlighting that people may have preconceived mental representations that are hard to change and thus, designers must focus on the human-design interaction. Cross (2011) further explored how designers think and work, highlighting the cognitive processes behind problem-solving.

Design Thinking in Context of Outcome Based Education

The integration of design thinking into education has gained traction due to its ability to promote inquiry-based and student-centered learning. In his early work on linking design thinking and education, Clive Dym highlighted the need for engineers to be trained as designers by introducing design study in curriculum at entry level, emphasizing on project-based learning and efficient faculty for the success and scalability of the course (Dym, 1994, 1999; Dym et al., 2005). Design thinking promotes essential skills such as creativity, critical thinking, and teamwork, which are vital for students' future careers. Beckman and Barry (2007) argued that design thinking fosters a learning-by-doing approach, helping students develop cognitive flexibility and adaptability. Further, Lor (2017), provides a critical review of over 68 sources on Design Thinking in education, highlighting its potential to enhance creativity and innovation while addressing the need for a framework in teaching, learning, curriculum design, and teacher training; with additional emphasis on further studies in the pedagogical framework. In the systematic review paper, Razali et al. (2022) explored design thinking approaches in education, highlighting its effectiveness in enhancing teaching and

learning while addressing challenges faced by educators and students, such as lack of training, time constraints, and communication issues. Furthermore, the successful application of this methodology fosters innovation during crises, such as the COVID-19 pandemic, by generating creative solutions to complex educational problems (Murthy & Murthy, 2024). The findings suggest that integrating design thinking into educational frameworks not only equips educators with essential skills but also empowers students to become proactive problem solvers in an ever-evolving learning environment.

Experiential Learning & Design Thinking

In his experiential learning theory, David Kolb identifies four learning styles—divergent, assimilator, convergent, and accommodator—each corresponding to different preferences in the learning cycle. These styles help tailor educational approaches to individual needs, enhancing the effectiveness of learning programs (Kolb, 1984). Kolb's experiential learning and the design thinking approach share a focus on learning through experience and problem-solving, yet they differ in their underlying philosophies and methodologies. Both approaches emphasize active engagement and reflection, but they diverge in their specific processes and applications. Studies have cited crucial links between the experiential learning model and design thinking methodology, particularly in education. While Kolb's model encourages students to take responsibility for their learning by engaging in experiential activities that promote critical thinking and problem-solving (Chae, 2024), when applied in educational contexts, design thinking fosters creativity, innovation, and collaboration (Dorland, 2024) and encourages students to engage in hands-on projects that require empathy and iterative testing, enhancing their ability to work in teams and develop innovative solutions (Doğantan, 2023). Both approaches offer valuable insights into the learning process, and their integration can enhance educational practices by combining structured reflection with creative exploration.

Design Thinking as a Pedagogical Framework in NEP 2020

In engineering education, design thinking cultivates an innovation-driven mindset, promoting interdisciplinary collaboration and real-world problem-solving (Luka, 2014). With the National Education Policy (NEP 2020) in India integrating design thinking into curricula, there is a growing need to evaluate its impact on student learning. NEP 2020 prioritizes the development of critical thinking and creativity as essential components of education. It aims to move away from rote memorization and instead focus on higher-order cognitive skills such as analysis, evaluation, and synthesis (Kumari, 2024). NEP 2020 recognizes the role of technology in enhancing educational outcomes and supports the integration of digital tools to facilitate experiential learning. This aligns with the principles of design thinking, which often involve using technology to prototype and test solutions (Mundhe, 2022; "National Education Policy-2020", 2022). While NEP 2020 is a forward-thinking framework for integrating design thinking into education, its successful implementation depends on adequate teacher training, infrastructure development, and a fine balance between traditional educational values and modern pedagogical approaches (Bade & Chavan, 2023; Ramesh, 2023). Design thinking as a framework is derived from combining multiple disciplines and hence, promotes interdisciplinary approach into its application, making it a powerful tool for addressing complex challenges. Apart from its core aspects from design in architecture and industrial design, it incorporates methods from engineering such as prototyping and iterative testing (Brenner et al., 2016), and principles from social sciences particularly psychology in understanding human behavior and needs (Bender-Salazar, 2023). This interdisciplinary approach is applied across sectors, including engineering, management, and education

product development, social and ecological systems, etc. making it a process that addresses complex problems using creativity and innovation.

Objectives

This study aims to:

1. Examine the integration of Design Thinking course in Engineering Education of NEP 2020, with respect to student engagement, creativity, and interdisciplinary approach.
2. Evaluate pedagogical effectiveness of Design Thinking course with respect to Outcome Based Education, with respect to effectiveness of teaching methodologies, faculty traits, and learning tools in delivering.
3. Assess the effectiveness of the course based on Student Perceptions and feedback and identify factors that explores successful implementation areas for improvement for achieving better learning outcomes.

Methodology

This study is to understand the designing, structuring, and implementation of a course on Design Thinking for First Year Undergraduate students of Engineering at the COEP Technological University, Pune. The paper tries to elaborate the implementation on this 1 credit course and evaluates the achievement of learning outcomes based on students' perception and feedback collected at the end of both semesters in the first year. A total of N = 232 students participated in the feedback/perception survey. The data was gathered using survey method and the responses were analysed using quantitative assessment of course outcomes on a 3-point scale and qualitatively using thematic coding.

Course Structure

The course was designed with very specific outcomes, focusing on providing hands-on experience and project-based learning (PBL) to the students. The course was taught for two semesters (1&2) with different set of students. The course outcomes were:

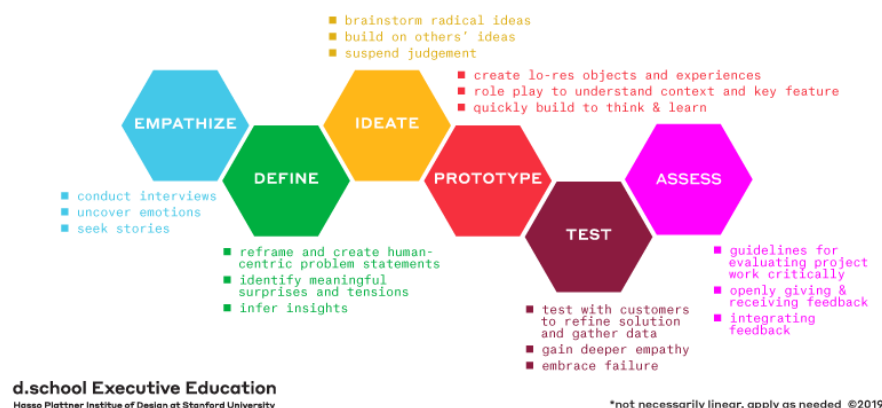
1. Compare and classify the various learning styles and outline the psychological principles in Design Thinking methodology
2. Infer the Design Thinking framework and Experiment with the process till ideation using human centric tools
3. Propose real-time innovative engineering product designs and choose appropriate frameworks, strategies, techniques during prototype development
4. Appraise user feedback and propose corrective innovative solutions to create better customer experience

Syllabus Design

Considering the background search, need of an interdisciplinary approach and specified course outcomes, this introductory course syllabus was split in two parts- Part a) focused on the human-centered concepts such as understanding and identifying the experiential learning style, concepts from perceptual processes, creativity & innovation, understanding empathy, etc. This part also introduced Design Thinking methodology using the Stanford d-school's 5-stage Design Thinking framework (Balcaitis, 2019; Fig.1) and certain human-centered tools such as empathy mapping & interviews, mind-mapping, engaging personas etc.

Figure 1: Stanford d.school Design Thinking Process

Design Thinking Process Diagram*



Part b) focused on the implementation of the framework through project-based learning methodology. In this the students were asked to:

1. Create teams that conducted primary research via empathy interviews for understanding user needs (Stage 1- Empathize)
2. Create empathy/journey maps and engaging personas to present the user data in a creative way and narrow it down to a problem (POV) statement that highlights user needs and goal directed statement of purpose (Stage 2- Define)
3. Generate ideas around the POV statement using techniques such as 6 Thinking Hats in brainstorming and mind mapping (Stage 3- Ideate)
4. Plan and create a scaled down model using material and facilities easily available and accessible to visually represent the idea generated (Stage 4- Prototype)
5. Present the model with a tentative analysis of practical aspects, such as costing, sustainability of the model, etc. (Stage 5- Test). This stage, however, was restricted in to only presentation considering the limited scope of the course.

Teaching Methodology & Course Evaluation

The course was structured in a way that allowed maximum student-teacher interaction with a focused approach on experiential learning in both semesters. Sessions were conducted for 2 hours for a batch of 40 students and each session was designed to follow continuous evaluation targeting the COs. The methodology included use of mixed strategy of teacher and student centered approaches, since pedagogically, both happened to be the users of the course. While core concepts were covered using lecture and presentation methods, learner-centered methods were used for hands-on experience, such as heuristic approach, peer learning approach through group discussions and brainstorming, and project-based method. This not just enabled a strong rapport between teacher and students but also facilitated continuous learning by doing. This methodology was crucial in structuring the evaluation pattern such that each task was assigned certain points that checked the validity of the task and kept the students aligned with the continuous assessment pattern. It further helped gather regular feedback about the implementation of the course for indirect assessment of the COs.

Analysis

The curriculum structure for the first-year students comprises of common courses for all, irrespective of the choice of discipline that students opted for; the discipline related courses begin second year onwards. It is to be, thus, noted here that the Design Thinking course is an introductory course for first year students and hence, its alignment with the overall mapping of program outcomes (POs) of the engineering program is difficult to justify. Thus, although OBE emphasizes the mapping of COs with overall POs, the direct assessment method of CO-PO mapping was not considered for the purpose of this study. With the objective to study student perceptions (user-experience), the analysis was conducted through indirect assessment method. For this, a feedback and exit survey was designed considering the a) attainment level of the COs, and b) effectiveness of the course in terms of teaching, which included- content, execution, evaluation, and assistance & help, as parameters (CE).

Results & Discussion

The results of this study are based on a combination of quantitative and qualitative research methodologies to analyse student perceptions of teaching methods, understanding of the subject, and real-life applicability of the course content.

Quantitative Inquiry

The quantitative analysis of this course was based on the feedback and exit survey taken at the end of each semester from the responses collected. A total of N = 232 participants took the survey that represented the students enrolled into first year of UG engineering program. A total of 18 questions were framed in the survey to assess these parameters (including an open-ended question for feedback); examples of the items can be seen in Table 1:

Table 1: Sample Items

Parameter	Item	Rating		
		Yes	No	To an extent
CO1	I am aware about the role of psychological principle used in the Design Thinking field, such as Gestalt.			
CO2	I will be able to empathize, define, and ideate to come up with innovative solutions for engineering problems using human centric tools.			
CO3	I will be able to apply the design thinking process and propose real-time engineering product designs that are practical and viable			
CO4	I will be able to appraise user feedback and propose corrective innovative solutions to create better customer experience			
Content	The course content was well researched, drafted and created to suit the need of engineers			
Execution	The general mood of the class was energetic, open, and interactive and there is focus on everybody's involvement			
Evaluation	The assignments and activities covered the syllabus and made me think and apply the knowledge beyond engineering.			
Assistance & Help	The faculty regularly checked the progress of all students, asked for difficulties and feedback and showed willingness to help the students			

The scope of quantitative inquiry in this study was restricted to the frequency counts of the affirmative responses received from the participants. This enabled the researcher to i) assess the percentage of positive responses for CO attainment and course effectiveness, and ii) assess the percentage of negative responses to identify limitations and scope for further improvement. Overall, for all parameters, a higher percentage of positive responses were recorded for both semesters. The results for- a) percentage of CO attainment was calculated according to the content it targeted and was thus coded as shown in Table 2:

Table 2: CO Parameters

CO1	Learning Styles & Design Thinking Methodology	LS & DTM
CO2	Levels of Design & Human Centric Tools	LD & HCT
CO3	Innovative Product Design & Prototype Development	IPD & PD
CO4	User Feedback & Corrective Innovative Solutions	UF & CIS

The course effectiveness (b), as mentioned earlier, was measured on content, execution, evaluation and assistance provided. The percentages of affirmative responses for each of these parameters can be depicted as follows:

Table 3: Percentages of Affirmative Responses

a) Course Outcomes (COs)	Semester 1	Semester 2
CO1 (LS & DTM)	75.70%	80.10%
CO2 (LD & HCT)	77.70%	85.45%
CO3 (IPD & PD)	74.70%	82%
CO4 (UF & CIS)	81.10%	85%
b) Course Effectiveness (CE)	Semester 1	Semester 2
Content	79.10%	84.85%
Execution	80.10%	85.63%
Evaluation	82.10%	85.14%
Assistance & Help	74.20%	85.05%

For both COs & CE there is a significant increase in the affirmative responses from Semester 1 to Semester 2, while the execution and evaluation percentages remain close. A major change is seen CO1, CO2, CO3, Execution and Assistance & Help. This can be depicted in the figures that suggest a trend:

Figure 2: CO Attainment Percentage of Affirmative Responses

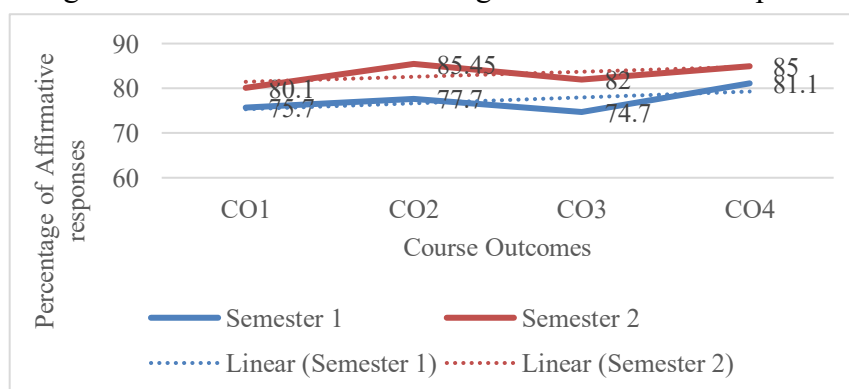
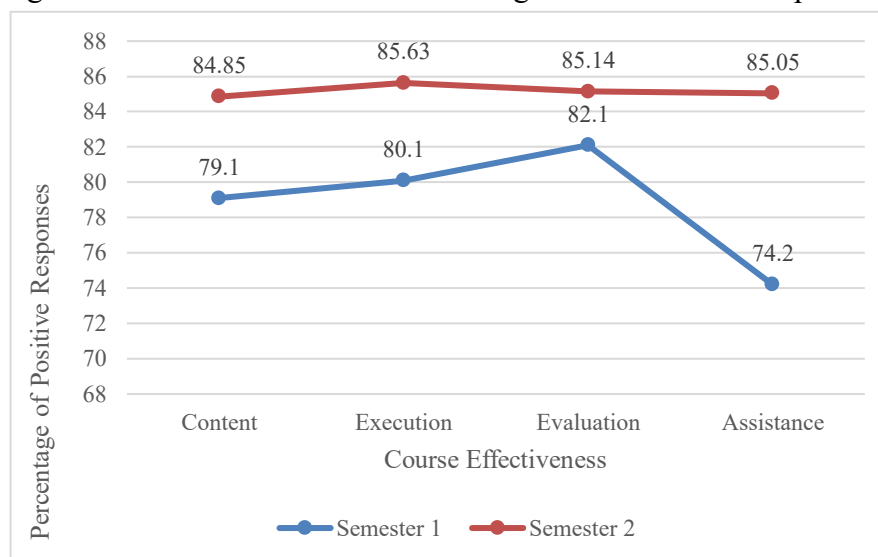


Figure 3: Course Effectiveness Percentage of Affirmative Responses



These observations highlight several things about the importance of pedagogical training, particularly for teaching non-technical courses to engineering students. The most important aspect of successfully implementing a non-technical course like Design Thinking heavily relies on the skill of the teacher, methodology adopted, and an open approach towards implementing changes based on feedback. This is the essence of the design thinking methodology which when implemented gives positive results. The results suggest that it is most important for the teacher to continuously improvise the execution of the course and modify the evaluation to suit the student's needs. Further, the changes in the positive responses for the two semesters are progressive, suggesting that the course was more effective in the second semester. The reasons for these differences may be attributed to the discipline of the students, since it is found that engineering disciplines show substantial interdisciplinary distinctions which may influence how courses are received and perceived by students (Potvin et al., 2013) and affects course reception by students (Ostafichuk et al., 2024). In the present student population, the course was offered to students of mechanical engineering in semester 1 and to students of metallurgy and manufacturing engineering in semester 2, and it can be said that since metallurgy students have been found to show improved learning outcomes through group learning approaches (Nansaarng & Siripattanakunkajorn, 2007), such as in this course, the findings justify the change in trend between the two semesters.

Qualitative Inquiry

A qualitative analysis was done on the open-ended responses of the participants from the survey to extract themes and patterns, categorizing them into possible strengths, weaknesses, and areas for improvement. The responses were analysed using thematic coding, identifying common themes, systematically categorizing both positive and constructive feedback and perceptions and frequencies of recurring themes were recorded to highlight major trends and key areas. The feedback from students regarding the course and faculty was overwhelmingly positive. The key findings from a thematic analysis of the open-ended responses can be categorized into the following themes:

1. *Quality of Teaching*: Participants highly appreciated the interactive and engaging teaching methods that included an interactive and engaging teaching style, clarity in delivering the content, and the ability to make complex concepts easily understandable. They also noted approachability and encouragement as key strengths.

“Faculty was very energetic and enthusiastic, which elevated the mood of the class, also the assignments were super fun... made us truly realize that how engineers do need this subject.”

“Faculty were extremely supportive and had a passion towards teaching their subjects in a very fun and exciting way. Their technique of teaching always kept us attentive and we were not bored at all...”

2. *Course Content and Structure*: The course was perceived as a unique and refreshing learning experience that was different from traditional classroom teaching. Its relevance to industry and professional applications was a major highlight, where the use of real-world examples, practical assignments, and interactive activities played a crucial role in making learning enjoyable and impactful. This helped students see the value of what they were learning, which was the outcome of bridging of theory and practice.

“DTIL was a unique course which I think would help in developing design perspective for engineering students... way of teaching was different from the conventional way...”

“An innovative subject that evaluates our outside-the-box thinking and our ability to come up with sustainable solutions. I think the course content was very well-planned... a mix of practical learning and theory enhanced learning experience.”

3. *Application to Real Life*: Participants reported that the course was highly relevant to real world where their problem-solving and creative skills improved significantly. Techniques such as SCAMPER and Six Thinking Hats were recognized as most valuable tools for practical application.

“This course very helpful for my profession as manufacturing engineer... taught us to understand the problems at the user's end and make a fascinating product using principles like SCAMPER.”

“Most interesting part was Prototyping... would benefit from it a lot as startups are on the rise... sparked creativity and problem-solving skills and we tackled real challenges collaboratively, gaining valuable insights to come up with variety of solutions...”

4. *Constructive Suggestions*: Participants highlighted certain areas that could improve the quality of the course further, such as incorporating more written assignments to reinforce learning; this points towards a preference towards a structured assessment pattern. Some also recommended prototyping and testing assignments in real-life scenarios while others pointed out that the need for increasing the number of sessions and course credits for better hands-on experience.

“... A written assessment so that students have to learn and retain subject knowledge better... assignments that are given should also be tested in practical life for hand on experience.”

“More useful if we could have had a little more time to work on the actual prototype... but it could be 2 credit course... because in this course there's is more content and more to learn, work and apply.”

Recommendations

The study points towards several possibilities for better pedagogical application of this course. A few key areas include:

1. Expansion of course content and duration, allowing students to explore advanced topics in greater depth.
2. Introducing real-world case studies, industry collaborations, and structured assessments to strengthen students' understanding and retention of concepts.
3. Personalization of learning experiences and cross-disciplinary applications, by tailoring content to individual learning style, making it relevant to a broader range of students.
4. Inclusion of a capstone project or real-world problem-solving assignments for enhance practical learning and application and apply these methodologies in diverse professional settings.
5. Incorporating AI-driven learning tools, gamified experiences, and immersive technologies that would increase student engagement making it an interactive, hands-on learning experience.

Conclusion

In conclusion, the integration of design thinking into engineering education, particularly under the National Education Policy (NEP) 2020 in India, represents a significant advancement in fostering a more innovative, student-centered learning environment. The findings from this study illustrate the positive impact of design thinking on student engagement, creativity, and interdisciplinary collaboration. The pedagogical effectiveness of the design thinking course was evidenced by the high levels of student satisfaction and the progressive improvement in course outcomes and effectiveness across two semesters. Qualitative feedback highlighted the importance of interactive teaching methods, real-world applicability, and the relevance of course content to professional practice. However, constructive suggestions from students indicate areas for further enhancement, such as the need for expanded course content, more structured assessments, and opportunities for hands-on experience. By addressing these recommendations, educational institutions can better prepare engineering students to navigate complex challenges and become proactive problem solvers in an ever-evolving landscape. Overall, the study underscores the necessity of continuous pedagogical innovation and adaptation to meet the demands of modern education and industry.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

The use of generative AI and AI-assisted tools is acknowledged to enhance the research and writing process in this paper. These technologies were utilized to assist in literature review, and the formulation of certain concepts presented in this study. It is affirmed that the final

content, interpretations, and conclusions drawn in this paper are the result of human expertise and critical thinking. All AI-generated content was reviewed and edited to ensure accuracy, coherence, and alignment with the objectives of the research. This declaration serves to maintain transparency regarding the integration of advanced technologies in the academic work, ensuring that the contributions of both human and machine intelligence are appropriately recognized.

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Understanding Group Dynamics and Task Behaviors: A Process Observation Analysis of Youth Engagement in Civic Development

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Abstract

The research focused on the Sangguniang Kabataan (SK) and Katipunan ng Kabataan (KK) in the Philippines, two youth organizations promoting community development in Rizal province. The study used process observation analysis to examine how task behaviors contributed to achieving discussion goals. Key behaviors observed during youth meetings included initiating, seeking information, giving opinions, clarifying, elaborating, summarizing, and testing for consensus. These behaviors were assessed to understand group dynamics as they developed community work plans—qualitative observational methods evaluated youth leaders' participation levels, revealing individual engagement differences. The analysis also included frequency counts of each behavior, identifying factors influencing discussions and youth activities. The study concluded that understanding task behaviors is crucial for enhancing civic education and youth engagement. By analyzing participation dynamics, the research suggests that fostering awareness of these behaviors can promote broader youth involvement in decision-making processes.

Keywords: leadership, management, process observation, task behaviors, youth

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Introduction

The youth in the Philippines play a crucial role in nation-building, with efforts focused on enhancing their participation, leadership, and influence in governance. A key platform for youth engagement is the Sangguniang Kabataan (SK), established as "Kabataang Barangay" under Presidential Decree No. 648 during Ferdinand Marcos Sr.'s presidency. To address inefficiencies and concerns about SK officials, the Sangguniang Kabataan Reform Act of 2016 (Republic Act No. 10742) was enacted, defining the roles and powers of SK officials to promote transparent governance (Erlina et al., 2022). Flores et al. (2022) state that youth involvement in social, economic, and political life is essential for fostering an inclusive democracy, as the Philippine Constitution recognizes. Youth in the Philippines engage politically through voting, joining political parties, activism, and utilizing social media. Each barangay is mandated to have a Katipunan ng Kabataan (KK), consisting of residents aged 15 to 30 registered with the Commission on Elections (COMELEC).

The participants in this assembly include KK officers from seven sub-villages in Sta. Cruz, Antipolo City, led by the SK officers. A meeting was scheduled three weeks after profiling KK youth members, serving as a data source for future programs. This meeting was a courtesy call from SK officers to newly elected KK youth officers, fostering mutual introduction and engagement. Additionally, the meeting briefed participants on the upcoming KK assembly, designed to train future youth leaders and raise awareness about the SK system, including the Local Youth Development Plan (LYDP) and other related programs. The purpose of this study is to analyze the productivity of the meeting and observe participant behaviors during discussions. By conducting process observation analysis, the study aims to gather information about the meeting's processes and identify potential issues that could affect its effectiveness.

Literature Review

Youth involvement in local government and community activities is vital for civic development. Organizations like the Sangguniang Kabataan (SK) and Katipunan ng Kabataan (KK) in the Philippines create platforms for young people to take on leadership roles and engage in governance. These groups aim to develop youth leaders who address community needs and contribute to nation-building. This study focuses on the behaviors and dynamics influencing youth engagement in Barangay Sta. Cruz, Antipolo City, Rizal.

Research emphasizes the importance of effective group dynamics in achieving organizational goals. Candelaria et al. (2019) noted that task behavior is crucial for helping group members reach objectives and that insufficient participation can hinder performance. This study analyzes task behaviors—such as initiating discussions, seeking information, and clarifying points—during SK and KK meetings. Effective execution of these behaviors enhances group engagement and success. Alvi and Rana (2019) found that unclear goals often lead to ineffective leadership behaviors, resulting in disorganized activities. This research investigates how giving opinions and summarizing can clarify objectives, impacting the success of youth assemblies.

Hooda (2024) linked youth civic engagement to the "5 Cs"—confidence, competence, connection, compassion, and character—highlighting their role in enhancing youth leadership. Wang and FitzGerald (2024) showed that behavioral indicators of task engagement, while not consistently predictive of outcomes, are essential signals of

participation. Seeking information and elaborating on ideas demonstrate how youth leaders engage in decision-making, aligning with this study's focus on measuring and improving task behaviors.

Wray-Lake and Abrams (2020) emphasized the positive impact of youth involvement on community vitality through the Positive Youth Development (PYD) framework, noting that ecological assets—resources and support systems—enhance civic engagement. This supports the study's focus on observing youth behaviors in structured meetings to boost participation. Rala et al. (2019) also highlighted task behavior as critical for achieving group objectives and managing discussions. Their work suggests that summarizing and consensus-testing improve organizational performance, which this study examines in youth assemblies. Peterson (2020) emphasized youth organizing as a means for young people to address societal issues, aligning with the focus on youth leaders' participation in decision-making. Palagnyuk et al. (2024) underscored the importance of youth participation in public affairs and policy formation. Brady et al. (2020) noted that encouraging youth participation fosters individual development and strengthens their roles as future citizens, reflected in the study's findings that task behaviors promote productive youth leadership.

Wierzbik-Strońska (2020) highlighted youth leadership's significance in political decision-making, especially in rural areas, where effective leadership drives progress. Fatoki (2024) argued that youth enthusiasm and potential contributions fuel their involvement in civil society. Fiorani et al. (2024) concluded that positive youth development is essential for sustainable civic development, advocating for frameworks that ensure meaningful participation. This aligns with the study's aim to analyze how task behaviors deepen engagement in governance, preparing young leaders for lasting contributions.

Methodology

This study employed a descriptive and observational research design to explore youth engagement and task behaviors in the Sangguniang Kabataan (SK) and Katipunan ng Kabataan (KK) organizations. Descriptive research aims to capture and illustrate individuals, events, or conditions as they naturally occur without manipulating variables (Siedlecki, 2020). In this design, the focus is on observing and documenting the characteristics or behaviors of a specific group in its natural setting, allowing the researcher to understand the participants' actions and interactions. While descriptive research can explore multiple variables, it excels at examining a single variable in-depth, making it ideal for understanding the dynamics of youth leadership and engagement in community activities.

Research Design

Observational research is a variety of non-experimental study designs in which behavior is methodically observed and documented. Describing a variable or group of variables is the aim of observational research. More broadly, the objective is to capture a moment of particular traits of a person, group, or environment (Price et al., 2022). The researchers analyzed the flow of the meeting, participant engagement, and factors that influenced the productivity of the discussions. Primary data, collected through direct observations, interviews, and questionnaires, and secondary data, sourced from journals, articles, and research papers, were utilized to comprehensively understand the group dynamics and task behaviors. The researchers analyzed the flow of the meeting, participant engagement, and how it was conducted, identifying factors influencing its productivity. The study relied on

both primary and secondary data sources. Primary data were collected through observations, interviews, and questionnaires, while secondary data were sourced from journals, articles, research papers, and online materials.

Theoretical Framework

Constructivism emphasizes that learners create meaning through active involvement with their environments, such as engaging in experiments and addressing real-world challenges. Knowledge is constructed through experiences and interactions (McLeod, 2024). Active participation in meetings, discussions, and problem-solving tasks reflects this principle. Literature on youth engagement supports this approach. Candelaria et al. (2019) highlighted the importance of task behaviors for achieving group objectives, noting that insufficient participation can hinder progress. This aligns with the constructivist view that learning is most effective when participants are actively engaged. Alvi and Rana (2019) emphasized that clear goals and well-defined tasks are critical for effective leadership. These insights reflect the study's focus on how behaviors like clarifying points and summarizing help structure discussions and guide youth groups toward successful outcomes.

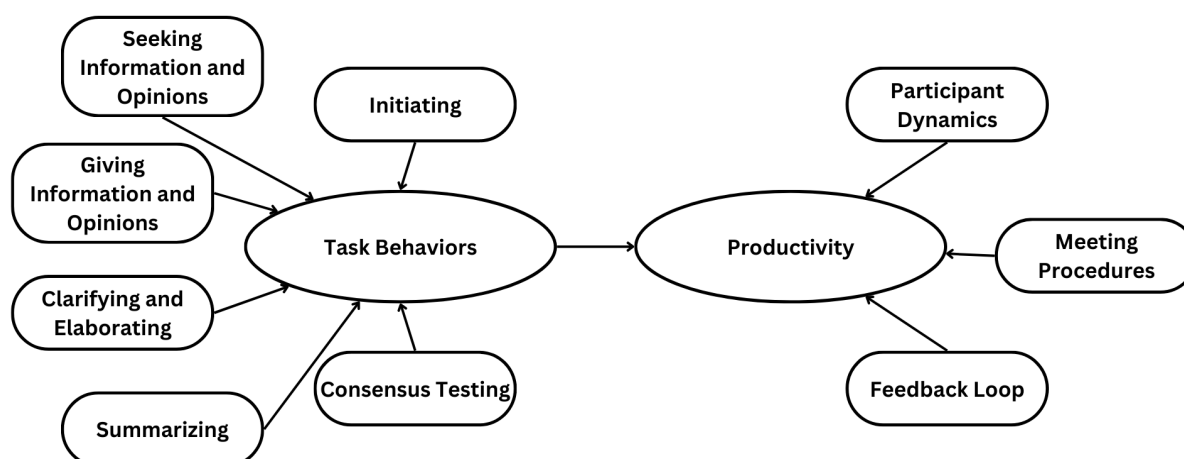
Participant dynamics, meeting procedures, and feedback loops significantly influence productivity and align with constructivism. A positive group dynamic and well-structured meeting procedures create an environment where learning can thrive. Hooda (2024) and Wray-Lake and Abrams (2020) underscored how youth civic engagement through active participation supports leadership development. Hooda's "5 Cs"—confidence, competence, connection, compassion, and character—are fostered through engagement, echoing constructivist principles.

Wang and FitzGerald (2024) demonstrated that task behaviors, such as seeking information and elaborating on ideas, are crucial for engagement. These behaviors indicate participation and contribute to achieving group goals, as seen in SK and KK meetings. Rala et al. (2019) and Peterson (2020) further supported the significance of task behaviors like summarizing and consensus-building for group success. These actions foster understanding and collective decision-making, essential in youth leadership. The study aligns with Peterson's view that youth organizing provides platforms for young people to engage with societal issues, linking task behaviors to meaningful civic participation. Brady et al. (2020) noted that active youth involvement in community activities strengthens their roles as future citizens, highlighting the broader impact of these behaviors. The Constructivist Learning Theory illustrates how youth leaders in the Philippines engage in task behaviors to build knowledge, develop leadership skills, and contribute to civic development. Meaningful participation in group activities and decision-making processes exemplifies this theory's emphasis on learning through active engagement and real-world experiences.

Conceptual Framework

The variables in the study are task behaviors and productivity. Task behaviors such as Initiating, Seeking Information and Opinions, Giving Information and Opinions, Clarifying and Elaborating, Summarizing, and Consensus Testing measure participants' actions to facilitate communication and decision-making.

Figure 1: Conceptual Framework



These behaviors have a direct impact on the productivity of the meeting, which refers to the achievement of the group's goals. Productivity is influenced by factors such as Participant Dynamics, Meeting Procedures, and the Feedback Loop. The study emphasizes the interconnectedness of these elements, showing that effective task behaviors, positive group dynamics, structured meeting procedures, and timely feedback contribute to higher productivity and more successful group outcomes. Therefore, although common rationality is a significant asset for an organization, a manager who wants to use it to increase productivity must activate it through collective decision-making (Mirbagheri et al., 2023).

Measures

The researchers used frequency distribution to analyze six task behaviors: initiating, seeking information and opinions, giving information and opinions, clarifying and elaborating, summarizing, and consensus testing. Initiating behaviors include proposing tasks, defining problems, and suggesting solutions (Candelaria et al., 2019). Seeking information and opinions involves asking for clarification, gathering relevant information, and sharing opinions. Giving information and opinions focuses on providing details and perspectives, such as offering facts and suggestions. Clarifying and elaborating includes interpreting concepts, clearing confusion, and identifying alternatives. Summarizing consolidates ideas, aids decision-making, and challenges suggestions, while consensus testing involves assessing group decisions and evaluating conclusions. The study by Rala et al. (2019) supports this framework by highlighting the importance of task behavior in group processes.

Participants

The participants in this assembly are Katipunan ng Kabataan (KK) officers from seven different sub-villages within Sta. Cruz village in Antipolo City, Rizal in the Philippines. The Sangguniang Kabataan (SK) officers, a community council representing the youth in the barangay above, led the first batch of the courtesy call and assembly briefing for the KK officers.

Table 1: General Information About the Group Composition

No.	Group Member	Particulars			
		Gender	Age	Designation as KK and SK Officers	Residential Locations (Sitios)
1	Kent Christian Masula	Male	19	SK Chairman	Villa Leyva 2
2	Romnick Estorba	Male	21	SK Secretary	Upper Lucban
3	Antonio Hilanga Jr.	Male	21	SK Treasurer	Upper Manalite 1 Phase 2
4	Shane Jhemiles Allata	Female	21	SK Member	Upper Manalite 1 Phase 2
5	Flounee Castillo	Female	23	SK Member	Upper Manalite 1 Phase 2
6	Rizza Mae Cruz	Female	22	SK Member	Upper Sto. Niño
7	Jacob Gonzales	Male	22	SK Member	Cacalog
8	Abdiel Anchieta	Male	23	KK President	Leyva 1
9	Rogelio Abrigonda	Male	25	KK Vice President	Leyva 1
10	Angel Latido	Female	18	KK Vice PResident	Manalite Phase 4
11	Carlo Latido	Male	17	KK Member	Manalite Phase 4
12	Coleen Vinoya	Female	17	KK Member	Manalite Phase 4
13	Margier Laminero	Female	21	KK President	Monolith
14	John Carlo Mahilum	Male	21	KK Vice President	Monolith

15	Jenyrose Mahilum	Female	16	KK Treasurer	Monolith
16	Michelle Asinero	Female	16	KK Member	Sampaguita
17	Jasfer Catillo	Male	16	KK Member	Sampaguita
18	Leni Rose Malaca	Female	16	KK Member	Sampaguita
19	Eunice Roqales	Female	14	KK Member	Sampaguita
20	Julianna Mosatalla	Female	20	KK Secretary	Señora Dela Paz
21	Jacob Vince Archi	Male	19	KK Member	Señora Dela Paz
22	Bea Bianca Cacepenio	Female	19	KK Member	Señora Dela Paz
23	Mikko Cacepenio	Male	19	KK Member	Señora Dela Paz
24	Nina Pamatian	Female	19	KK Member	Señora Dela Paz
25	Isaac Philip Eraga	Male	22	KK President	Summer Happy Homes
26	Michael Ibuén	Male	22	KK Treasurer	Summer Happy Homes
27	Joshua Torrato	Male	19	KK Chairman for Active Citizenship	Summer Happy Homes
28	Rhea Mae Bongat	Female	18	KK Chairman of Environment	Summer Happy Homes
29	Enrique Jaquias	Male	17	KK Chairman of Peace Building & Security and Global Mobility	Summer Happy Homes

30	Oliver Villarmino	Male	20	KK President	Vista Grande
31	Janine Felix	Female	Not Declared	KK Vice President	Vista Grande
32	Chricen Gunuanes	Female	15	KK Secretary	Vista Grande
33	Cyden Tahares	Male	16	KK Secretary	Vista Grande
34	Jennifer Delicano	Female	17	KK Treasurer	Vista Grande
35	Abegail Alba	Female	19	KK Member	Vista Grande

Note: All participants consented to be identified and agreed to participate in the study. Ethical guidelines were strictly followed to protect their rights. The researchers ensured transparency and respect for participants throughout the observation and analysis process.

Table 1 details the participants involved in the study. Seven SK officers represent 20% of the total, including the chairman, secretary, treasurer, and four members. The majority, 29 KK officers, make up 80% of participants, coming from seven sub-villages in Sta. Cruz village. The observation occurred during a courtesy call led by chairman Mr. Kent Christian Masula, treasurer Antonio Hilanga Jr., and member Ms. Shane Jhemiles Allata. The group included 48.57% males (17) and 51.43% females (18), with ages ranging from 15 to 25 years (average age = 19.12). Participants are from various local sitios.

Data Gathering Procedure

The researchers obtained permission from the Head of the Sangguniang Kabataan (SK) council to observe an SK and Katipunan ng Kabataan (KK) meeting. The research used qualitative methods to examine task behaviors related to meeting objectives, focusing on initiating discussions, seeking opinions, clarifying, summarizing, and testing for consensus. The authors recorded the meeting with video and audio devices to ensure data accuracy and then transcribed the recordings. In compliance with the Data Privacy Act of 2012, the study took measures to protect participants' privacy and confidentiality. All sensitive data was handled carefully and used only for this study. Participants voluntarily consented to be identified and followed ethical guidelines throughout the research. A trained analyst supervised the data collection process to maintain ethical integrity. The researchers prioritized participants' well-being and safeguarded the study's integrity by adhering to these standards.

Data Analysis

Table 2: Frequency Distribution of Individual Task Behavior (Part 1)

Task Behavior	Frequency of Statements					Total
	Kent Masula	Antonio Hilanga Jr.	Shane Allata	Carlo Mahilum	Jasfer Catillo	
1. Initiating	2	1	2	0	0	5
2. Seeking Information and Opinions	19	4	20	1	0	44
3. Giving Information and Opinions	37	20	34	0	2	93
4. Clarifying and Elaborating	18	7	20	1	0	46
5. Summarizing	1	0	1	0	0	2
6. Consensus-testing	1	0	0	0	0	1
Total	78	32	77	2	2	191

The frequency distribution of individual task behaviors (see Table 2) observed during the meeting reveals varying levels of engagement among participants. 220 statements were made across six key task behaviors: Initiating, Seeking Information and Opinions, Giving Information and Opinions, Clarifying and Elaborating, Summarizing, and Consensus-testing. Kent Masula contributed the most overall, with 78 statements, followed by Shane Allata with 77. Antonio Hilanga Jr. made 32 statements, while Carlo Mahilum and Jasfer Catillo each contributed two. Regarding specific behaviors, Initiating was the least frequent, with only five statements in total. Kent Masula initiated the most, with two statements, while Antonio Hilanga Jr. and Shane Allata each initiated 1 statement. Seeking Information and Opinions had the highest frequency, with 44 total statements. Shane Allata made the most significant contribution, with 20 statements, while Kent Masula followed closely with 19. Giving Information and Opinions also showed significant participation, totaling 93 statements. Kent Masula again led with 37 statements, followed by Shane Allata with 34 and Antonio Hilanga Jr. with 20. For Clarifying and Elaborating, there were 46 statements in total. Kent Masula and Shane Allata contributed the most, with 18 and 20 statements, respectively. In the Summarizing category, only two statements were made, with Kent Masula and Shane Allata each contributing 1. Finally, consensus testing was the least frequent behavior, with only 1 statement by Kent Masula. This distribution of task behaviors underscores the differences in participation levels among the members, with Kent Masula and Shane Allata being the most active participants in initiating discussions and providing information, while Carlo Mahilum and Jasfer Catillo contributed less frequently across all categories.

Table 3: Frequency Distribution of Individual Task Behavior (Part 2)

Task Behavior	Frequency of Statements					Total
	Leni Malaca	Nina Pamatian	Oliver Villarmin	Janine Felix	Abegail Alba	
1. Initiating	0	0	0	0	0	0
2. Seeking Information and Opinions	0	3	3	1	1	8
3. Giving Information and Opinions	3	1	7	6	1	18
4. Clarifying and Elaborating	0	0	3	0	0	3
5. Summarizing	0	0	0	0	0	0
6. Consensus-testing	0	0	0	0	0	0
Total	3	4	13	7	2	29

The frequency distribution of individual task behaviors (see Table 3) observed during the meeting reveals the participation levels of each member across various task behaviors. A total of 29 statements were made across six key task behaviors: Initiating, Seeking Information and Opinions, Giving Information and Opinions, Clarifying and Elaborating, Summarizing, and Consensus-testing. Regarding specific behaviors, Initiating was not observed in this group, as no statements were made under this category by any participant. For Seeking Information and Opinions, a total of 8 statements were made. Nina Pamatian contributed the most with three statements, followed by Oliver Villarmin and Abegail Alba, who each made 1 statement, and Janine Felix, who made one statement. The Giving Information and Opinions category had 18 total statements. Oliver Villarmin made the highest contribution with seven statements, followed by Janine Felix with 6, Leni Malaca with 3, and Nina Pamatian and Abegail Alba with 1 statement each. Three statements were made in the Clarifying and Elaborating category, with Oliver Villarmin contributing all 3. No statements were made in the Summarizing or Consensus-testing categories, indicating no participation in these behaviors during the meeting. This distribution suggests that the group primarily engaged in giving information and seeking opinions, with Oliver Villarmin contributing most actively, particularly in giving information and elaborating. The absence of statements in initiating, summarizing, and consensus-testing behaviors indicates that the group may have focused more on exchanging and clarifying information rather than setting the agenda or reaching collective decisions.

Table 4: Frequency Distribution of Group Task Behavior

Task Behavior	Frequency of Statements	Percentage (%)
1. Initiating	5	2.27
2. Seeking Information or Opinions	52	23.64
3. Giving Information or Opinions	111	50.45
4. Clarifying and Elaborating	49	22.27
5. Summarizing	2	0.91
6. Consensus-testing	1	0.46
Total	220	100

The frequency distribution of group task behaviors (see Table 4) observed during the meeting shows the overall participation across various task behaviors. A total of 220 statements were made across six key behaviors: Initiating, Seeking Information or Opinions, Giving Information or Opinions, Clarifying and Elaborating, Summarizing, and Consensus-testing. Regarding specific task behaviors, Giving Information or Opinions was the most frequent, with 111 statements, accounting for 50.45% of the total participation. This was followed by Seeking Information or Opinions, with 52 statements (23.64%), and Clarifying and Elaborating, with 49 statements (22.27%). Initiating occurred 5 times, making up 2.27% of the total, while Summarizing and Consensus-testing were less frequent, with 2 statements (0.91%) and 1 statement (0.46%), respectively. This distribution highlights that the group was primarily engaged in Giving Information or Opinions and Seeking Information or Opinions, accounting for nearly three-quarters of the total task behaviors. Clarifying and Elaborating also played a significant role in the meeting, while Initiating, Summarizing, and Consensus-testing behaviors were less prevalent. Overall, the data suggest that the group focused on sharing and processing information rather than initiating new topics or summarizing discussions, with minimal engagement in consensus-building.

Results and Discussion

The analysis of task behaviors during the Sangguniang Kabataan (SK) and Katipunan ng Kabataan (KK) meeting at Barangay Sta. Cruz, Antipolo City, revealed valuable insights into the group dynamics and effectiveness of youth participation in local governance. The observations, based on the frequency distribution of individual task behaviors, helped illustrate the level of engagement and the role of each participant in contributing to the meeting's objectives.

Frequency and Distribution of Task Behaviors

The behaviors observed during the meeting included Initiating, Seeking Information and Opinions, Giving Information and Opinions, Clarifying and Elaborating, Summarizing, and Consensus-testing. The total number of task behaviors recorded for all participants was 220,

distributed across the six categories. The most frequent task behavior observed was Giving Information and Opinions, which accounted for 111 statements, followed by Seeking Information and Opinions with 52 statements. Clarifying and Elaborating occurred 49 times while Initiating, Summarizing, and Consensus-testing were less frequent with 5, 2, and 1 statements, respectively. Notably, certain participants were more active than others in terms of specific task behaviors. For example, Kent Masula engaged in Giving Information and Opinions the most, with 37 statements, while Antonio Hilanga Jr. contributed significantly to Seeking Information and Opinions with 19 statements. This suggests that the group's overall effectiveness was likely driven by these participants' proactive engagement in sharing ideas and seeking input from others. Rala et al. (2019) emphasized that to monitor progress within a group setting effectively, it is essential to accurately analyze participants' task behaviors through process observation analysis, which should always be considered during meetings.

Group Task Behavior

When looking at the overall task behaviors for the group (see Table 4), it is evident that Giving Information or Opinions dominated the discussion, accounting for 50.45% of all statements made. This was followed by Seeking Information or Opinions (23.64%) and Clarifying and Elaborating (22.27%). Initiating behavior was relatively minimal, contributing only 2.27% of the total statements, indicating that participants generally did not take the lead in opening discussions. Further, Summarizing and Consensus-testing were extremely limited, comprising only 0.91% and 0.46% of the total behavior, respectively. The prevalence of Giving Information or Opinions suggests that the meeting primarily focused on exchanging ideas and sharing perspectives, which aligns with the purpose of the meeting to brief and update the KK officers on key local government initiatives, such as the Local Youth Development Plan (LYDP) and Comprehensive Barangay Youth Development Plan (CBYDP). The relatively lower frequency of Seeking Information or Opinions suggests that while information was shared, there may have been limited active inquiry from the participants about those ideas or plans. The SK leaders should be the ones that initiate asking or seeking information and opinions from the other participants to set the mood. According to Scott et al. (2023), soliciting input fosters an environment of openness and trust. People will likely stay engaged, loyal, and productive when they believe their opinions count. Additionally, participants are far more inclined to voice insightful worries and recommendations.

Participant Engagement and Group Productivity

The observations also revealed differences in how participants engaged with the agenda. Participants like Shane Allata and Carlo Mahilum showed more significant involvement in Giving Information and Opinions, likely contributing to the overall flow and ensuring the meeting's goals were communicated. In contrast, the absence of significant Initiating behaviors could indicate a lack of leadership in driving the discussion or setting the agenda. While the meeting was productive regarding information dissemination, the lack of Summarizing and Consensus-testing suggests that the group did not spend much time aligning on specific actions or confirming understanding of the topics discussed. Wu and Paluck (2022) state that active group participation enhances cooperation and organizational productivity through increased information sharing. Hearing one member's voice can motivate others and drive positive organizational change.

The relatively low number of consensus-testing behaviors (i.e., only 1 statement) is particularly noteworthy. Consensus testing plays a crucial role in ensuring that all members are on the same page and that decisions made during the meeting are understood and agreed upon by all participants. The limited engagement in this task behavior may point to a potential area for improvement in future meetings, where there could be more emphasis on reaching a collective agreement or confirming a shared understanding of the discussed issues.

Task Behavior and Leadership Development

The findings align with the literature on task behaviors in youth leadership and civic engagement, such as the works of Candelaria et al. (2019) and Alvi and Rana (2019), who emphasized the importance of task behaviors in achieving organizational goals. In particular, Seeking Information or Opinions and Giving Information or Opinions are critical for facilitating group discussions and ensuring that members share knowledge and learn from each other. The findings of this study suggest that while these behaviors were prominent, other behaviors, like Consensus-testing and Summarizing, which help guide the group toward consensus and clarity, were not as frequently observed. This study's findings resonate with Hooda's (2024) concept of the "5 Cs" (i.e., confidence, competence, connection, compassion, and character), as the behaviors exhibited by the participants in the meeting—especially Seeking Information and Opinions and Giving Information or Opinions—can be seen as building blocks for confidence and competence in leadership. Additionally, the findings from Wray-Lake and Abrams (2020), which emphasize the role of youth engagement in civic activities, further support the notion that these task behaviors are vital to promoting youth participation in local governance and decision-making.

Implications for Future Meetings and Leadership Development

The results indicate that while there is a strong presence of information-sharing behaviors, the group could benefit from incorporating more Initiating behaviors and more structured Consensus-testing in future meetings. These behaviors would enhance the group's ability to lead discussions more effectively, ensure that all members are engaged, and improve the clarity of decisions made. Encouraging Summarizing behaviors would also be valuable, as it could help synthesize information and reinforce understanding of the key points discussed, promoting better decision-making processes in future meetings. Jenkins et al. (2020) identified self-efficacy as a key element of successful leadership and noted that goal-setting, decision-making, and problem-solving influence leadership behavior development.

Conclusion

The overall productive nature of the meeting, with approximately 61% of the time dedicated to deliberation, underscores the potential of the SK and KK platforms to facilitate youth participation in local governance. However, the study also pointed to areas for improvement, particularly in organizing discussions more effectively and enhancing engagement from all attendees. The limited occurrence of Consensus-testing and Summarizing suggests that future meetings would benefit from a stronger focus on reaching collective decisions and reinforcing key discussion points to ensure better understanding and action. The findings also underline the importance of creating an environment encouraging inclusivity and active participation. The noticeable improvement in engagement following the announcement about esports illustrates the potential for increased participation when topics align with the interests and concerns of youth participants. Therefore, the study calls for a more structured approach

to planning and facilitating meetings, where diverse voices are heard and all participants are encouraged to contribute to the decision-making process.

In conclusion, Youth Engagement and Task Behaviors in Civic Development is central to the success of the SK and KK councils. Youth leaders can be more impactful in local governance and community development by fostering effective task behaviors such as Seeking Information, Giving Opinions, and Clarifying Points while emphasizing Initiating and Summarizing behaviors. Moving forward, the SK and KK organizations should prioritize strategies that promote comprehensive participation, clarify meeting objectives, and enhance the decision-making process, ensuring that youth leaders are well-prepared to address the challenges of civic development in their communities.

Directions for Future Research

Future research on youth engagement and task behaviors should expand by exploring regional differences in the Philippines, as cultural, economic, and social factors can influence youth participation in civic activities, offering insights into tailored strategies for different areas. Additionally, investigating psychosocial factors such as motivation, confidence, and resilience can deepen understanding of how internal traits and external influences impact youth leadership and performance. Research on the effectiveness of leadership training programs is also essential, as it could identify the most impactful methods, such as workshops, mentorship, and hands-on experiences, to enhance leadership skills. Through programs like civic education and extracurricular activities, educational institutions play a crucial role in fostering leadership and civic responsibility, and research could examine how these contribute to youth engagement. Finally, exploring the role of mentorship and digital platforms could provide new ways to support youth leaders, offering guidance and tools for engaging in civic activities and accessing training resources.

Comparative Studies Across Regions

Researchers could explore how regional factors—like culture, socio-economic conditions, and governance—affect youth engagement in Sangguniang Kabataan (SK) councils across the Philippines. For instance, youth leaders in urban areas like Metro Manila may have better access to resources than those in remote provinces, who may face challenges such as limited infrastructure. Comparing youth engagement across different regions could reveal best practices and specific difficulties, offering insights for tailored strategies to enhance youth leadership, as noted by Lelwic-Ojeda and Akintola (2024).

Longitudinal and Psychosocial Research on Youth Leadership

Longitudinal studies could track youth leaders, examining how their skills and internal traits evolve. Researchers might find that consistent participation helps leaders grow in areas like initiating discussions and summarizing meetings. Additionally, exploring psychosocial factors, such as self-confidence and motivation, could reveal how these traits influence civic engagement. For example, a motivated leader may struggle initially but improve with support. Organizations should adopt strategies that balance demands with resources to help young leaders thrive (Irehill et al., 2023).

The Impact of Leadership Training Programs

Youth leaders attending training programs focused on skills like initiating conversations may become more active in discussions. Research could investigate which training methods—workshops, mentorship, or hands-on projects—are most effective. Findings from Azad et al. (2024) could guide organizations in enhancing leadership training to improve motivation and performance. Future studies might explore how peer learning or scenario-based exercises help youth leaders structure meetings and reach consensus.

Interest-Based Engagement

Engagement levels can rise when discussions align with youth interests, such as esports. Research could examine how connecting civic discussions to youth passions influences participation and task behaviors. Understanding what excites youth can help design civic programs that foster sustained engagement, as highlighted in the study by Padua et al. (2024), emphasizing the connection between personal interests and participation.

The Role of Educational Institutions in Civic Development

Educational institutions play a key role in developing youth leadership. Future research could investigate how schools and universities contribute to essential skills for civic engagement, such as seeking information and giving opinions. Universities are vital for imparting knowledge and values necessary for community development (Lutaj, 2021). Studies could focus on how civic education and extracurricular activities prepare youth for active participation in governance.

Inclusivity and Barriers to Participation

Certain youth may feel marginalized due to socio-economic status, gender, or location, impacting their civic participation. Future research could identify barriers that hinder participation and explore strategies to enhance inclusivity. Addressing these barriers can ensure that all youth voices are represented in decision-making. Hosseinkashi et al. (2024) emphasized measuring inclusiveness in meetings to track changes and encourage individual improvement.

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Authorship Contribution Statement

The following co-authors contributed to the design conceptualization of the study and the conduct of process observation analysis: Edrian T. Untalan, Grace E. Ceballos, Angelica Anne P. Jaquias, Beverly T. Melchor, John Angelo A. Santiago, and Jaypy T. Tenerife. Angelica Anne P. Jaquias and John Angelo A. Santiago wrote the Methodology, Results, and Discussion sections. Beverly T. Melchor crafted the conclusion. Grace E. Ceballos was

responsible for the Introduction, while Edrian T. Untalan authored the Abstract. Jaypy T. Tenerife assisted with reviewing and editing the paper. He provided the research design and methodological approach as an expert in quantitative and qualitative analysis and conducting process observation analysis.

Declaration of Competing Interest and the Use of Artificial Intelligence (AI) in the Research Writing Process

The authors declare no conflicts of interest in this study. No generative AI tools were used to create this manuscript's ideas, concepts, or theories. AI was only employed to enhance readability and language under strict human supervision. After AI-assisted refinement, the authors carefully reviewed and edited the manuscript to ensure its accuracy and clarity. Acknowledging the limitations of AI, including potential biases or inaccuracies, the authors verified all content through thorough human oversight. The authors affirm their commitment to ethical standards, ensuring that human contributors carried out all intellectual and academic tasks.

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Short-Relationship Between Teachers' Personality Traits and Their Perceptions of School Climate

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Abstract

This study examined the relationship between teachers' personality traits and their perceptions of school climate, involving 61 teachers from four schools in Zamboanga City, Philippines. The research utilized the Big Five Personality Test (BFPT) and the Organizational Climate Description Questionnaire (OCDQ-RE) to gather data and employed correlation to explore these relationships. The results revealed that teachers generally exhibited moderate levels across the Big Five personality traits, with notably higher levels of conscientiousness, agreeableness, and openness to experience, while showing lower levels of extroversion and neuroticism. In terms of school climate, teachers perceived principal behaviors as supportive, directive, and restrictive, and teacher behaviors as collegial and intimate. Supportive principal behavior was rated the highest, while disengaged teacher behavior was rated the lowest. The study also found specific associations between personality traits and school climate behaviors. Extroversion was positively associated with supportive principal behavior. Agreeableness was linked to positive teacher behaviors: it was associated with collegial behavior and negatively associated with disengaged behavior. Neuroticism was negatively associated with directive principal behavior. Openness was related to both directive and restrictive principal behaviors, as well as intimate teacher behaviors. These findings highlight how different personality traits influence various aspects of school climate. To leverage these insights, it is recommended to conduct capacity-building workshops focused on educational leadership. Topics should include personality traits, ethics and professionalism, and leadership development. Such workshops can help align leadership practices with the diverse personality traits observed in educational settings, potentially enhancing overall effectiveness.

Keywords: personality traits, school climate, big five personality, agreeableness, conscientiousness, extroversion, neuroticism, openness

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Introduction

Educational leadership plays a vital role in shaping the landscape of modern education. An effective educational leader not only inspires teachers and students to reach their full potential but also fosters a thriving educational community. This positive influence enhances the effectiveness of educators, enriches the educational experience for students, and encourages greater engagement from parents and guardians in the learning process. Research by Garcia et al. (2014) highlights that a leader's personal characteristics—such as their abilities and personality traits—are significant predictors of their leadership behavior.

The Big Five Personality Traits framework is widely recognized as a standard for assessing individual personality. This psychological model delineates five broad dimensions: Openness to experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. Research indicates that these traits tend to remain relatively stable throughout a person's life (Lim, 2023). Openness to Experience is one of the five fundamental dimensions of personality. According to McCrae and Greenberg (2014), openness is characterized by breadth, depth, and permeability of consciousness, as well as a continuous pursuit of new experiences and ideas. This trait is closely linked to divergent thinking and creativity. A study by Handoyo and Hidayat (2021) found that individuals high in openness to experience are often associated with transformational leadership. They suggest that teachers exhibiting this trait are more likely to foster creativity and innovation in their students, thereby enhancing their effectiveness as transformational leaders. Another key dimension of the Big Five is Conscientiousness, which is defined as the tendency to adhere to socially prescribed norms for impulse control, goal orientation, planning, and the ability to delay gratification (Roberts et al., 2009). Jackson and Roberts (2015) further elaborate that conscientiousness encompasses a range of constructs reflecting self-control, responsibility, diligence, organization, and rule adherence. Extraversion, or extroversion, represents the degree to which individuals seek social interaction and engage with their environment. This trait encompasses comfort and assertiveness in social situations and indicates the sources from which individuals derive their energy (Lim, 2023).

Another personality trait examined in this study is Agreeableness. According to Tackett, J. L. (2020), it encompasses characteristics such as compassion, compliance, politeness, empathy, and modesty. Ackerman (2017) further elaborates that this trait reflects how individuals approach their relationships with others. Unlike extraversion, which emphasizes the pursuit of social connections, agreeableness centers on the quality of interactions and the orientation individuals have toward others. Additionally, Neuroticism, as defined by Widiger, T. A. (2009), represents a persistent tendency to experience negative emotional states. Individuals who score high in neuroticism are more prone than the average person to feelings such as anxiety, anger, guilt, and depression. They often struggle to cope with environmental stressors, may perceive ordinary situations as threatening, and can find minor frustrations overwhelmingly challenging. Furthermore, those high in neuroticism tend to be self-conscious and shy, and they may have difficulty managing their impulses and urges when experiencing distress.

Aside from personality traits, another variable examined in this study is school climate, which has been characterized as the implicit personality and atmosphere of a school, encompassing its norms, values, and expectations (Maxwell et al., 2017). Dernowska (2017) found that school culture and climate play a crucial role in determining the overall efficiency of a school. She emphasized that fostering a positive school climate involves creating

conditions that enable both students and teachers to work and learn effectively—feeling supported, safe, motivated, and satisfied with their achievements, while also being prepared to contribute to school improvement. Miskel and Hoy (2013) further defined school climate as a distinctive atmosphere that sets one school apart from another, significantly influencing the behavior of every individual within the school.

The Organizational Climate Description for Elementary Schools (OCDQ-RE) by Hoyet et al. (1991) identifies six key dimensions of school climate. Firstly, supportive principal behavior emphasizes a genuine concern for teachers. In this dimension, principals actively listen to teacher input, offer frequent and sincere praise, and provide constructive feedback when necessary. Secondly, directive principal behavior is characterized by rigid and close supervision. Here, the principal exerts constant monitoring and control over all teacher and school activities, often focusing on minute details. Thirdly, restrictive principal behavior refers to actions that hinder rather than facilitate teachers' work. This includes overwhelming teachers with paperwork, committee obligations, routine duties, and other demands that detract from their primary teaching responsibilities.

Another dimension, as noted by Hoy (n.d.), is collegial teacher behavior, which fosters open and professional interactions among teachers. In this environment, educators take pride in their school, enjoy collaborating with colleagues, and maintain an atmosphere of enthusiasm, acceptance, and mutual respect. In contrast, intimate teacher behavior reflects strong social bonds among teachers. In this dimension, educators know each other well, share close personal friendships, socialize regularly, and provide robust social support to one another. Lastly, disengaged teacher behavior indicates a lack of purpose and focus in professional activities. Teachers in this category often feel unmotivated, merely going through the motions in unproductive group efforts without shared goals. Their interactions may be characterized by negativity and criticism towards their colleagues and the school environment. Together, these dimensions provide a comprehensive understanding of the various aspects that contribute to the overall school climate.

While numerous studies have investigated personality traits, research on the correlation between these traits and perceptions of school climate remains limited. This research aims to bridge this gap in the literature.

Research Questions

This study aimed to investigate the relationship between teachers' personality traits and their perceptions of school climate in four high schools in Zamboanga City. Specifically, it sought to:

1. Determine the level of teachers' Big Five personality traits.
2. Assess the level of teachers' perceptions of school climate.
3. Examine the significant relationships between teachers' personality traits and their perceptions of school climate.

Methodology

This study employed a Descriptive-Correlational Research design. Descriptive research, also known as statistical research, aims to describe the data and characteristics of the population or phenomenon under investigation. According to Nassaji (2015), the primary objective of descriptive research is to characterize a phenomenon and its distinctive features. This study

primarily focuses on what occurred rather than delving into the underlying causes or mechanisms. Data on the respondents' personality traits and their perceptions of school climate were collected through a questionnaire. A correlational approach was then utilized to investigate the significant relationships between these variables.

The study participants comprised 61 teachers from four public schools in Zamboanga City who responded to an online survey. Regarding gender, 18 (29.5%) identified as male, 42 (68.9%) as female, and 1 (1.6%) preferred not to specify. In terms of age, 32 (52.5%) of the teachers were under 30 years old, 17 (27.9%) were between 31 and 40 years old, 9 (14.8%) were between 41 and 50 years old, and 3 (4.9%) were over 51 years old. Finally, concerning teaching experience, 50 (82%) of the respondents had less than ten years of teaching experience, 7 (11.5%) had 11 to 20 years of experience, and 5 (8.2%) had more than 20 years of experience.

This study utilized the Big Five Personality Test (BFPT) to assess teachers' personality traits across five dimensions: extroversion, agreeableness, conscientiousness, neuroticism, and openness to experience. The BFPT is a 50-item instrument employing a 5-point Likert scale, where "Agree" is scored 5, "Slightly Agree" is scored 4, "Neutral" is scored 3, "Slightly Disagree" is scored 2, and "Disagree" is scored 1. Higher scores indicate higher levels of the respective personality trait. To measure teachers' perceptions of school climate, the Organizational Climate Description Questionnaire (OCDQ-RE) was administered. This instrument comprises six dimensions: supportive, directive, and restrictive principal behaviors, and collegial, intimate, and disengaged teacher behaviors. The OCDQ-RE consists of 42 items utilizing a 4-point Likert scale. "Very Frequently Occurs" is scored 4, "Often Occurs" is scored 3, "Sometimes Occurs" is scored 2, and "Rarely Occurs" is scored 1.

Results and Discussions

This study aimed to assess teachers' personality traits, their perceptions of school climate, and to investigate the relationships between these variables. Following a thorough analysis of the data, the following results were obtained:

Respondents' Personality Traits

Table 1 reveals that among the personality traits assessed in this study, the respondents exhibited a moderate level of agreeableness ($M = 3.33$, $SD = .68$), which was the highest among the five personality traits. They also demonstrated moderate levels of conscientiousness ($M = 3.31$, $SD = .62$) and openness to experience ($M = 3.08$, $SD = .76$). Conversely, the respondents exhibited low levels of extraversion ($M = 2.26$, $SD = .73$) and neuroticism ($M = 2.30$, $SD = .78$).

Table 1: Descriptive Statistics of Respondents' Personality Traits

Personality Traits	Weighted Mean	SD	Interpretation
Extroversion	2.26	.73	Low
Agreeableness	3.33	.68	Moderate
Conscientiousness	3.31	.62	Moderate
Neuroticism	2.30	.78	Low
Openness to experience	3.08	.76	Moderate

Respondents' Perceptions on School Climate

Table 2 indicates that teachers perceive their school climate positively, with high levels of supportive ($M = 3.06$, $SD = 0.66$) and directive ($M = 2.90$, $SD = 0.68$) principal behaviors, and moderate levels of restrictive principal behaviors ($M = 2.75$, $SD = 0.57$). Furthermore, teachers reported high levels of collegial ($M = 2.98$, $SD = 0.50$) and intimate ($M = 2.82$, $SD = 0.62$) teacher behaviors, while perceiving low levels of disengaged teacher behaviors ($M = 2.10$, $SD = 0.72$).

Table 2: Descriptive Statistics of Respondents' Perceptions on School Climate

Dimensions of School Climate	Weighted Mean	SD	Interpretation
Supportive Principal Behavior	3.06	.66	High
Directive Principal Behavior	2.90	.68	High
Restrictive Principal Behavior	2.75	.57	Moderate
Collegial Teacher Behavior	2.98	.50	High
Intimate Teacher Behavior	2.82	.62	High
Disengaged Teacher Behavior	2.10	.72	Low

Significant Relationship Between Teachers' Personality Traits and Their Perceptions of School Climate

Table 3: Test of Normality Among Personality Traits and Perceptions of School Climate Variables

Variables	Kolmogorov-Smirnov^a		Shapiro-Wilk	
	Statistic	Sig.	Statistic	Sig.
Extroversion	.362	.000	.771	.000
Agreeableness	.325	.000	.781	.000
Conscientiousness	.299	.000	.760	.000
Neuroticism	.270	.000	.857	.000
Openness to experience	.281	.000	.841	.000
Supportive Principal Behavior	.117	.037	.946	.010
Directive Principal Behavior	.279	.000	.798	.000
Restrictive Principal Behavior	.356	.000	.733	.000
Collegial Teacher Behavior	.382	.000	.674	.000
Intimate Teacher Behavior	.319	.000	.770	.000
Disengaged Teacher Behavior	.374	.000	.750	.000

^a Lilliefors Significance Corrections; $df = 61$

The Kolmogorov-Smirnov and Shapiro-Wilk tests ($p < .05$), as shown in Table 3, revealed significant deviations from normality for all variables. Consequently, Spearman's rho, a non-parametric correlation coefficient, was selected as the most appropriate statistical method for examining the relationships between variables.

Table 4: Correlation Between Teachers' Personality Traits and School Climate Perceptions Variables Using Spearman's Rho

Personality Traits	Dimensions of School Climate					
	Supportive	Directive	Restrictive	Collegial	Intimate	Disengaged
Extroversion	.257*	.186	.097	-.058	.200	.186
Agreeableness	.045	.056	.189	-.079	.260*	.063
Conscientiousness	.121	-.026	-.118	.335**	.139	-.282*
Neuroticism	-.153	-.310*	-.031	-.060	-.159	-.042
Openness to Experience	.209	.366**	.373**	.052	.326**	0.73

** $p < .01$; * $p < .05$ (two-tailed)

Table 4 presents the correlation data between teachers' personality traits and their perceptions of school climate, analyzed using Spearman's rho. Findings revealed a positive correlation between extroversion and supportive school climate ($r = .257$, $p < .05$) and between agreeableness and intimate school climate ($r = .260$, $p < .05$). Conscientiousness demonstrated a positive correlation with collegial teacher behavior ($r = .335$, $p < .01$) and a negative correlation with disengaged school climate ($r = -.282$, $p < .05$). Neuroticism showed a negative correlation with directive principal behavior ($r = -.310$, $p < .01$). Finally, openness to experience was significantly correlated with directive ($r = .366$, $p < .01$), restrictive ($r = .373$, $p < .01$), and intimate ($r = .326$, $p < .01$) aspects of the school climate.

Discussion

This study aimed to examine the relationship between teachers' personality traits and their perceptions of school climate. Findings revealed that teachers exhibited moderate levels of agreeableness, conscientiousness, and openness to experience, while demonstrating lower levels of extroversion and neuroticism. This suggests a potential area for professional development, particularly in enhancing extroversion among teachers. Furthermore, the study found a moderate positive relationship between extroversion and supportive school climate, suggesting that teachers with higher levels of extroversion (i.e., more sociable and outgoing individuals) may be more likely to foster a supportive environment within the school. Research consistently demonstrates that extroversion is the strongest Big Five predictor of emergent leadership (Judge et al., 2002; Spark & O'Connor, 2021). Individuals high in extroversion, compared to those low in extroversion, are more likely to assume informal leadership roles, exert social influence, and be perceived as "leader-like" by their peers (Spark & O'Connor, 2021).

Furthermore, the finding of a relationship between agreeableness and intimate school climate suggests that sympathetic and empathetic teachers tend to prefer a school climate characterized by cohesive and strong social interactions among colleagues. Agreeableness, as defined by Lim (2023), reflects how individuals approach relationships with others. Individuals high in agreeableness are often described as soft-hearted, trusting, and well-liked. They are sensitive to the needs of others, helpful, and cooperative, and are generally perceived as trustworthy and altruistic. Given their empathetic nature, these individuals are likely to thrive in a school environment where harmonious collaboration and strong interpersonal relationships among colleagues are valued.

Similarly, conscientiousness was found to be positively correlated with collegial teacher behavior, while demonstrating a negative correlation with disengaged school climate. According to Lim (2023), individuals high in conscientiousness are typically organized,

disciplined, detail-oriented, thoughtful, and careful. In contrast, those low in conscientiousness may struggle with impulse control, leading to difficulties in completing tasks and fulfilling goals. They may also tend to be more disorganized and may dislike excessive structure. This suggests that individuals who value and engage in open and professional interactions (collegial behavior) are likely to possess higher levels of conscientiousness. Conversely, individuals low in conscientiousness may be more prone to disengaged behavior, characterized by a lack of motivation and unproductive interactions. Furthermore, Özbağ (2016) found that agreeableness and conscientiousness are important antecedents for ethical leadership.

The study also revealed a negative correlation between neuroticism and directive principal behavior. This finding suggests that individuals high in neuroticism, characterized by emotional instability, may dislike a leadership style characterized by constant monitoring and control. Mupa (2022) argues that a lack of instructional leadership can contribute to a negative and stressful school environment. Therefore, capacity-building workshops focusing on instructional leadership, teacher ethics and professionalism, and leadership development are crucial for addressing these concerns.

Furthermore, the study found that openness to experience was significantly correlated with directive, restrictive, and intimate aspects of the school climate. This suggests that curious, creative, and imaginative individuals may be more likely to endorse directive and restrictive leadership styles while also valuing close interpersonal relationships among colleagues. This finding aligns with the research of Judge et al. (2002), who found a positive correlation between openness to experience and transformational leadership.

Conclusion

The findings of this study have significant implications for teachers, school administrators, and the Department of Education. By understanding their own personality traits, particularly the importance of extroversion, teachers can proactively develop the interpersonal skills necessary for effective leadership. School administrators can utilize these findings by incorporating modules on personality traits into in-service training and school learning action cells. Simultaneously, they should emphasize team-building activities and other faculty development initiatives. Furthermore, the Department of Education can play a crucial role by initiating programs that foster the development of key personality traits among aspiring school leaders. To maximize these insights, capacity-building workshops focused on educational leadership are recommended. These workshops should cover personality traits, ethics and professionalism, and leadership development. Such training can align leadership practices with the diverse personality traits observed in educational settings, potentially enhancing overall effectiveness. These recommendations have the potential to improve teacher well-being, foster a more positive and supportive school environment, and ultimately enhance student outcomes.

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Navigating the Use of Plain Japanese as a Glocal Lingua Franca: Japanese University Students' Perspectives

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Abstract

Plain Japanese (Yasashii Nihongo), a simplified version of the Japanese language, has emerged as a significant tool for intercultural communication in Japan's increasingly multicultural society. Initially developed for disaster communication, its use has since expanded to the fields of education, public services, business, and tourism. As a means of bridging communication across linguistic and cultural divides in local and global contexts, Plain Japanese can be conceptualized as a glocal lingua franca. This study investigates how Japanese university students navigate the use of Plain Japanese in intercultural exchange settings, examining the challenges and benefits of simplified language use. Unlike previous studies that primarily focus on non-first language (L1) speakers or institutional applications, this study offers a novel perspective by foregrounding the experiences of L1 Japanese speakers. Based on semi-structured interviews with two students actively engaged in intercultural activities, it employs reflexive thematic analysis to identify five key themes: (1) accessibility and inclusion, (2) maintaining conversational depth and naturalness, (3) balancing cultural norms with linguistic simplicity, (4) adaptive communication strategies, and (5) reflections on personal growth. The findings highlight not only the tension between simplification and cultural appropriateness but also the communicative and pedagogical value of strategic adaptation. The study underscores the need to incorporate reflective, interlocutor-sensitive language use into language education, positioning Plain Japanese as a practical tool to develop intercultural competence and communicative flexibility in both local and global contexts.

Keywords: lingua franca, Plain Japanese, intercultural communication

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Introduction

Although language is essential for human connection, it can also pose barriers that hinder effective communication, particularly in multicultural societies. Japan is becoming increasingly diverse with a growing number of foreign residents and workers, and Japanese first language (L1) speakers are interacting with more non-L1 speakers in various domains. In this context, facilitating mutual understanding through simplified and accessible communication is crucial.

Plain Japanese, also known as “Yasashii Nihongo,” is a simplified version of the Japanese language that was initially developed as a disaster communication tool following the Great Hanshin Earthquake of 1995, with the aim of providing non-L1 Japanese speakers with clear, comprehensible information during emergencies (Iori, 2016). Since then, its applications have expanded to include education, public services, business, tourism, and intercultural communication. Recognized for promoting inclusiveness and linguistic accessibility in a multicultural society, it has become a crucial instrument in contemporary Japan.

The role of Plain Japanese extends beyond national borders. With the growing popularity of the Japanese language and (pop) culture worldwide, many international learners are connecting with L1 speakers through online platforms and study-abroad programs. In these contexts, Japanese functions as a “lingua franca,” a language that bridges communication both within Japan and globally. Understanding how L1 Japanese speakers, particularly university students, adapt their language to accommodate non-L1 speakers can provide valuable insights into the dynamics of intercultural communication.

While previous research has largely focused on how Plain Japanese is implemented in institutional or public settings, or received by non-L1 speakers, few studies have examined how L1 Japanese speakers engage with and reflect on its use in actual intercultural interactions. This study bridges this research gap by exploring the perspectives of Japanese university students who use Plain Japanese in informal and educational exchange settings, offering a novel lens on linguistic adaptation, mutual understanding, and intercultural competence.

This study aims to investigate how Japanese university students navigate the use of Plain Japanese in intercultural exchange settings. Specifically, it seeks to answer the following research questions (RQs):

(RQ1) How do Japanese university students adapt to using Plain Japanese in “glocal” intercultural exchanges?

(RQ2) What are the challenges and benefits of using Plain Japanese when communicating with Japanese-language learners?

By addressing these questions, this study seeks to contribute to a broader understanding of language simplification, communicative adaptability, and intercultural competence.

Background

English is widely recognized as the predominant lingua franca in global discourse. According to Seidlhofer (2011), English as a lingua franca (ELF) is defined as “any use of English among speakers of different first languages for whom English is the communicative medium of choice” (p. 7). However, the concept of a lingua franca can extend beyond English to

include other languages that bridge communication divides across diverse linguistic and cultural groups. These lingua franca can be broadly categorized as global, local, or glocal.

A global lingua franca, such as English, enables international communication across multiple regions and domains (Crystal, 2003). In contrast, a local lingua franca is specific to a particular geographic area; for example, Kiswahili is a common language among ethnolinguistically diverse communities in East Africa (Habwe, 2009). A glocal lingua franca operates at the local and global intersection and is used in both domestic and transnational contexts, enabling communication across cultural and linguistic boundaries while retaining local relevance. Japanese, for instance, can be described as a glocal lingua franca in settings such as intercultural exchange programs, multicultural university courses, and diverse community interactions within and beyond Japan (Aoyama et al., 2020; Takei, 2024; Takei et al., 2023; Yamada, 2021). Similarly, Song and Xia (2020) explore the use of Chinese as a glocal lingua franca for international students in a Chinese university context.

Plain Japanese is a compelling example of a glocal lingua franca, facilitating communication within local communities and in global contexts involving both L1 and non-L1 speakers. Domestically, it is employed in various sectors, such as public services, disaster response, education, and tourism, to bridge the gap between L1 Japanese speakers and non-L1 residents, students, or visitors and to enhance accessibility and promote inclusive communication, without requiring complete fluency from either party. Beyond Japan, Plain Japanese plays a vital role in communities interested in learning the Japanese language and culture, particularly in international exchange programs and virtual intercultural interactions, where Japanese is the communication medium. Plain Japanese enables more equitable participation by reducing linguistic complexity and lowering communication barriers for learners of varying proficiency levels. Its effectiveness in glocal contexts underscores its relevance in an increasingly interconnected and multilingual world. As a glocal tool, Plain Japanese facilitates linguistic access and promotes intercultural empathy, adaptability, and mutual understanding, essential for meaningful engagement in diverse societies.

Plain Japanese is characterized by two fundamental levels of operation: linguistic simplification and social adaptation. The former involves using simplified vocabulary and shorter sentence structures and avoiding complex grammatical forms to enhance clarity and comprehension. The latter encourages speakers to tailor their language to the proficiency and background of their conversational interlocutors. This approach is encapsulated in the Japanese word *yasashii* in “Yasashii Nihongo,” which carries the dual meaning of “easy” and “kind,” a connotation that reflects the essence of Plain Japanese as both a linguistic tool and a gesture of social consideration (Yoshikai, 2020). In this way, it supports the broader goals of intercultural communication by addressing the linguistic and interpersonal dynamics of effective interaction.

This philosophy reflects a global trend toward simplified language approaches to improve communication in multilingual societies. Similar initiatives include Simple English Wikipedia (n.d.), which uses simplified vocabulary and grammar to enhance the content's accessibility to non-L1 English speakers, children, and individuals with limited literacy. These practices demonstrate an increasing awareness of the need for accessible and inclusive languages, such as Plain Japanese, reinforcing their value in fostering effective intercultural communication.

Research Method

This study focused on two female Japanese university students who actively participated in virtual and in-person intercultural exchange programs and events during and after the pandemic. They were purposively selected based on the positive deviance approach, which identifies individuals who demonstrate exceptional practices within a given context (Pascale et al., 2010). These two students had consistently demonstrated proactive engagement in intercultural activities with a strong preference for Japanese-mediated interactions with non-L1 speakers. This ensured that they had rich, firsthand experiences in adapting the language for intercultural communication. Their backgrounds offered valuable insights into the practical use of Plain Japanese in various communicative settings.

Data were collected through semi-structured interviews via Zoom, with each session lasting approximately 40 minutes. Prior to the interviews, the participants were provided with detailed information about their rights, including the option to withdraw at any time without penalty, and the study's purpose and procedures. After obtaining their written informed consent, the interviews were recorded and transcribed for analysis. The complete list of interview questions is provided in the Appendix. Reflexive thematic analysis (RTA) was used to interpret the data based on Braun and Clarke's (2006, 2019, 2020) six-phase framework. This approach supported a nuanced and reflexive examination of the students' narratives, allowing themes to emerge inductively from their lived experiences. My positionality as a researcher with a professional background in intercultural education and expertise in Japanese as a lingua franca shaped the interpretive process, informing a critically reflexive stance that contributed to the transparency and depth of the analysis.

Findings

The following five major themes emerged from the RTA of the interview data, offering insights into the participants' experiences using Plain Japanese in intercultural communication contexts.

Theme 1: Accessibility and Inclusion

Participants highlighted the critical role of Plain Japanese in creating a welcoming and inclusive communication environment. By simplifying their speech, they were able to make conversations more accessible to non-L1 speakers, thereby reducing anxiety and fostering meaningful interaction. However, they noted that modifying their language required conscious effort, as they often had to restructure sentences and find alternative expressions without compromising their intended meaning.

Theme 2: Maintaining Conversational Depth and Naturalness

Participants faced the significant challenge of maintaining conversational depth while using Plain Japanese. Although simplification facilitated communication, excessive modification occasionally resulted in mechanical, superficial exchanges. Participants found it difficult to express complex emotions, abstract concepts, and cultural nuances, occasionally leading to misunderstandings or less engaging conversations.

Theme 3: Balancing Cultural Norms with Simplified Language

Japanese cultural norms emphasize politeness and indirectness in speech. Participants struggled to balance these norms with the need for clarity in Plain Japanese. They were concerned that oversimplification might make them appear too casual or direct, potentially leading to unintended perceptions of impoliteness or condescension.

Theme 4: Unique Strategies for Effective Communication

To overcome the obstacles to effective communication, participants developed several strategies. They actively listened, using reactive responses known as *aizuchi* (Maynard, 1997) or nodding, to encourage their interlocutors. They also observed nonverbal cues to adjust their speech accordingly and provided additional examples or explanations to clarify meaning without complicating the dialogue.

Theme 5: Reflections on Growth and Skill Development

Through their experiences, participants recognized the importance of adaptability in communication. They confidently modified their language to suit different audiences, a skill they regarded essential for future intercultural interactions. Their reflections highlighted the broader implications of Plain Japanese in fostering global engagement and multilingual adaptability.

These themes reveal the dynamic and reflective process through which students navigate the use of Plain Japanese, balancing linguistic simplicity with communicative depth and cultural sensitivity.

Discussion

This section addresses this study's two RQs. The findings shed light on how Japanese university students adapt to using Plain Japanese in intercultural contexts and identify the challenges and benefits they encounter. The discussion is organized into two parts corresponding to each RQ.

RQ1: How do Japanese university students adapt to using Plain Japanese in “glocal” intercultural exchanges?

The findings reveal that Japanese university students actively and reflectively used Plain Japanese in intercultural communication, particularly in glocal contexts involving both domestic and international Japanese language learners. This use was not passive but a strategic, adaptive process aimed at promoting mutual understanding.

Participants made conscious efforts to simplify their speech by avoiding complex grammatical structures and replacing difficult vocabulary with more common words. Importantly, these adjustments were not applied uniformly but varied depending on the interlocutor's level of proficiency, underscoring the flexible, interlocutor-sensitive nature of Plain Japanese, as discussed in previous ELF research on adapted language strategies and communication tailored to listeners' needs (Cogo & Dewey, 2012).

Students also made real-time adjustments during conversations, carefully monitoring nonverbal cues such as facial expressions and body language, to determine whether their messages were being understood as conveyed. This dynamic monitoring and response system reflects a broader communicative competence that goes beyond linguistic simplification and is consistent with previous research on lingua franca interactions in which mutual intelligibility, adaptation, and negotiation are central to communicative success (Canagarajah, 2007; Seidlhofer, 2011).

Students also developed and applied various adaptive strategies such as paraphrasing, offering additional context, and using visual or gestural cues to support verbal messages. These strategies, along with repeated intercultural interactions, enhanced the clarity of their communication, fostered deeper engagement with their interlocutors, and led to students becoming increasingly attuned to the needs and responses of their conversation partners. This process of reflection and adjustment contributed to their growth as flexible, responsive communicators capable of navigating the complexities of intercultural dialogue. Such adaptive strategies are integral to developing intercultural communication competence, as they involve modifying verbal and non-verbal cues to ensure effective communication across diverse cultural contexts (Byram, 1997; Deardorff, 2006).

RQ2: What are the challenges and benefits of using Plain Japanese when communicating with Japanese language learners?

Participants encountered several challenges in their efforts to use Plain Japanese effectively. A commonly reported challenge was the risk of oversimplification. Although linguistic simplification increases accessibility for non-L1 speakers, students noted that excessive simplification occasionally results in mechanical or superficial exchanges. They often found it challenging to simplify their language effectively, because they were unsure which words or expressions would be easier for their interlocutors to understand. In such cases, they struggled to express abstract ideas, nuanced emotions, and culturally embedded concepts. These limitations made some interactions feel less authentic or personally engaging, highlighting the need for a more balanced and context-sensitive approach to simplified language use.

Another key challenge was the tension between linguistic simplicity and cultural norms. Japanese communication traditionally prioritizes indirectness, politeness, ambiguity, and hierarchical awareness, particularly in formal and professional contexts (Lebra, 1976; Maynard, 1997). Participants expressed concern that using overly direct or simplified language, while helpful for comprehension, may violate cultural expectations and be perceived as inappropriate, overly casual, or even disrespectful. This dilemma highlights the need for a culturally informed understanding of Plain Japanese, as not only a linguistic tool but also a communication strategy that requires sensitivity to context and social norms.

Despite these challenges, students identified several notable benefits. One was the development of enhanced intercultural communication skills. As students adjusted their speech to encourage non-L1 speakers, they became more aware of how their linguistic choices shaped their interactions, in line with Byram's (1997) model of intercultural communicative competence. Similarly, Deardorff (2006) highlighted adaptability and audience sensitivity as key outcomes of intercultural learning, both of which were evident in students' reflections on how they tailor communication to meet their interlocutors' needs. Another benefit was growth in communicative confidence. Although the students were

initially hesitant and feared unintentionally offending their interlocutors, their confidence increased over time through repeated interactions and reflections. This progression reveals that strategic adaptability and increased communicative awareness often lead to greater ease and confidence in intercultural dialogue, reflecting Cogo and Dewey's (2012) ELF research.

Finally, the students emphasized the development of adaptive communication strategies as a key long-term benefit of using Plain Japanese. The ability to paraphrase, provide contextual explanations, and incorporate multimodal cues not only enhanced their immediate communicative effectiveness but also prepared them for future interactions in diverse linguistic and cultural settings. These findings suggest that, when used thoughtfully, Plain Japanese can serve as a valuable tool to cultivate communicative flexibility and promote inclusive intercultural dialogue. Interestingly, the experience of adjusting their L1 for the benefit of others seemingly had a motivational effect, with some students expressing a renewed commitment to learning additional non-L1 languages such as English. This is consistent with the findings of Dörnyei (2009) and Ushioda (2011), who emphasized the role of meaningful intercultural experiences in increasing motivation for language learning.

Conclusion

This study provides a deeper understanding of how Japanese university students navigate the use of Plain Japanese in intercultural communication. While affirming its value as a tool to enhance linguistic accessibility, it simultaneously highlights its limitations and, therefore, the need for a balanced approach that leverages the benefits of simplification without compromising the naturalness, depth, or cultural appropriateness of communication.

A key insight from this study is that Plain Japanese is not merely about reducing linguistic complexity; rather, it fosters inclusive and effective dialogue. Students' experiences illustrate that the successful use of Plain Japanese involves thoughtful adaptation and real-time responsiveness to the needs of diverse interlocutors. Moreover, this study underscores the fact that linguistic adjustments alone are insufficient. Developing intercultural awareness in tandem with language skills is essential to navigate multilingual and multicultural environments where strategic and context-sensitive communication is increasingly vital.

The findings of this study have important implications for language education, particularly in preparing students for real-world intercultural communication. Although language instruction has traditionally prioritized the mastery of grammar and vocabulary, as Moeller and Nugent (2014) argue, effective language education must surpass structural competence to include the development of intercultural communicative competence and foster skills such as strategic language use, audience awareness, and adaptability. This study supports this view by suggesting that incorporating these elements into language curricula can better prepare students to navigate the linguistic and cultural complexities of diverse communication settings. As demonstrated in this study, Plain Japanese can serve as a practical tool for developing intercultural communication skills. By integrating it into language curricula, students can learn to adapt their speech to meet the needs of their interlocutors. Pedagogical activities such as role-playing, audience-specific tasks, and reflective exercises on communication successes and breakdowns can foster greater communicative flexibility and responsiveness, equipping learners with the confidence to navigate diverse linguistic and cultural settings. These approaches reflect the psychological and cognitive findings from Yamada's (2021) research on Japanese as a lingua franca for L1 speakers.

Although this study offers valuable insights into the use of Plain Japanese by Japanese university students, it has several limitations that provide important directions for future research. This study focused exclusively on the perspectives of L1 Japanese speakers, which limits the scope of understanding the reciprocal nature of intercultural communication. Future studies should explore how non-L1 speakers perceive the use of Plain Japanese by L1 speakers. Investigating whether they find it genuinely helpful, condescending, or contextually appropriate could offer a more comprehensive view of how Plain Japanese contributes to or potentially hinders intercultural understanding. Another limitation is the study's short-term, small-scale nature. Conducting longitudinal research would allow scholars to examine how students' use of Plain Japanese evolves over time. Such studies can track the development of communicative strategies and assess whether sustained engagement with Plain Japanese enhances linguistic flexibility, intercultural awareness, and confidence in communication.

By expanding the research on Plain Japanese and its role as a global lingua franca, scholars and educators can further develop strategies to enhance effective and inclusive communication in diverse linguistic settings. This study marks an initial step toward understanding the complexities of linguistic simplification in intercultural interactions, paving the way for further exploration and practical applications in language education and global engagement.

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Appendix

Interview questions (translated from the original Japanese)

1. What is your motivation to participate in intercultural exchange?
2. What do you hope to gain from intercultural exchange?
3. How have your experiences in previous intercultural exchange programs affected you?
4. What communication challenges have you faced in intercultural exchange?
5. What difficulties do you encounter in intercultural exchange?
6. How interested are you in learning English or other foreign languages?
7. How do you use your English or other foreign language skills in intercultural exchange?
8. Why do you think using English or other foreign languages in intercultural exchange is important or beneficial?
9. Have you ever had difficulty using English or other foreign languages?
10. How much do you know about the concept of Plain Japanese?
11. Have you ever used Plain Japanese? Please tell us about your experience.
12. Why do you think using Plain Japanese is important or beneficial?
13. Have you ever had any problems using Plain Japanese?
14. What do you think are the challenges and problems of using Plain Japanese?
15. In intercultural exchanges, in what situations do you choose English, other foreign languages, or Plain Japanese?
16. What is the most important factor when choosing a language?
17. In your opinion, what is the importance of using Plain Japanese?
18. What advice would you give to your peers who are interested in intercultural exchange?
19. Please feel free to share any thoughts or suggestions you have about this interview.
20. Has your opinion changed in any way as a result of this interview?

The Design and Preliminary Evaluation of a Bartending Skills Training Game Combining Generative AI-Based NPCs and Contextual Simulation Mechanisms

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Abstract

Bartending skills in practice emphasize the ability to respond to customer demands. However, the training approach in technical and vocational education in the past has focused on memorization of materials and the operation of bartending techniques, with learners lacking the capability to apply the skills in real situations. In contrast, a generative AI (GAI) simulation-based scaffolding can help learners to solve problems in the communication process by responding to customer demands and facilitate students' reflection through a real-time diagnostic mechanism. Therefore, this study designed a GAI module-based bartending skill simulation game, in which learners play the role of a bartender and must actively ask questions to the customer played by the GAI to collect key clues and determine the correct cocktail to satisfy the customer demands. This empirical study was conducted with a total of 20 participants. The results of the study showed that the learners had significant improvements in the three dimensions of basic bartending knowledge, bartending components, and situational application, and showed higher engagement in all dimensions of the flow. In terms of the perception of fidelity, the GAI contextual fidelity, role-play fidelity, and operational fidelity dimensions all showed high fidelity; meanwhile, learners had high intrinsic cognitive load and high germane cognitive load, as well as lower extrinsic cognitive load. It is suggested that various strategies and potentials of GAI for bartending knowledge and skills training can be further analyzed in the future.

Keywords: generative AI scaffolding, bartending skills, contextual simulation, problem solving skills

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Introduction

In recent years, with the development of GenAI's large language modeling technology, the education field has begun to widely use GenAI to integrate into instruction. Teachers can use GenAI to adjust course content and learning progress, which is also helpful to the learning efficiency of learners (Huang, 2021), and to design personalized learning solutions to enhance learning effectiveness (Archibald & Clark, 2023). Compared to traditional instruction, contextual simulations of game-based learning can increase students' learning effectiveness, motivation, and critical thinking (Chang et al., 2020), as well as increase student engagement (Thanasi-Boçe, 2020; Yang et al., 2022). Studies have shown that high-fidelity simulation learning can promote self-confidence (Tonapa et al., 2023) and skill performance (Kim & Yoo, 2022). Utilizing GenAI to play as non-players characters (NPCs) can facilitate contextual simulation (Chen & Hou, 2024); also, incorporating GenAI into the game can make the NPCs more dynamic and improve the simulation and complexity of the game (Zeng, 2023).

Text-based GenAI such as ChatGPT is a common NPC design tool currently, but there are still some problems in applying it to education, such as answering incorrect or inaccurate knowledge (Baidoo-Anu & Ansah, 2023), duplicating information, or illogical reasoning (Mahyoob et al., 2023). To avoid this problem, this study utilizes the innovative ChatGPT-NPC Framework proposed by Chen and Hou (2024), which adds plug-in modules to the RAG technology, as the basis for designing a GenAI NPC educational game. This technology can solve the shortcomings of general text-based AI that does not provide accurate or contextualized topics. Through the knowledge text setting and similarity analysis of this module, we can diagnose off-topic questioning, adjust various parameters to promote the realism of the conversation, and build a process structure that provides various real-time scaffolding. Based on this framework, we can design more realistic NPCs in the game context, and this framework has shown preliminary results (Wei et al., 2024).

There are still limited empirical studies on the specific mechanisms and strategies of GenAI for instruction. Therefore, we designed a bartending skills training game with GenAI as the NPC to explore the impact of GenAI on the knowledge and skills of bartending service. The training of bartenders not only focuses on technical training, but also on the capability of comprehending customers' demands in practice. In this game, many context clues are embedded in GenAI, and players will interact with GenAI NPC customers with realistic personalities. GenAI NPCs give different dynamic context clues according to different ways of asking questions and encourage learners to conduct inquiry-based cognitive thinking through dynamic scaffolding.

To investigate whether the GenAI skill training game can provide learners with a higher sense of fidelity as well as enhance their learning effectiveness and engagement, the research questions are as follows:

1. What is the learning effectiveness of learners with this GenAI educational game?
2. What is the flow of learners with this GenAI educational game?
3. What is the fidelity of this GenAI educational game?
4. What is the cognitive load of learners with this GenAI educational game?

Method

The participants in this study were 20 students from a university of science and technology in Taiwan, including 3 males and 17 females, with an average age of 28.4 years old. The experimental procedure included: explanation of the activity process and attention (5 minutes), the pretest of the learning outcomes assessment (15 minutes), after the pretest, explanation of the game rule (10 minutes), followed by the instructional activity (40 minutes); after the activity, the posttest questionnaire was conducted, which included the learning effectiveness assessment, the flow scale, the fidelity questionnaire, and the cognitive load scale (25 minutes). The questionnaires and scales are described as follows.

1. Learning effectiveness assessment: The questions were designed based on the theme of bartending service knowledge, with a total of three components, including knowledge comprehension (characteristics of base wines, totaling 6 points), combination memory (bartending materials, totaling 35 points), and situational application (solving customer's problems and needs, totaling 5 points), and the same questions were used in the pretest and posttest. All questions were designed by a teacher with 13 years of hospitality management experience and revised by an educational expert to provide expert validity.
2. Flow scale: In order to understand learners' engagement in activities, this study was based on the flow scale by Kiili (2006), and used the Chinese version translated by Hou and Li (2014) to conduct the test, using the 5-point Likert scale, which is divided into two main components: flow antecedents and flow experience, with a total of 22 questions. Cronbach's $\alpha = .894$, which has a very high reliability.
3. Fidelity questionnaire: in order to understand the perception of fidelity that the GenAI game provide to learners, this questionnaire was based on the game fidelity questionnaire by Chan et al. (2024), which was conducted with the three main questions of AI situational fidelity, character fidelity, and operational fidelity, using the 5-point Likert scale with a Cronbach's $\alpha = .759$, which has a good reliability.
4. Cognitive load scale: this scale is based on the cognitive load scale of Leppink et al. (2013) and adapted from the scale of Klepsch et al. (2017), using the 5-point Likert scale. The scale was divided into three main components with a total of 8 questions, including 2 questions on intrinsic cognitive load, 3 questions on extraneous cognitive load, and 3 questions on germane cognitive load. Cronbach's $\alpha = .724$, which has a good reliability.

The learning objectives of this GenAI NPC educational game aim to develop knowledge comprehension, combination memory, and situational application of bartending services. Learners play the role of a bartender in the game, and through the process of interacting with GenAI customers, they will try to understand the demands of customers and complete their tasks by making cocktails that meet customer satisfactions. Learners can obtain clues through text conversations with GenAI in the GenAI NPC interactive interface (Figure 1); then use the bartending interface to complete tasks as well as utilize the feedback provided by the customer satisfaction feedback for evaluation and reflection (Figure 2).

Figure 1: GenAI NPC Interactive Interface



Figure 2: Bartending Interface and Customer Satisfaction Feedback



Results

In this study, the Wilcoxon signed rank test was conducted to analyze learning effectiveness, flow, fidelity, and cognitive load. The results showed that the posttest scores of the three dimensions of learning effectiveness were significantly higher than the pretest scores (Table 1); the scores of each dimension of flow were significantly higher than the median 3 of the scale (Table 2); and the scores of the three dimensions of fidelity were significantly higher than the median 3 of the scale (Table 3). In terms of cognitive load, the scores of intrinsic and germane cognitive load were significantly higher than the median 3 of the scale, and the scores of extrinsic cognitive load were significantly lower than the median 3 of the scale (Table 4).

This indicates that after using this GenAI NPC educational game, students' learning effectiveness was significantly improved, and they had higher flow and fidelity perception. Also, the design of the game mechanism does not cause excessive external cognitive load to the learners.

Table 1: Descriptive Statistics of Learning Effectiveness (n = 20)

	Pretest		Posttest		<i>Z</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Knowledge comprehension	2.25	1.77	4.15	1.84	-2.83**	.005
Combination memory	19.65	2.70	27.60	5.57	-3.71***	.000
Situational application	1.75	1.16	2.80	1.32	-2.74**	.006

p* < .01, *p* < .001

Table 2: Descriptive Statistics of Flow (n = 20)

	<i>M</i>	<i>SD</i>	<i>p</i>	<i>ES</i>
Flow Antecedents	4.14	.41	.000***	2.78
Challenge-skills Balance	4.13	.56	.000***	2.02
Clear Goals	4.30	.44	.000***	2.34
Unambiguous Feedback	4.00	.54	.000***	1.85
Sense of Control	4.18	.65	.000***	1.82
Action-awareness Merging	4.10	.68	.000***	1.62
Flow Experience	4.11	.65	.000***	1.71
Concentration	4.44	.57	.000***	2.53
Time Distortion	3.70	1.11	.015*	0.63
Autotelic Experience	4.34	.66	.000***	2.03
Loss of Self-consciousness	3.95	1.13	.004**	0.84
Total	4.17	.48	.000***	2.44

p* < .05, *p* < .01, ****p* < .001, test value = 3

Table 3: Descriptive Statistics of Fidelity (n = 20)

	<i>M</i>	<i>SD</i>	<i>p</i>	<i>ES</i>
Situational fidelity	3.60	.88	.011*	0.68
Character fidelity	4.05	.94	.001**	1.12
Operational fidelity	3.90	.91	.002**	0.99

p* < .05, *p* < .01, test value = 3

Table 4: Descriptive Statistics of Cognitive Load (n = 20)

	<i>M</i>	<i>SD</i>	<i>p</i>	<i>ES</i>
Intrinsic cognitive load	4.05	.72	.000***	1.46
Extrinsic cognitive load	2.17	.59	.000***	-1.41
Germane cognitive load	3.73	.62	.000***	1.18

*** $p < .001$, test value = 3

Discussions and Conclusion

In this study, we designed an interactive bartending skills training game incorporating a simulated GenAI NPC. Previous studies have shown that incorporating immersive scenarios and interactive contextual dialogues into games can contribute to learning effectiveness (Chien et al., 2024). This study further found that the use of simulated GenAI as NPC in instruction was effective in promoting learners' knowledge comprehension, combinatorial memory, and situational application without imposing too much external cognitive load on learners. Meanwhile, after using the GenAI educational game, students had higher flow and fidelity perception, which indicated that the GenAI mechanism is suitable to be used as a contextualized interactive element in instruction. The dynamic dialogic interactions with NPCs can help learners to integrate into the situation (Hasani & Udjaja, 2021). It is suggested that future research could adopt a quasi-experimental design to investigate the differences in other variables between the GenAI NPC interaction mechanism and the control group, and to increase the number of participants, so that this GenAI educational game can be developed into a learning framework for other fields of subjects.

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Promulgating Knowledge on Innovative Technology and SDGs Through Human-Technology Interaction in *Ready Player One* and *The Circle*

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Abstract

The study aims to create a cognizant of futuristic technology using science fiction novels. The inquiry explores how the cognitive development and behaviour skills of humans are reformed using technology. For a quantitative study using the simple random sampling method, a survey was conducted around 250 participants belonging to various streams to test their knowledge on the four futuristic technologies - SeeChange, Childtrack, Neighbourwatch, and OASIS introduced in two novels *Ready Player One* and *The Circle*. The analysed data and its consequent results obtained from the inspection stated that many were not aware among the budding generation. Further, to enhance their knowledge and to implement the idea that technology should not be considered as a replacement for human capabilities but to be regarded as the tools to augment our life, the research also provides how the HTI can be developed through the SDGs 9 and 16. It emphasizes the importance of promoting inventive sustainable technologies, thwarting crimes, injustice and abuse towards building an innovative lifestyle and democratic society. This examination intends to reflect the significance of these technologies and acquaintance to academics and parents about safety and security. It focuses on putting forth our ability in creating a better world, aiming to be an eyeopener for the scientists, and policy makers who help in forming new paths for technology in relation to human life. The additional outcomes highlight that educationists and experts are engrossed in specialized training and the need for curriculum design with practical sessions to attain global issues.

Keywords: cognitive development, futuristic technology, human-technology interaction, science fiction, Sustainability Development Goals

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Introduction

Human-Technology Interaction (HTI) delves into how individuals interact with and utilize technology across various aspects of their lives. Human Cognition forms the foundation of our thoughts and behaviors, serving as the underlying mechanism that shapes how we interact with the world. It enables us to navigate complexities, solve problems, and adapt to new situations, reflecting its fundamental role in human intelligence and functioning.

We have focused on SDG 9 and SDG 16 for the present study. According to SDG 9 (Industry, Innovation, and Infrastructure), promoting sustainable industrialization and affordably fostering innovation contribute to developing resilient infrastructure. Implementing SeeChange, OASIS & NeighborWatch technologies in a company or industry enhances innovation, ensures worker safety, and helps to fortify the environment.

SDG 16 (Peace, Justice, and Strong Institution) aims to protect children from abuse, trafficking, and exploitation and reduce all forms of violence. By introducing ChildTrack, NeighborWatch, and SeeChange technologies into society, we can work towards achieving target indicators such as 16.1, 16.2, and 16.5. These technologies will provide children and people safety, security, and justice. These technologies are introduced in the two science fiction novels.

Science Fiction bids optimistic possible futures; it is used for discussions of ethical dilemmas, and it will create the possibility to model ethical ideals. Also, Science Fiction served as an inspiration for science and technology innovation. The novels selected for my study, such as *Ready Player One* and *The Circle*, project the trajectory of current technologies, raising crucial questions about the boundaries in our lives.

The Circle by Dave Eggers is a dystopian novel centered around technology in society. *The Circle*, set shortly, focuses on Mae, a new employee at *The Circle*, the most robust internet company in the world. Surveillance cameras are employed to ensure safety, ostensibly reducing crime rates. The technologies studied in the novel are NeighborWatch, SeeChange, and ChildTrack.

The novel *Ready Player One* is set in a dystopian future where people spend most of their time in a virtual reality world called OASIS. Users can log in and interact with a digital environment. The digital platform provides the user with a scope for work, playing games, socializing, and exploring virtual worlds and environments. OASIS (Metaverse) technology was used in this novel for the study.

Technologies Used in *Ready Player One* & *The Circle*

i) SeeChange Camera

In the novel, *The Circle* many technologies were introduced; SeeChange is one of the main technologies portrayed by the author. It is described as a small camera that wirelessly streams live high-definition video. SeeChange is highly valuable because privacy is not a priority in these contexts. In some places, we need safety and security for ourselves and our belongings. We should know how to use and understand the societal implications of using SeeChange technology.

ii) ChildTrack

It is a small chip that can be implanted into the bone of a child's body, allowing parents to know their child's location at all times. With the help of ChildTrack technology, the kid can be tracked down immediately, and also reduce child abduction, rape, and murder. This technology doesn't do anything but tell us where a child is, it's just a simple tracker. It is embedded into the bone, it stays there, and can't be seen with the naked eye.

iii) NeighborWatch

It is a neighborhood watch service, utilizing SeeChange cameras which are placed throughout the neighborhood so that residents can identify suspicious persons. People in the neighborhood register their data and biometrics with NeighborWatch to identify them as residents. Residents of the neighborhood or known visitors are displayed as blue figures. Unknown people are displayed as red figures, triggering a notification to residents. To promote peace, safety, and security within the community, NeighborWatch has been introduced.

iv) Metaverse (OASIS)

OASIS is a source of information and the way people can connect with one another. It is an open-source reality and we could design a completely new identity for ourselves, fully customizing our appearance and voice as perceived by others. "In the OASIS, you could create your own private planet, build a virtual mansion on it, furnish and decorate it however you like and invite a few thousand friends over for a party" (Cline, 2011, p. 57).

Most of the OASIS public school teachers seemed to genuinely enjoy their job, probably because they didn't have to spend half their time acting as babysitters and disciplinarians. The OASIS had the potential to revolutionize how people worldwide lived, worked, and connected. "The OASIS would ultimately change the way people around the world lived, worked and communicated" (Cline, 2011, p. 56). It also transmits entertainment, global politics, and even social networking.

Objectives of the Study

- To identify whether the select technologies affect students' cognitive development and human skills.
- To assess students' understanding of the technologies used in science fiction novels.
- To suggest ideas for further education and to provide safety measures for implementing the technology.
- To promote these technologies to achieve sustainable development goals (9 & 16) and to integrate these technologies into the educational curriculum.

Hypothesis of the Study

The selected four futuristic technologies enhance the cognitive development and skill of tertiary level students.

Status of the Literature

The selected literature encompasses a wide range of studies and perspectives that explore the intersection of technology, cognition, and science fiction. Zhao et al. (2022) and Ren (2023) examine how evolving technologies such as virtual reality and artificial intelligence, impact cognitive development and social interactions among people. Leung et al. (2022) and Huang et al. (2022) highlight the prospective of technology to develop cognition in adults and enhance cultural acceptance among students. Cline (2011) and Eggars (2013) both explain how advanced technologies have been useful for society and have reshaped our culture and perceptions.

Aku (2024) delves into the implications of cognitive psychology on human behavior and decision-making. Bleecker (2009) and Shedroff and Noessel (2012) talk about design fiction as a method to envision and critically examine technology's future is explored through scholarly essays and reviews. This literature review, reveals that my perspective has not been researched anywhere.

Perception Survey Among Engineering Students on These Technologies

Methodology

Survey details: We surveyed the engineering students of various branches of SASTRA Deemed University, Thanjavur, India, to ascertain their perception of cognitive development and skill of humans in the selected technologies through science fiction novels. The survey questionnaire was distributed as a Google form. However, the first author explained and assessed the knowledge about the concept of human cognition, optimistic and pessimistic views of every technology, and the objectives of the survey to the students in the classes before their responses.

Tool description: The survey questionnaire comprised 25 open-ended questions with a 5-point Likert scale. The questions were classified into four different domains namely perception, attention, learning and problem solving.

Method of collection: 250 responses were collected using the simple random sampling method and the results were analyzed using the ANOVA statistical tool.

Analysis & Results

The survey's target audience consists of B.Tech students of CSE, ECE, EEE, Aerospace, Biotechnology, Mechanical Engineering, AI & Robotics branches were selected using a simple random sampling method. It was observed that students were initially unaware of the technologies such as SeeChange, ChildTrack, NeighborWatch & OASIS (Metaverse). The data encompassed the performance of 250 participants' responses to the 25 questions.

The pie chart represents responses to the question: "Are you aware of these technologies?" Most respondents, 80%, lack awareness of the technologies, while only a small portion, 20%, are familiar with them. Many students are unaware of these technologies because, nowadays, many do not read science fiction novels. Instead, they are deeply engaged with mobile phones and internet connectivity. It's all the more baffling because the technology is getting cheaper daily. To gain knowledge of new technologies, one should read science fiction novels

because it has been found that fictional technologies can inspire real-world applications and prototypes. Science fiction could be introduced in the curriculum to enhance learners' creativity.

We explained that these technologies are beneficial in promoting SDGs 9 & 16, contributing to achieving these goals. By leveraging these technologies, we can advance sustainable development, particularly in building resilient infrastructure, fostering innovation, and ensuring proper education, safety, and security. They also play a crucial role in reducing violence and abuse. With the support of these technologies, we can promote peaceful and inclusive societies, provide access to justice for all, and uphold principles of equity and fairness.

While these technologies may initially present challenges or negative impacts, it is essential to recognize that technology inherently has both optimistic and pessimistic aspects. So, we should always grow and create new things; that is how humankind works. By responsibly focusing on the positive potential and adapting to these technologies/innovations, we can harness their benefits for the greater good. Though there will be limitations to the implementation, we can try our part and make a change.

Finally, we found that there is not much difference between mean and standard deviation. So, we have gone for the ANOVA to see if there is any significant difference.

Table 1: Perception on Technologies of Engineering Students
ANOVA

Technologies	N	Mean	Std. Deviation	Variance
SeeChange	250	13.7800	2.10841	4.445
ChildTrack	250	14.8640	2.41429	5.829
NeighborWatch	250	13.9360	2.40229	5.771
OASIS	250	14.4520	2.14525	4.602

Table 1 shows the 250 observations ranging from a minimum of 6.00 to a maximum of 20.00, with an average (mean) of 14.8640 and a standard deviation (SD) of 2.41429. The SD gives an idea of how much the individual values in the dataset deviation from the mean.

Table 2: Age – (SeeChange, ChildTrack, NeighborWatch, OASIS)
ANOVA

Technologies		F	Significance
SeeChange	Between Groups	2.443	.119
ChildTrack	Between Groups	.835	.362
NeighborWatch	Between Groups	1.035	.310
OASIS	Between Groups	.585	.445

Note: Significance level is 0.05

As shown in table 2, the p values for SeeChange, ChildTrack, NeighborWatch, Metaverse are 0.119, 0.362, 0.310 & 0.445 respectively. The awareness levels do not differ significantly between age groups, because the p-value is greater than 0.05 in the age category.

Table 3: Gender - (SeeChange, ChildTrack, NeighborWatch, OASIS)
ANOVA

Technologies		F	Significance
SeeChange	Between Groups	1.151	.329
ChildTrack	Between Groups	.387	.763
NeighborWatch	Between Groups	.634	.594
OASIS	Between Groups	.996	.395

Note: Significance level is 0.05

The table 3, exemplifies the results of a one-way ANOVA analysis to test whether there is a statistically significant difference in awareness of four technologies between male and female. For all four technologies, the p-values are exceeding 0.05, indicating no statistically significant difference in awareness between male and female participants for any of these technologies.

Table 4: Residential - (SeeChange, ChildTrack, NeighborWatch, OASIS)
ANOVA

Technologies		F	Significance
SeeChange	Between Groups	.004	.952
ChildTrack	Between Groups	1.326	.251
NeighborWatch	Between Groups	.130	.719
OASIS	Between Groups	1.668	.198

Note: Significance level is 0.05

The results in Table 4, illustrates residence of the four technologies whether there is significant difference in the p-values for SeeChange, ChildTrack, and NeighborWatch. It suggests that there is no significant difference in awareness levels across residential groups (rural, urban, semi-rural, semi-urban), as they are greater than 0.05. The result indicates that all the respondents know about the technology and its precedence.

Table 5: Family Background - (SeeChange, ChildTrack, NeighborWatch, OASIS)
ANOVA

Technologies		F	Significance
SeeChange	Between Groups	.004	.952
ChildTrack	Between Groups	1.326	.251
NeighborWatch	Between Groups	.130	.719
OASIS	Between Groups	1.668	.198

Note: Significance level is 0.05

Table 5 displays the result of the ANOVA test analysing the awareness of four technologies on Family Background. The awareness levels do not significantly differ between individuals from educated and uneducated family backgrounds. This indicates that family background does not have a substantial impact on the awareness of these technologies based on the data provided because p-value is greater than 0.05.

From the human cognition aspect of perception, according to respondents' opinions on SeeChange, it is safe to have SeeChange cameras/ SeeChange technology installed in their houses/ private areas, given safety and security despite SeeChange invading a person's privacy. From the aspect of attention, installing a SeeChange camera at home brings attention or focuses on the difficulties/ struggles undergone within the wall.

In ChildTrack technology, perception can enhance child safety and security. According to the aspect of attention, constant use of ChildTrack might affect a child's ability, decision-making, and problem-solving skills. From the human cognition aspect of learning, respondents' opinions on NeighborWatch suggest that the installation of NeighborWatch helps people learn more about the safety and security of themselves and their surroundings.

From the human cognition aspect of learning, respondents' opinions on OASIS suggest that the life skills learned from virtual reality can be helpful for implementation in real life. An individual's learned decision-making and problem-solving abilities from a virtual reality help in the real world, particularly in high-stakes or complex scenarios. All these technologies may take over the function, owing to the developments in AI, Nanotechnology, Genetic Engineering, Network Security, and so on.

The researcher provided the respondents with knowledge about these technologies. Once the knowledge has been assessed, all respondents determine a theoretical understanding of these technologies and their advantages, and the results indicate that the students possess in-depth knowledge. As we all know, without an in-depth understanding, one should not attempt to answer questions about the aspects of human cognition related to these technologies or their impact on privacy or cognitive development. Finally, the knowledge of the respondents was assessed.

This understanding was then assessed through a multiple-choice questionnaire that was served to students as Google Forms. This knowledge will be beneficial and adequately prepared to utilize such technologies. Therefore, it is proposed that these technologies be integrated into the curriculum in education and that policies be developed to support their implementation.

Subsequently, we aim to determine whether these technologies affect humans' cognitive development/abilities and skills. To test this perspective, we created a Google form based on four key aspects of human cognition: perception, attention, learning, and problem-solving of the selected technologies for the study. Then, the questionnaire was served to students.

Results From the Survey Questionnaire

Here, we wanted to know whether these technologies enhance or affect human cognitive abilities, cognitive development and skill on humans and creative thinking and exploration.

Figure 1: Technology Affects the Cognitive Development

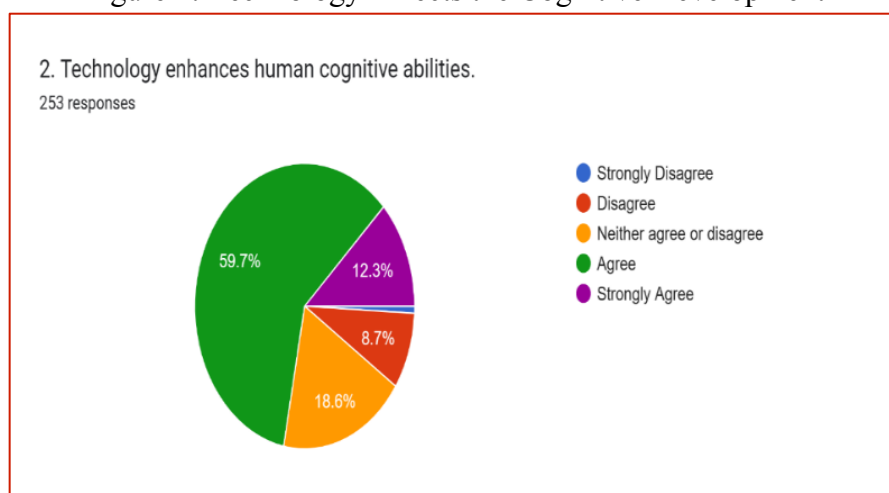
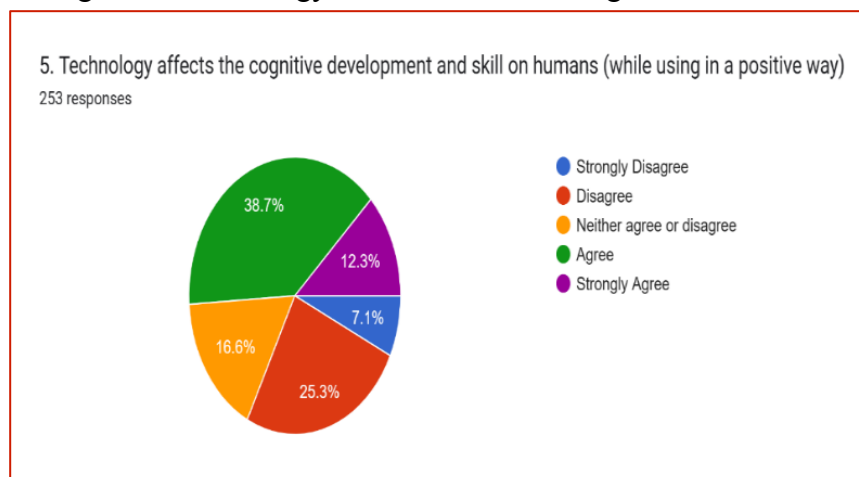


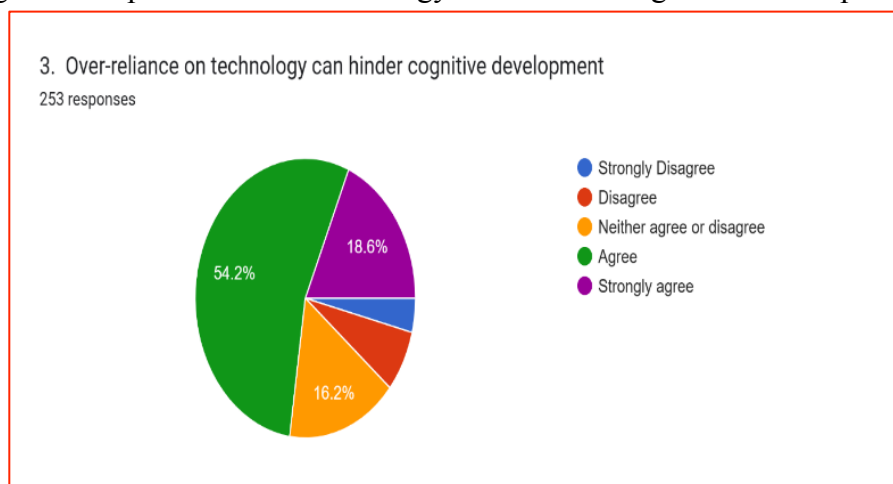
Figure 2: Technology Enhances Human Cognitive Abilities



As shown in Figure 1; the analysis of the data indicates that, around 59.7% of respondents thought that technology will develop cognitive abilities and creative thinking and it could enhance human cognitive development of the people. Figure 2 denotes that around 38.7% of students believe that technology affects cognitive development and human skills. These findings suggest a nuanced view where a majority see technology positively contributing to cognitive enhancement, while a notable minority acknowledges its influence on human capabilities.

But according to respondents, when a person has excessive dependence or over-reliance on technology, it will hinder cognitive development. The chart below delineates its key concerns:

Figure 3: Dependence on Technology Can Hinder Cognitive Development



We aim to promote these futuristic technologies to society to achieve SDGs 9 & 16. Survey results show that around 41.1% agreed that these technologies will help foster innovation and promoting peaceful and inclusive societies. Also, it could help to reduce abuse and enhance safety, security, and education for people. The charts below illustrate its concerns:

If we want to foster these technologies, we must first promote them by following these ideas:

- Visiting schools, social gatherings, creativity awareness campaign

- Workforce development and global collaboration
- Posting these ideas on social media by making it look attractive for people to sit and read or watch as a video, can reach a lot of people
- By giving awareness to the rural people
- Establishing technology-friendly policies and regulations
- Fund research and development programs
- Develop online resources and tutorials

The technological development would be very beneficial and will take a positive lead unless it affects or invades the privacy of a person.

Conclusion

The study focused on how humans understand the technologies depicted in the novels *Ready Player One* and *The Circle* and their implications for societal safety and security. Four specific technologies from these novels were selected for examination. A survey was conducted to assess awareness of these technologies and determine whether their use enhances human cognitive development and skills. The results revealed that respondents were unaware of these technologies and their societal effects. Hence, the researcher provided essential knowledge about these technologies before assessing students' perceptions.

The research findings indicate that awareness of these four technologies enhances tertiary-level students' cognitive abilities and skills. But, if people have excessive dependence or over-reliance on technology, it will hinder their mental development and abilities. These technologies will help foster innovation and promote peaceful and inclusive societies. It could also help reduce abuse and crime cases, improve safety and security, and provide educational value to the people.

To achieve Sustainable Development Goals 9 and 16, the technologies selected for this study can significantly eradicate crimes and enhance societal justice. Additionally, safety measures can be proposed to implement advanced technology inspired by science fiction novels to address privacy concerns. Integrating these technologies into society with an optimistic perspective can also be incorporated into educational curricula to promote awareness and understanding of the technology. The study results show that when students interact with these technologies, cognitive development and behavior skills modification are possible. These technologies will be an eye-opener for scientists, technocrats, and policymakers.

Scope & Limitations of the Study

The study's limitation is that it focused exclusively on engineering students. To broaden the scope, surveys could be extended to include students from humanities, arts, sciences, and education fields, as well as gathering data from teachers and parents.

To expand the scope of the study, one can survey other science fiction novels of recent origin and identify other technologies portrayed in the novels. From this, a new study can be conducted to find out the evolution of the emerging technologies.

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**Unlocking Potential Woman-Headed Family (PEKKA) in Indonesia:
Innovation in Technology-Based Entrepreneurship Education
Through Digital Literacy and Knowledge Management**

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Abstract

The emergence of digital literacy capability in the disruptive era 4.0 is one of the most influential sectors to deal with women headed-family (PEKKA) in Indonesia's new capital city. As the digital landscape evolves rapidly, entrepreneurs must adapt by embracing innovation and growth through technology. Empowering womenpreneurs requires addressing digital barriers and enhancing learning experiences through digital literacy and effective knowledge management. This study explores how agile methodology and knowledge exploitation can support small and medium enterprises (SMEs) in acquiring and utilizing relevant knowledge to meet evolving business needs. It also addresses a gap in entrepreneurial education by analyzing the willingness of individuals and organizations to create, share, and apply knowledge within a digital, innovative, and flexible learning environment. Using a quantitative research approach, the study involved 150 PEKKA participants selected through purposive sampling. Structural Equation Modeling using Partial Least Squares (SEM-PLS) was applied to examine the relationships among variables. Findings indicate that technology-driven entrepreneurial education positively impacts womenpreneurs, highlighting meaningful interactions between digital literacy and knowledge management. The study also reveals that women with a preference for active experimentation tend to develop entrepreneurial skills more effectively. However, these skills can also be nurtured through targeted education, coaching, and hands-on practice. This research contributes original insights by proposing a digital literacy framework tailored to the unique needs of PEKKA—a group often marginalized in digital access. It offers practical training strategies and integrates innovation diffusion theory with a resource-based view to address digital skill gaps and resistance to innovation effectively.

Keywords: digital literacy, knowledge management, technology innovation

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Introduction

Women's empowerment in the digital economy sector has far-reaching implications for enhancing their competitiveness and overall well-being. Programs focused on women's empowerment, particularly in digitalization and micro, small, and medium enterprises (MSMEs), align with the Sustainable Development Goals (SDGs) and the Three Economic Engines Strategy (Portal Informasi Indonesia, 2024). These initiatives particularly support inclusive quality education, including digital skills (SDG 4), reducing inequalities (SDG 10), promoting gender equality (SDG 5), and fostering decent work and economic growth (SDG 8). Women's entrepreneurship empowerment, facilitated by technology, plays a crucial role in overcoming various potential barriers and fostering innovative learning processes that incorporate digital literacy and knowledge management. Strengthening women's participation in the digital economy sector enhances their entrepreneurial competitiveness (Capel et al., 2017; Dharmayanti et al., 2022), ultimately contributing to their overall well-being.

Digital literacy skills in the Industry 4.0 era have become a critical issue for economic empowerment, particularly among women in Indonesia (Susiana, 2024). These skills encompass the ability to operate digital tools and platforms, as well as an understanding of data security, digital ethics, and business analytics. Meanwhile, digital entrepreneurship refers to leveraging technology in managing and expanding business ventures (Asgharneghad & Haghdoust, 2022; Meungwe, 2025). Furthermore, knowledge management plays a vital role in supporting the administration and growth of technology-driven businesses. According to Ghufon and Mardiana (2020), the synergy between digital literacy and knowledge management creates new opportunities in the Industry 4.0 era, enabling strategic information management that contributes to both individual and organizational competitive advantage. Research by Xia and Jiaqi (2024) highlights that digital literacy in leadership directly influences green technological innovation within companies. Additionally, the effectiveness of knowledge management is a key factor in product and service development (du Plessis, 2007; Lai & Lin, 2012), significantly contributing to organizational innovation (Alegre et al., 2013; Mardani et al., 2018). Without adequate digital literacy and knowledge management skills, women will face significant challenges in competing and thriving in the modern digital economy.

According to the Center for Indonesian Policy Studies, women constitute 21% of entrepreneurs in Indonesia, a figure significantly higher than the global average of 8% (Anjani, 2021). In 2018, Bank Indonesia reported that the total number of MSMEs in Indonesia reached 57.83 million, with more than 60%—approximately 37 million enterprises—managed by women. However, an OECD report indicates that women-owned MSMEs tend to be less oriented toward high growth and large-scale job creation. On average, female-led businesses only begin to provide employment opportunities for others after at least five years of operation (PRAKARSA, 2020).

In the report by PRAKARSA (2020), women entrepreneurs, particularly those classified as Female-Headed Households (PEKKA), encounter significant challenges in expanding their businesses due to time constraints related to domestic responsibilities. Statistics from Central Bureau of Statistics (BPS) reveal that 12.72% of Indonesian households are headed by women (Paramitha, 2023), with Samarinda recording a higher figure at 19.96% (Secretariat of the Samarinda City Government, 2024). Women who simultaneously manage households and businesses to support their families are commonly referred to as “Mompreneurs” (Landor, 2020). For PEKKA, these challenges are even more complex, as their businesses

serve not as supplementary income but as the primary means of financial support (PRAKARSA, 2020). Many assume the role of sole breadwinners due to divorce, the loss of a spouse, or a partner's inability to work (Asih, 2024). Key barriers they face include limited access to technology, entrepreneurial education, business opportunities, and financial resources (East Kalimantan Provincial Office of Communication and Information Technology, n.d.). Low digital literacy makes women, particularly PEKKA, more vulnerable to digital threats such as online fraud and illegal digital lending schemes (IDN Times, 2023). Consequently, many PEKKA struggle to sustain and grow their businesses due to a lack of opportunities to enhance their skills and adapt to digital technology (North Kalimantan Provincial Government, 2022).

In various regions of Indonesia, particularly in rural areas, there is a notable phenomenon where the proportion of women serving as heads of households exceeds that of men. According to data from the Central Bureau of Statistics (2024) in 2023, Papua and West Papua recorded the highest percentages in this category. Papua reported 91.1% of female-headed households, making it the region with the highest proportion, followed by West Papua at 83%. Additionally, Bali, a globally recognized tourist destination, also exhibited a significant figure, with 79% of households led by women. In other regions, such as East Nusa Tenggara (NTT) and North Sumatra, the percentages reached 77% and 76%, respectively. This phenomenon reflects complex socio-economic dynamics, including male labor migration, shifts in family structures, and the influence of cultural and social policies that contribute to the increasing number of female-headed households.

Despite various empowerment efforts, challenges faced by PEKKA still require attention and support from multiple stakeholders. The East Kalimantan government has introduced several initiatives, including soft skills training programs for female MSME entrepreneurs (Samarinda Municipal Department of Women Empowerment and Child Protection, 2024), aimed at enhancing their business competencies. However, disparities in access to resources and economic opportunities remain an issue (East Kalimantan Provincial Office of Communication and Information Technology, n.d.). In the context of entrepreneurship education, integrating digital literacy serves as an effective strategy for equipping women with industry-relevant digital skills. Technology-based entrepreneurship education not only enhances academic knowledge but also develops practical skills essential for establishing and managing digital businesses (Boocock et al., 2009). Silamut and Petsangsri (2020) emphasize that integrating digital tools into learning enhances women's ability to access and manage information effectively, ultimately accelerating innovation in digital business.

To address the challenges of low digital literacy and resistance to new innovations, accessible and contextually relevant training programs are essential. Technology-driven educational models emphasizing experiential learning such as business simulations and digital startup incubators can provide PEKKA with valuable hands-on experience (Ghufron & Mardiana, 2020). With the right strategies, digital literacy and entrepreneurship education can serve as powerful tools for empowering women, strengthening their business competencies, and fostering a more inclusive digital economy. Previous studies have also underscored the importance of entrepreneurship training tailored to local natural resources to enhance women's skills and knowledge in job creation and economic well-being (Karwati, 2017). Additionally, research by Arbarini et al. (2023) highlights the critical role of digital literacy training in empowering rural women. Such initiatives enable women to drive economic progress through simple yet impactful actions, such as leveraging social media for product promotion, ultimately improving their financial well-being.

This study holds original value in redesigning a digital literacy framework specifically tailored to the needs of *Perempuan Kepala Keluarga* (PEKKA) in Indonesia, a group that often faces limited access to technology. By integrating a comprehensive approach that combines digital literacy and knowledge management in entrepreneurship education, this research not only offers practical solutions for enhancing digital skills but also provides a unique theoretical contribution by merging the Diffusion of Innovation (DOI) theory (Rogers, 2003) with the Resource-Based View (RBV) approach (Barney, 1991). The DOI theory explains how new ideas and technologies spread within societies, while the RBV approach emphasizes the importance of valuable, rare, inimitable, and non-substitutable (VRIN) resources in achieving a competitive advantage. The key added value of this study lies in its ability to address the challenges of low digital literacy and resistance to new innovations through an accessible and relevant training model, while simultaneously ensuring inclusivity and sustainability in Indonesia's digital economy development.

Literature Review

Diffusion of Innovation (DOI) Theory

The Diffusion of Innovation (DOI) theory, introduced by Everett Rogers (2003), explains how new ideas, technologies, and practices spread within a society or organization over time. According to Rogers, the adoption process occurs through five key stages: knowledge, persuasion, decision, implementation, and confirmation. The theory categorizes adopters into five groups based on their willingness to embrace innovation:

1. Innovators (2.5%) are risk-takers and the first to adopt new technologies.
2. Early Adopters (13.5%) are influential opinion leaders who guide and inspire others to follow.
3. The Early Majority (34%) are practical individuals who adopt innovations ahead of the average person.
4. The Late Majority (34%) are cautious and skeptical, adopting only after an innovation becomes widely accepted.
5. Laggards (16%) are resistant to change, adopting new ideas only when necessary or unavoidable.

In the context of digital literacy and entrepreneurship among PEKKA (*Perempuan Kepala Keluarga*), the DOI theory helps explain why some individuals quickly adopt digital tools while others face challenges due to limited knowledge, trust issues, or access to resources. Understanding this diffusion process enables the development of targeted strategies to accelerate digital adoption among female entrepreneurs.

Resource-Based View (RBV) Approach

The Resource-Based View (RBV) approach, developed by Jay Barney (1991), focuses on how an organization's internal resources and capabilities create a sustainable competitive advantage. According to RBV, a resource must meet the VRIN criteria to be a source of competitive advantage:

1. Valuable means it can help improve efficiency and effectiveness.
2. Rare means it is not widely available to competitors.
3. Inimitable means it is difficult to replicate or substitute.
4. Non-substitutable means there is no equivalent alternative.

Applying RBV to digital entrepreneurship, female entrepreneurs who develop strong digital literacy skills and effective knowledge management strategies gain a competitive edge. Their ability to leverage digital platforms, utilize technology for business efficiency, and create unique value propositions aligns with RBV principles, enabling long-term sustainability in the digital economy.

Digital Literacy

Digital literacy refers to an individual's ability to effectively navigate, comprehend, and utilize digital technologies for various purposes, including communication, content creation, and information management (Musa, 2024). It consists of several key dimensions:

1. Photo-visual literacy
The ability to interpret and derive meaning from visual digital representations, enhancing comprehension of multimedia content (Musa, 2024).
2. Reproduction literacy
The skill to create, modify, and disseminate digital content ethically and effectively, enabling innovation in digital communication (Ghufron & Mardiana, 2020).
3. Branching literacy
The competence to navigate and synthesize non-linear digital information structures, such as hyperlinks and interconnected content, fostering adaptive learning (Jasin et al., 2024).
4. Socio-emotional literacy
The capability to engage responsibly in digital environments, ensuring ethical online communication, digital well-being, and awareness of cyber risks (Ghufron & Mardiana, 2020).
5. Information literacy
The ability to locate, evaluate, and utilize digital information efficiently, ensuring critical thinking and informed decision-making (Musa, 2024).

Integrating these dimensions is essential for improving digital empowerment, particularly among women-headed households (PEKKA) in Indonesia, supporting their entrepreneurial and socio-economic advancement.

Knowledge Management

Knowledge management refers to the systematic process of creating, sharing, and applying knowledge to enhance organizational or individual capabilities (Musa, 2024). It consists of three key dimensions:

1. Knowledge creation
The development of new ideas, insights, and solutions through interaction, learning, and innovation in digital environments (Musa, 2024).
2. Knowledge sharing
The exchange of knowledge among individuals or groups to improve collective understanding and problem-solving capabilities (Jasin et al., 2024).
3. Knowledge application
The effective utilization of acquired knowledge to enhance decision-making, productivity, and innovation in various domains (Jasin et al., 2024).

A strong knowledge management framework is crucial in fostering digital literacy and entrepreneurship, particularly for women-headed households (PEKKA), enabling sustainable economic empowerment.

Technology Innovation

Technology innovation refers to the development and implementation of new or improved technological solutions to enhance efficiency, competitiveness, and adaptability (Ghufron & Mardiana, 2020). It comprises three key dimensions:

1. Product innovation
The creation or enhancement of products with new features, improved performance, or better user experience to meet market demands (Jasin et al., 2024).
2. Process innovation
The optimization of operational workflows and production methods through technology-driven advancements to improve efficiency and reduce costs (Ghufron & Mardiana, 2020).
3. Technological integration
The seamless incorporation of digital tools, automation, and smart technologies into business processes to enhance productivity and decision-making (Jasin et al., 2024).

Effective technology innovation is essential for digital transformation, particularly in entrepreneurship and knowledge-driven economies.

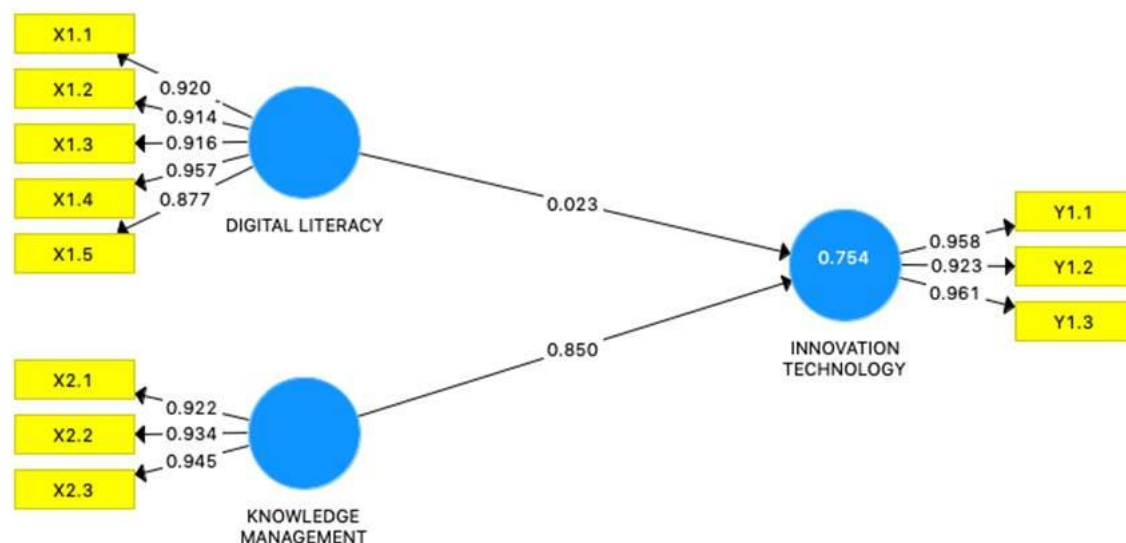
Method

This study employs a quantitative approach with a survey method to analyze the factors influencing the role of *Women-Headed Families* (PEKKA) in East Kalimantan within a socio-economic framework. The research population consists of 150 PEKKA in East Kalimantan. Following the guidelines of Kerlinger and Lee (2000), which state that a minimum of 30 respondents is required for quantitative research, this study selects 33 respondents, ensuring compliance with the recommended sample size. A purposive sampling technique was utilized, as only respondents meeting specific criteria and willing to participate were included. Data collection was conducted through structured questionnaires and analyzed using *SmartPLS 4.0*, a method suitable for examining relationships between latent variables, even with relatively small sample sizes.

Result, Discussion, and Conclusion

A quantitative method approach was employed to explore innovation in technology-based entrepreneurship education through digital literacy and knowledge management within PEKKA. SEM-PLS analysis was conducted to evaluate the relationships between latent variables and their supporting indicators. PLS is known to be effective in handling models with complex data, small samples, and predictive relationship testing. The following figure presents the results of the structural model and measurement mapping, illustrating the strength of relationships among Digital Literacy, Knowledge Management, and Innovation Technology, as well as the contribution of each indicator in constructing the research model.

Figure 1: PLS Algorithm of Model Hubungan Digital Literacy, Knowledge Management, Dan Innovation Technology



Based on the analysis results, Digital Literacy is measured through five indicators (X1.1 to X1.5) with loading factors ranging from 0.877 to 0.957, indicating that all indicators strongly contribute to this construct. Meanwhile, Knowledge Management is measured with three indicators (X2.1 to X2.3), showing very high loading factors between 0.922 and 0.945, signifying that this variable is well-represented by its indicators.

As a dependent variable, Innovation Technology has three indicators (Y1.1 to Y1.3), with excellent loading factors ranging from 0.923 to 0.961, reinforcing that this construct is measured strongly and validly. The relationship between Digital Literacy and Innovation Technology produces a coefficient of 0.023, indicating a very small or even nearly insignificant effect. On the other hand, Knowledge Management shows a much stronger influence on Innovation Technology with a path coefficient of 0.850, emphasizing that knowledge management plays a crucial role in driving technological innovation.

Overall, this model demonstrates that while Digital Literacy remains essential, Knowledge Management contributes more significantly to fostering technological innovation. This study can serve as a foundation for designing training programs that focus more on strengthening knowledge management, alongside efforts to improve digital literacy for entrepreneurs.

Based on the results of the Outer Loadings analysis, all indicators demonstrate excellent values in measuring their respective constructs. In Partial Least Squares Structural Equation Modeling (PLS-SEM), outer loadings are used to assess the extent to which each indicator represents its construct. According to Hair et al. (2021) and Sarstedt et al. (2022), the recommended threshold for outer loadings is ≥ 0.708 , as this value ensures that an indicator explains at least 50% of the variance in its construct.

Table 1: Outer Loadings

	Outer Loadings
X1.1	0.92
X1.2	0.914
X1.3	0.916
X1.4	0.957
X1.5	0.877
X2.1	0.922
X2.2	0.934
X2.3	0.945
Y1.1	0.958
Y1.2	0.923
Y1.3	0.961

In this study, all outer loadings exceed 0.87, with some approaching 0.96, indicating that all indicators exhibit a very strong contribution to their respective constructs. The indicators X1.4 (0.957), X2.3 (0.945), Y1.1 (0.958), and Y1.3 (0.961) have the highest loadings, signifying their strong association with the constructs they represent. These findings confirm that the measurement instrument used in this study possesses excellent indicator validity.

In Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis, the Fornell-Larcker Criterion is used to assess discriminant validity by comparing the square root of the Average Variance Extracted (AVE) for each construct with the correlations between constructs. The following table demonstrates that Digital Literacy, Innovation Technology, and Knowledge Management meet this criterion, indicating that each construct has good discriminant validity and can distinctly differentiate itself from other constructs.

Table 2: Fornell-Larcker Criterion

	DIGITAL LITERACY	INNOVATION TECHNOLOGY	KNOWLEDGE MANAGEMENT
DIGITAL LITERACY	0.917		
INNOVATION TECHNOLOGY	0.677	0.948	
KNOWLEDGE MANAGEMENT	0.769	0.868	0.934

Based on the analysis using the Fornell-Larcker Criterion, the discriminant validity in this research model has met the established criteria. Discriminant validity is a crucial aspect of measurement model assessment to ensure that each construct is distinct from others. According to Fornell and Larcker (1981), discriminant validity is achieved when the square root of the Average Variance Extracted (AVE) of a construct is greater than its correlation with other constructs in the same model.

In this study, the square root of AVE for each construct is 0.917 for Digital Literacy, 0.948 for Innovation Technology, and 0.934 for Knowledge Management. When compared to the inter-construct correlations, it is evident that each square root of AVE value is higher than the correlations with other constructs, such as the correlation between Digital Literacy and

Innovation Technology (0.677) and between Innovation Technology and Knowledge Management (0.868). This finding confirms that each construct explains more variance in its own indicators than in those of other constructs in the model, thereby demonstrating strong discriminant validity.

Reliability

To ensure the quality of the measurement model, reliability and validity tests were conducted using Cronbach's Alpha, rho_A, Composite Reliability, and Average Variance Extracted (AVE).

Table 3: Construct Reliability and Validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
DIGITAL LITERACY	0.953	0.956	0.964	0.841
INNOVATION TECHNOLOGY	0.943	0.945	0.964	0.898
KNOWLEDGE MANAGEMENT	0.927	0.929	0.953	0.872

Based on the results of the Construct Reliability and Validity assessment, all constructs in this study exhibit excellent reliability and validity. Construct reliability was measured using Cronbach's Alpha and Composite Reliability (CR), both of which exceeded 0.9. According to Hair et al. (2021), a Cronbach's Alpha ≥ 0.7 indicates high internal consistency, while a CR above 0.7 suggests strong reliability, ensuring that the construct consistently measures the intended variable.

Convergent validity was assessed using the Average Variance Extracted (AVE), with all variables scoring above 0.7. As per the guidelines of Hair et al. (2021) and Sarstedt et al. (2022), an AVE ≥ 0.5 indicates that a construct explains more than 50% of the variance in its indicators, confirming good convergent validity. Additionally, the rho_A values, which exceed 0.9, further reinforce the reliability assessment. According to Henseler et al. (2015), rho_A is a more accurate reliability indicator than Cronbach's Alpha in Partial Least Squares Structural Equation Modeling (PLS-SEM), as it accounts for inter-indicator correlations more flexibly.

R Square

To assess the strength of the structural model, R Square analysis is used to measure the extent to which the independent variables can explain the dependent variable. R Square indicates the proportion of variance in the Innovation Technology variable that can be explained by Digital Literacy and Knowledge Management.

Table 4: Coefficient of Determination (R Square) for the Innovation Technology Variable

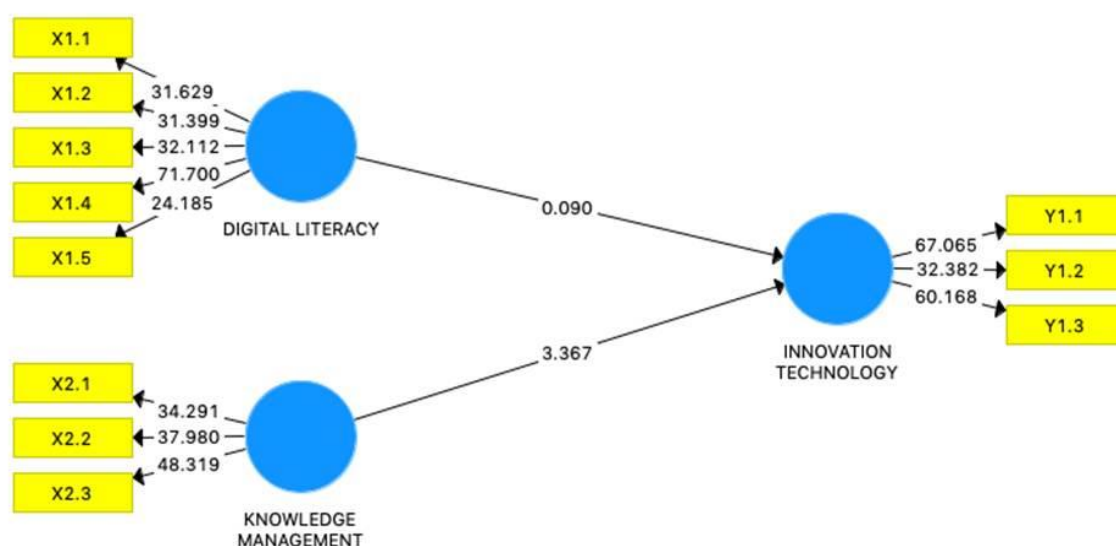
	R Square	R Square Adjusted
INNOVATION TECHNOLOGY	0.754	0.738

The R Square (R^2) value for the Innovation Technology construct is 0.754, with an Adjusted R^2 of 0.738. The R^2 value represents the proportion of variance in the dependent construct that can be explained by the independent constructs within the research model. Generally, a higher R^2 indicates a stronger predictive power of the model in explaining the variance of the dependent variable (Hair et al., 2021).

Discussion

Path analysis can explore the relationships between Digital Literacy, Knowledge Management, and Innovation Technology. This analysis aims to understand the extent to which each independent variable contributes to driving technological innovation and to identify which variable has a more dominant influence.

Figure 2: Path Results for the Influence of Digital Literacy and Knowledge Management on Innovation Technology



The results show that Digital Literacy has a path coefficient of 0.090, indicating a very small and statistically insignificant influence. This suggests that while digital literacy is essential as a foundation for supporting technology adoption, its direct impact on technology innovation remains limited without the reinforcement of other factors. Conversely, Knowledge Management demonstrates a significantly larger path coefficient of 3.367, highlighting a strong and significant effect on Innovation Technology. This finding underscores the critical role of effective knowledge management in driving technological innovation. The processes of knowledge acquisition, sharing, and utilization emerge as dominant factors that accelerate and enhance innovation.

Although digital literacy remains an essential element for ensuring access to and understanding of technology, effective knowledge management has a more substantial impact on fostering technology innovation. Therefore, strategies that integrate digital literacy enhancement with robust knowledge management systems present the most effective approach to building a sustainable innovation ecosystem, particularly among women entrepreneurs (PEKKA) who are encouraged to adapt to digital transformation.

Table 5: Bootstrapping Result

Hipotesis	T Statistics (O/STDEV)	P Values	Referensi
DIGITAL LITERACY - > INNOVATION TECHNOLOGY	0.090	0.928	Xia and Jiaqi (2024); Cetindamar et al. (2021); Ahmad et al. (2020); de Bem Machado et al. (2022)
KNOWLEDGE MANAGEMENT -> INNOVATION TECHNOLOGY	3.367	0.001	du Plessis (2007); Lai and Lin (2012); Lin et al. (2012); Mardani et al. (2018); Alegre et al. (2013); Marwick (2001); Schultze and Boland Jr (2000); Tseng (2008)

Hypothesis 1: Digital Literacy → Innovation Technology

The findings indicate that digital literacy does not have a significant impact on technology innovation (T-Statistic = 0.090, P-Value = 0.928). This suggests that while digital literacy is a fundamental aspect of technological adoption, it alone is insufficient to drive technology-based innovation in entrepreneurship education for women-headed families (PEKKA).

Prior studies, such as Xia and Jiaqi (2024) and Cetindamar et al. (2021), have emphasized that managerial and employee digital literacy contributes to digital transformation. However, its impact on innovation is contingent upon organizational readiness and supporting factors. Similarly, Ahmad et al. (2020) highlighted that workplace information literacy supports innovation, but its effectiveness largely depends on organizational support and technological resources. This is in line with findings by Judijanto and Nurrohman (2025), who assert that the effectiveness of financial technology adoption in MSMEs depends not only on digital access, but also on financial management capabilities and supporting digital ecosystems. In the context of PEKKA, although access to digital technology exists, innovation is often constrained by limited resources, inadequate digital ecosystem support, and skill gaps in leveraging technology for entrepreneurial development. Utami et al. (2024) emphasize the importance of strengthening digital literacy and infrastructure for MSMEs in the Society 5.0 era, particularly through inclusive approaches targeting vulnerable groups like PEKKA.

Certain PEKKA members require a shift in thinking prior to embracing the concept of digitalization and subsequently integrating technology into their business operations. The majority of individuals possess a minimal comprehension of digitalization. They struggle to independently generate complex marketing content or utilize digital marketing tools. As highlighted by Judijanto et al. (2024), digital economy adaptation also demands the ability to manage content creation, marketing, and digital tools—areas in which many community-based entrepreneurs still lag behind.

Furthermore, de Bem Machado et al. (2022) argued that digital transformation requires integration with knowledge management to foster sustainable innovation. This aligns with the notion that while digital literacy facilitates access to technology, without an effective knowledge management framework, technology-driven innovation in entrepreneurship

education for PEKKA cannot be fully realized. The community-based adoption process is more acceptable to members in the PEKKA community, as it occurs collectively. Members are more inclined to accept innovation due to the support of the group or community itself. This collective model resonates with the findings of Judijanto and Nurrohman (2024), who underscore the importance of environmental and social governance (ESG) principles in enabling inclusive innovation through shared community values.

Practice-based learning methods are also an important aspect of technology-based entrepreneurship education. According to Juwita, Arsyad, et al. (2024), women may find it difficult to grow their enterprises due to a lack of entrepreneurial literacy; therefore, a localized strategy is required to assist business development. Juwita, Rahayu, et al. (2024) also state that programs which provide technical coaching, business training, and business development assistance have been shown to be successful in helping PEKKA Community to improve their digital marketing and business management abilities. Thus, entrepreneurship education integrated with technology can create a learning environment that supports the development of practical skills that are relevant to market needs. This is consistent with the recommendations in Utami et al. (2024), which emphasize context-specific training and support systems as critical success factors in digital entrepreneurship for marginalized groups.

Hypothesis 2: Knowledge Management → Innovation Technology

The results demonstrate that knowledge management has a significant positive effect on technology innovation (T-Statistic = 3.367, P-Value = 0.001). This finding reinforces the argument that effective knowledge management, including knowledge sharing and technology-based knowledge utilization, enhances the capacity for technological innovation in entrepreneurship education for PEKKA. This suggests that access to digital tools alone is not sufficient for PEKKA; it is equally important for them to effectively manage and share knowledge within their entrepreneurial ecosystem. The exchange of knowledge among entrepreneurs or within the community can facilitate the more efficient application of technology. Properly managed knowledge enables PEKKA to drive innovation, improve competitiveness, and expand their business networks. Judijanto et al. (2024) highlighted that digital economy adaptation and convergence are shaped not only by access to digital tools, but also by how knowledge is structured and managed across sectors and communities, particularly in marginalized groups.

These findings are consistent with previous research, such as du Plessis (2007), which identified knowledge management as a key enabler of innovation within organizations. Similarly, Lai and Lin (2012) found that well-implemented knowledge management strategies enable firms to develop superior technological innovations. In the PEKKA context, fostering a structured system of knowledge exchange within entrepreneurial communities can facilitate technology-driven solutions that enhance business innovation among women-headed families. Judijanto and Nurrohman (2024) also stress the importance of sustainable business strategies supported by integrated knowledge systems and ESG principles, which are essential for empowering local entrepreneurship in the long term.

Moreover, Mardani et al. (2018) and Alegre et al. (2013) underscored the critical role of knowledge management in driving competitive advantage and innovation, particularly in technology-driven industries. Additionally, Marwick (2001) and Schultze and Boland Jr (2000) emphasized that knowledge management technologies accelerate innovation processes

by enhancing access to critical information and best practices. For PEKKA, a well-structured knowledge management system—incorporating digital knowledge-sharing platforms, community-based training, and mentorship programs—can empower women-headed families to effectively utilize technology for business innovation. As emphasized in Utami et al. (2024) collaborative digital programs supported by knowledge sharing and practical education frameworks can strengthen innovation capacity among MSMEs, especially for underrepresented communities.

Thus, this study confirms that technology-based innovation in entrepreneurship education for PEKKA is more strongly influenced by the effectiveness of knowledge management strategies than by digital literacy alone. These findings suggest that fostering innovation requires not only digital literacy but also a robust knowledge management system that enables woman-headed families to leverage technology effectively in their entrepreneurial endeavors. This aligns with Judijanto and Nurrohman (2025), who argue that fintech and digital transformation efforts in MSMEs should be accompanied by structured knowledge management practices to ensure sustained innovation and efficiency.

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Tools Available to Develop Critical Thinking to Combat Hoaxes, Disinformation, and Conspiracy Theories at Secondary Education Level

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Abstract

Hoaxes, disinformation, conspiracy theories... are not only a matter of the adult world, but thanks to the digital era, the skills of the youngest, and, last but not least, the influence of the home environment or the immediate surroundings, they are also becoming part of the world of children and adolescents. What tools does the teacher, as one of the dominant agents influencing the learners and their critical thinking, have in his or her hand to direct them correctly against deceptive, conspiratorial content? The present study focuses on the available material in the field, which could be used as companion material at the secondary education level in German-speaking and Slovak-speaking countries, and its comparison. The aim is to summarize such documents and at the same time to point out possible resources for the development of critical thinking that are applicable in different phases of the teaching process and can sensitize the learner's mindset to the subject content in a step-by-step manner.

Keywords: hoaxes, disinformation, conspiracy theories, critical thinking, secondary education level, German-speaking area, Slovak-speaking area

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Introduction

The increasing tendency to spread hoaxes, disinformation, and conspiracy theories is undoubtedly linked to the possibilities of using and abusing the digital world. Although fake and conspiratorial content is not new on the scene, their impact is incomparably greater than in the past, precisely because this happens much faster and more cleverly in the online world. This is not only a quantitative perspective (number of convinced addressees), but also an impact from a qualitative perspective (the addressees do not have constant values for certain socio-demographic criteria such as gender, age, level of education, standard of living, etc.).

The present study focuses on a group of addressees aged 10–18/19, i.e. pupils of the secondary level of education.¹ We can assume that this group of addressees has a varying but at least basic level of mastery of online tools and active use of online social networks (the level of digital skills may vary depending on many factors, such as gender, socio-economic background, level of education, etc.). This current standard is already linked to the general availability of the internet and the availability of digital technologies at an early age, but also to the targeted investments made in recent years in society's digital competence as one of the prerequisites for active participation in a multicultural society, in democratic processes and the productivity and economic growth of the country (in the context of digital transformation).

The COVID-19 pandemic is seen as a driving force behind the digital transformation process, as a result of which the digital space has become an integral and unavoidable part of the everyday lives of children, young people, and adults. However, the results of the survey *How children (10-18) experienced online risks during the Covid-19 lockdown - Spring 2020* (11 EU countries) showed that while the digital space offers many new possibilities and opportunities, it also harbors many risks, such as cyberbullying and cyber-hate, misinformation, misuse of personal data, etc. (Lobe et al., 2021, p. 6). A more narrowly defined measure, measuring belief in conspiracy theories among young people (Jolley et al., 2021a), which was one of the first of its kind to be conducted in the UK, also revealed worrying results. The phenomenon of conspiracy theories is becoming increasingly prevalent among young people, even those as young as 14 years old (Jolley et al., 2021b). Similar conclusions can be found in *Vertrauensstudie 2022* (Trust Study/ *Vertrauensstudie 2022. Angst vor der Zukunft. Jugendliche zwischen gesunder Skepsis und gefährlicher Verschwörungsneigung*, Germany), which was preceded by a survey across different age groups (6-11, 12-16, adults) (Bepanthen-Kinderförderung, 2022). In particular, the second group (12-16 years) tended to show a positive attitude towards conspiracies, which is closely related to distrust of the media, official institutions, and the search for information in social networks (pp. 26–28). Finally, the results of the HoDeKoProM surveys (research of hoaxes, disinformation, conspiracies, and propaganda among young people aged 13–25; Slovakia, Czech Republic) offer a relatively optimistic view of the consumption of untrustworthy content (e.g. awareness of the risks associated with the spread of fake or conspiratorial content for individuals and society, etc.), but this is not a phenomenon to which young people are completely immune, or one to which they react with indifference (Belovičová et al., 2024, pp. 9–27).

¹ From the developmental psychology point of view, puberty, and adolescence are involved (e.g. Končeková, 2014); according to the ISCED educational scale, these are the ISCED 2 and ISCED 3 levels (UNESCO, 2012).

In this context, reference is made to the European Union's *European Declaration on Digital Rights and Principles for the Digital Decade*, which explicitly refers to the need to acquire digital skills and competencies, including media literacy and critical thinking (European Union, 2023). The latter competencies can play an important role in managing risky situations in the online space, as well as in recognizing distorted facts and fake news (information with conspiratorial content) and their subsequent perception. The development of digital skills, media literacy, and critical thinking represents some of the most significant challenges in today's educational process and can be considered key tools in the fight against online threats. However, their development requires appropriate conditions, which certainly include the availability of supporting educational materials for teachers, regarded as effective tools in the educational process aimed at overcoming the aforementioned challenges.

Fake and Conspiratorial Content – A Threat to the World of Young People

False and conspiratorial content is one of the greatest threats and risks to society and democracy. There are several types of such content, and a distinction is not always made between them (disinformation, hoaxes, fake news, conspiracy theories). The instrumentalization of lies can be seen as the unifying element. The distinction is primarily based on the claim to the truth of the statement. The purveyors of hoaxes or fake news are primarily concerned with disinformation and defamation. There is often a political, economic, or personal goal behind the dissemination of false news. Conspiracy theories seem to be more dangerous (Dubóczy, 2023). Most conspiracy theorists are convinced that they have exclusive knowledge and the only true reality. They see themselves as insiders and feel called to share their knowledge. The urge to convince others goes hand in hand with beliefs about themselves and their alternative explanations for events. Because these are based on assumptions about hidden conspiracies, their dissemination leads to unconfirmed assumptions taking precedence over science, verified facts, and confirmed evidence. The importance of such an approach has led to a great deal of attention being paid to conspiracy theories from a few different perspectives, and as a result, we now have a relatively detailed description of them, which will be followed up below.

Given the nature of conspiracy theories, they are regarded as alternative models of explanation and interpretation of events that generally have the character of crises with social relevance. Their main characteristics include dualism (a binary view of the world against the background of the friend-enemy or perpetrator-victim schema); personalization of power in the form of conspirators (conspirators are elites, government officials, certain institutions, transnational organizations, secret societies, etc.); determinism (absence of random events linked to planned actions subject to the specific interests of the powerful); concealment of the actual plans by the powerful and the need for them to be revealed by the "awakened/conscious"; reduction of the complexity of an event to a single essential cause that is revealed (Barkun, 2003; Butter, 2023; Fuchs, 2022; Lutter, 2001; Nocun & Lamberty, 2020). Notwithstanding the objections to the scientific nature of conspiracy theories based on the concept of "theory" and its characteristics (Götz-Votteler & Hespers, 2019; Nocun & Lamberty, 2020; Schmiede et al., 2023), the presence of elements of scientific style in the content shared can often be observed as a supporting component to establish their credibility (Demčíšák, 2024).

It is also crucial to consider the perspective of the individual who may be inclined to subscribe to conspiracy theories. Douglas et al. (2017, pp. 538–540) have demonstrated the correlation between the addressee's need satisfaction and their belief in the conspiratorial

content through three categories of motives: epistemic, social, and existential. The epistemic motives relate to the need to identify the origin of the problem (adverse events such as social or economic crises, stressful events, etc.). The social motives relate to the need for recognition of the self and the group, and the existential motives follow the need to regain a sense of security and control (Douglas, 2021; Douglas et al., 2017). The need to feel safe in one's environment, to have a sense of control over oneself and one's surroundings, is paramount. Consequently, individuals often seek a cause or an explanation for phenomena that elude their control. In a related study, Douglas et al. (2019) explored additional factors that contribute to the comprehension of conspiracy theories and the adoption of positive attitudes toward them. These factors encompass demographic characteristics (e.g. age, gender, education, social circumstances), as well as political influences (e.g. political preferences).

Lack of security or the need to cope with feelings of fear and isolation were also identified in the Spring 2020 survey as possible factors influencing young people's positive perceptions of conspiracy theories. Of course, this must be seen in the context of the measures taken during the COVID-19 pandemic and the uncertainty and lack of clear information in its early stages. Equally important, however, is the life stage of the group studied (10–18/19 years) – a period encompassing puberty, adolescence, and the transition to adulthood, with puberty being seen as a transitional period of crisis accompanied by a sense of loss of control. Thus, a possible link can also be found between frustration and uncertainty about the future and greater susceptibility to conspiracy theories to "stabilize oneself" (the view of the social psychologist Clara Schliesser in Heigl & Lang, 2024). The views favored in the family environment and the current influx of diverse information "from outside" make it necessary to seek answers to the questions that arise. The Internet space is usually one of the first choices, also because of the rapid availability of information and the possibility of unlimited communication with a wide audience. Although young people's preference for the online space tends towards social networks (e.g. Eurostat, 2022; Go4Insight, 2024), fake or conspiratorial content can also be found there, given its openness and interconnectedness with other sources.

It is almost impossible to completely prevent access to online space and social networks. This is also directly related to the constantly evolving digital society and the need to be an active part of it. While we can control the content that is shared, viewed, and commented on, and we can limit the flow of unwanted content up to a certain age of the child, we cannot act as a "guardian" around the clock. Therefore, it is important to guide children and young people to think about individual content, to teach them to evaluate and judge that content based on credible sources of relevant information that are available, and to teach them how to engage in appropriate debate, i.e. to engage in constructive debate and avoid aggressive clashes of different opinions.

Media Literate and Critically Thinking People Can Combat Fake and Conspiratorial Content

Media-literate people are able to make informed choices, understand the nature of content and services and take advantage of the full range of opportunities offered by different communication technologies. They are better able to protect themselves and their families from harmful or illegal content. (European Commission, 2023, p. 1)

Not only in the Media Literacy Guidelines (see above), but also in most official documents on education, the development of media literacy is one of the strategic objectives. Media

literacy is a promising tool for people to effectively manage and critically evaluate all media content. Its key competencies are considered to be: the ability to seek out and use media and to share appropriate and valuable information with others; the ability to understand the news and to use critical thinking and understanding to analyze its quality, truthfulness, and credibility; the ability to create media content taking into account purpose, audience, and other factors; the ability to apply social responsibility and ethical principles to one's own identity, communication and behavior; and the ability to act and engage in citizenship through the media, to become part of a democratic society (McDougall et al., 2018, p. 5).

The importance of media literacy was highlighted by Thoman and Jolls (2003) at the beginning of the 21st century. The following five aspects (p. 9) have been highlighted:

1. The influence of media in our central democratic processes.
2. The high rate of media consumption and the saturation of society by media.
3. The media's influence on shaping perceptions, beliefs and attitudes.
4. The increasing importance of visual communication and information.
5. The importance of information in society and the need for lifelong learning.

It is clear from the above that media literacy is not about memorizing facts about media, nor is it about being able to produce a video, for example; media literacy has a much broader dimension. It is about thinking about the questions we ask when we critically engage with media content. Thoman and Jolls (2004) see this activity as a set of sub-activities that correspond to the core skills defined in the Media Literacy Guidelines: "It involves posing problems that exercise higher order thinking skills - learning how to identify key concepts, make connections between multiple ideas, ask pertinent questions, identify fallacies, and formulate a response" (p. 23). Although media literacy consists of a set of competencies that are not age-specific and can be acquired and developed throughout life, there has been a growing emphasis in recent years on integrating its development into the formal education system. Introducing these skills gradually from an early age promises to establish a solid foundation on which to build, expand, and shape a media-literate individual as an active member of society (McDougall et al., 2018, p. 7).

Critical thinking is considered one of the key competencies of media literacy. A guide to critical thinking summarizes it as self-directed, self-disciplined, self-monitored, and self-correcting thinking (Paul & Edler, 2003, p. 1). This aspirational goal is much better captured in terms of acquired competencies, which are also presented in the guide. According to this, a person who has well-developed critical thinking skills, poses precise questions for discussion; gathers and analyses relevant information; draws sound conclusions using logical rules and objective criteria, norms, and standards of evidence; remains open to divergent perspectives, and assesses their assumptions, implications and consequences appropriately. It also communicates effectively to facilitate solutions to complex problems. Pfister (2020, p. 7) also includes other attributes such as careful, purposeful consideration and reflective, rational, and enlightened thinking. The concept of reflective thinking, as the author explains elsewhere, goes back to the American philosopher John Dewey. According to him, reflective thinking is defined as "active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the reasons which support it and the further conclusions to which it tends", which is very close to the above-mentioned competencies (pp. 13–14; see also Hitchcock, n.d.). If some of the sub-skills of critical thinking were used when dealing with misleading or conspiratorial information, the level of trust could be quite different. However, this requires their development and encouragement.

Critical thinking is now one of the generally accepted educational goals, but it is not equally integrated into the curricula of the individual educational levels everywhere. For example, differences between Germany and the USA are pointed out; in contrast to the USA, a lack of curricular consideration of critical thinking in schools is observed in Germany (Kohnen, 2023, pp. 327–328; in the context of science education in Germany, Austria, and Switzerland, also Rafolt et al., 2019, p. 4). There is also a lack of task types that specifically promote aspects of critical thinking, or these tend to be assigned to university teaching (Kohnen & Rott, 2023; Rott, 2024).² A similar situation can be observed in Slovakia. Although there are methodological recommendations for specific subjects or subject types, including modeling tasks (Bederková, 2021), they tend to focus on upper secondary subjects (grammar school, middle school); however, there is a lack of feedback on their use in the classroom, including their shortcomings and advantages in terms of their suitability and effectiveness, as well as suggestions for improvement. Any development of critical thinking, be it at different levels and in different school subjects, is of course a good starting point for understanding the dangerous content consumed, but it would still be appropriate to start much earlier with a targeted and continuous development of this competence. The appropriate inclusion of fake or conspiratorial content in teaching and learning is just another desirable step in developing awareness of deliberately misleading and false content in posts. The next chapter deals with the types of materials (tools) available to teachers to develop and support pupils' critical thinking and its sub-skills concerning hoaxes, disinformation, and especially conspiracy theories.

Tools for Developing Pupils' Critical Thinking About Fake and Conspiratorial Content

Developing critical thinking in the context of disinformation and conspiracy content requires space and thorough preparation. One way in which such content can be integrated, are areas of formal education that have been introduced based on the recommendations of official EU documents in the context of digital transformation, but also the new challenges of an ever-changing online world, such as media education (Slovakia), basic digital education and therein media education/media literacy (Austria), or media literacy and its component media education (Germany). Not all of these areas are implemented as a separate subject (Slovakia, Germany), and differences can also be observed within the countries themselves (e.g. the teaching of media education in the second stage of primary school in Slovakia - the differences in Slovakia concerned the teaching of media education in general, the teaching of this area as a separate subject, the allocation of hours for teaching, etc.) (Bielčíková, 2021). In addition to this most effective way, it is possible to develop media literacy and critical thinking towards fake and conspiratorial content as a cross-cutting theme in different subjects or within the framework of selection seminars or voluntary school activities. As hoaxes, disinformation, and conspiracy theories affect different areas of life today, it is possible to address them in a range of subjects (e.g. history, natural history, physics, geography, civics, and others, depending on the focus of the middle school). To this end, methodological guidelines have been developed at the level of relevant ministries and state institutions, focusing primarily on the development of media literacy, some of them mainly at a theoretical level (an example of more practically oriented educational material is Viki (2022); Viki is the Slovak educational and information platform of the Ministry of Education, Science, Research and Sport of the Slovak Republic), others with references to practical materials that also take into account the risks of the online world and that can be used at

² There are current publications by these authors in which the task formats for corresponding educational levels are also presented, for example in Rott (2024) task formats in grade I/primary school (dilemmas, decision stories, modeling), in Kohnen & Rott (2023) secondary level I/grammar schools (sustainability dilemmas).

different levels of education, including secondary education (see e.g. Austrian Federal Ministry of Education, Science and Research, n. d.; at the level of the German federal states, e.g. Bildungsportal Niedersachsen, n. d.).

At the supranational level, the European Commission has developed guidelines on disinformation and critical thinking, two of which are particularly relevant to the secondary school age group: *Guidelines for teachers and educators on tackling disinformation and promoting digital literacy through education and training* (European Commission, 2022) and *How to spot and fight disinformation. Toolkit for teachers* (European Commission, 2024), both materials are in the languages of the Member States EU. In both cases, the documents have the character of a handbook and contain, in addition to the theoretical background on disinformation, suggestions for activities that can be implemented in formal education, methodological recommendations for implementation (practical application requires a link to real empirical material/concrete examples), practical demonstrations with concrete examples (practical application allows for variation of concrete examples) and additional tips and recommendations for teachers that should be taken into account. The Awareness Centre Klicksafe works as part of the European Union's CEF Telecom programme, producing various educational materials, infographics, info cards, and online games, including on topics such as fake vs. fact, deepfakes, disinformation, conspiracy theories, etc. As a theoretical starting point and also as methodological material for teachers, the publications of the international organizations UNESCO (United Nations Educational, Scientific and Cultural Organisation) and OSCE (Organisation for Security and Co-operation in Europe) can be used; under the auspices of the former, a publication in the form of a handbook entitled *Umgang mit Verschwörungstheorien – Was Lehrkräfte wissen müssen* (available in English, French, German, and Spanish) (UNESCO, 2024) has been produced to provide methodological support for teachers in their efforts to sensitize pupils and students to conspiracy theories and to encourage them to think critically so that they are not easily deceived. In this context, the OSCE organization published the German publication *Verschwörungstheorien hinterfragen, Lehrhilfe 4* (OSCE, 2019) which offers a clear combination of theoretical background on conspiracy theories and methodological recommendations for dealing with the topic in the classroom but does not contain a practical demonstration of a teaching unit.

In addition to the above sources of educational and other support materials for fake and conspiratorial content, we can also refer to resources that may or may not be exclusively related to the field of education in general. There are various impulses behind the creation of educational and other support materials, most often an awareness of the topicality and relevance of a particular issue, a request from educational institutions to develop educational material or even the realization of various projects dealing with conspiracy theories. A prime example of educational material for teachers in German is *Trollwerkstatt. Verschwörungsmymen als Thema im Unterricht. Theorie und Praxis*, produced by the non-profit organization Wiener Bildungsserver (Amon et al., 2021). This package of teaching materials, designed for lower and upper secondary schools (ages 10/11–19), combines the theoretical level of thematic content with its practical application through five practical modules on specific aspects of conspiracy theories and the development of critical thinking skills concerning them. The modules represent a chronological sequence of activities that build on each other and are complemented by accompanying materials and real-life examples. At the same time, it is possible to customize the teaching materials by selecting your practical examples. Bundeszentrale für politische Bildung also deals with disinformation and conspiracy content under the auspices of the Federal Ministry of the Interior (Germany).

Its website provides a range of free materials that can be used to prepare lessons, but also as theoretical background material, especially for older pupils (15-19 years), or to give to pupils as a learning aid (see Learning). During the pandemic (2020), a collection of materials was compiled that can be used to integrate the content of disinformation and conspiracy theories into the classroom. There are thematic dossiers such as *Digitale Desinformation* (Bundeszentrale für politische Bildung, 2019), infographics such as *Ist diese Meldung ein Fake?* (GrafStat, 2023), *Gib Fake News keine Chance!* (Bundeszentrale für politische Bildung, 2023), the collection of teaching materials *Fakten gegen Fake News oder Der Kampf um die Demokratie* (Gensing, 2020), the collection of studies entitled *Wahrheit* (Bundeszentrale für politische Bildung, 2017), the leaflet *Flyer – Was tun gegen Verschwörungsideologien?* (Bundeszentrale für politische Bildung, 2020), and the online game *Fake It To Make It*, which deals with the social consequences of fake news. The seriousness and topicality of these issues are still palpable, which can also be observed in other available articles that link the topic of disinformation, conspiracy theories, hoaxes, etc. with current trends, i.e. their anchoring in various social networks, such as *Fake News*, *Misinformation*, *Desinformation* (Hoffmann, 2023), *Falsche Informationen, Kriegspropaganda und wie man sie erkennt* (Bösch, 2023), *Hass for you. Antisemitismus und der Nahostkonflikt bei TikTok* (Berendsen & Schnabel, 2024). In most of the sources listed, either within the texts or at the end of the texts, additional sources are mentioned that discuss the topic of disinformation and conspiracy content. Finally, the non-profit organization Das Anne Frank Zentrum, based in Berlin, should be mentioned for use in the classroom. Although the online game *Das Kurierkomplott* was originally developed for a different target group (eLearning in the prison system), it can also be used as a (self-)educational tool for pupils aged 14 and over to sensitize them to conspiracy theories and antisemitism.

In the Slovak language area, the required materials can also be found, including those of an educational nature. The civil association called Inštitút ľudských práv (Human Rights Institute) offers the publication *Dôveruj, ale preveruj. Informovanosťou proti extrémizmu na internete* (Krempaská & Weisenbacher, 2015), where the second chapter is dedicated to hoaxes, conspiracy theories, and trolls and the fourth chapter contains recommendations for teachers. As in the German-speaking area, an example of the combination of theoretical principles and practical application of knowledge in the field of education can be found in the Slovak-speaking area, namely in the publication *(Ne)bezpečne v sieti. Manuál rozvoja kritického myslenia v online priestore* (eNef, 2021) designed for non-formal education, for which there is also an online web application. The title of the publication already acknowledges the effort to provide material that simultaneously develops critical thinking and media literacy in direct relation to the digital world and its dangers. The publication has been produced as part of the project *(Ne)bezpečne v sieti* and, in addition to 5 introductory chapters, contains 37 educational activities on media literacy, critical thinking, staying safe online, digital citizenship (see table of contents), with a timetable of successive steps, recommendations for their implementation and also suggestions for variations of the activities. The recommended age groups for the 10+ and 15+ activities are for secondary education. In 2017, the magazine Denník N produced two materials on the topic in question - commissioned by teachers: *Kritické myslenie. Ako rozlíšiť pravdu od lži. Ako nenaletieť. Ako nepodľahnúť konšpiračným teóriám. Ako sa nebáť rozmýšľať samostatne, ale pritom dôverovať aj iným* (Denník N, 2017a) and *Klamstvá a konšpirácie. Príručka pre stredné školy* (Denník N, 2017b). Both materials develop the theoretical background and explain various concepts related to the topics covered engagingly, and the materials also include practical exercises and guidance for students with concrete examples. The fact that the topics are covered by a collective of authors from different fields (political science, journalism,

journalism studies, formal education, critical thinking classes, and others) makes the way they are treated popular and instructive, with an emphasis on practical examples and broad comprehensibility.

In addition to classroom support materials (both formal and informal), it is important to remind students to check the veracity of the information they consume outside of school. Given the age range in secondary education, older students in particular should be able to check the veracity of information without much difficulty. To this end, there are several international and national fact-checking online services, such as *Snopes*, *Correctiv*, *Mimikama*, *APA-Faktencheck*, *dpa-Faktencheck*, *ARD-Faktenfinder*, *Faktenfuchs*, *Volksverpetzer*, *AFP Österreich*, *Faktiv* in Austria and Germany, *Konšpirátori.sk*, *AFP Fakty* in Slovakia, *Demagog* in Czechia and others.

Conclusion

The present study focused on disinformation and conspiratorial content in the context of education. The aim was to focus on the availability of tools to develop critical thinking concerning disinformation and conspiracy content. The tools were considered as (ideally educational) materials that can be used by teachers to develop critical thinking in the defined context for secondary school students, i.e. in the age group 10–18/19 years. We were particularly interested because of the worrying results of several surveys focusing on young people's perceptions of issues such as hoaxes, disinformation, conspiracy theories, etc. One of the questions that arose in the context of these findings was the extent to which critical thinking about disinformation and conspiracy content is developed in the classroom, which requires appropriate conditions, including the availability of educational materials for teachers. In this regard, the following observations can be made:

- Teachers in both language areas have at their disposal different types of support materials for the needs of secondary level of education, namely methodological guidelines and recommendations of a more general nature, publications containing mainly theoretical knowledge, usually written in a popular science style to be understood by the widest possible audience, handbooks combining theoretical knowledge with practical demonstrations and activities applicable in the educational context, infographics, brochures, web applications, online games, fact-checking portals; the sources mentioned in the previous part of the study do not represent an exhaustive selection of available educational materials, but represent their general availability;
- Relevant ministries (Austria, Germany, Slovakia), relevant EU institutions, international organizations, official institutions under the responsibility and support of other ministries, project teams with grant funding support, civil associations, NGOs, and online media have participated in the development of supporting (educational) materials, which proves the particular relevance and necessity of integrating content such as hoaxes, disinformation, and conspiracy theories into education; and
- The ways of integrating the above-mentioned content into education are different in Slovak and German-speaking countries; the most common option is to integrate the content as cross-curricular topics and thus within the standard subjects (Germany, Slovakia); the most effective way of targeted development of critical thinking towards hoaxes, disinformation and conspiracy theories is to implement media education (some parts of Slovakia) and basic digital education (Austria) as separate subjects, which gives teachers more time to gradually sensitize students to such serious content.

If we take into account the first two statements, i.e. the good availability of (educational) materials for the development of critical thinking concerning disinformation and conspiratorial content, the interest in their preparation, and also their updating with changing trends in the online world, then the question arises as to where the problem lies in their effective use in pedagogical practice – whether it is the lack of methodological support for teachers, time constraints in the teaching process or the still low integration of these topics in the curricula. However, several cross-national surveys are needed to answer this question before recommendations can be discussed.

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Advancing Racial Inclusivity: Capability, Aspirations, Resources, and Engagement in Hong Kong Kindergartens

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Abstract

This study explored the challenges and opportunities faced by Hong Kong kindergartens in admitting ethnic minority students. Funded by the Equal Opportunities Commission, the research examined the impact of government subsidies on kindergarten admissions and the strategies employed to support ethnic minority children. Data were collected from 161 kindergartens through surveys and follow-up interviews, revealing that increased financial support led to greater acceptance of ethnic minority students. However, many kindergartens still faced obstacles such as resource limitations and lack of support from local communities. The report highlighted the strengths of kindergartens in terms of Capability, Aspirations, Resources, and Engagement (CARE framework) and provided actionable recommendations for enhancing inclusivity. By leveraging community resources and fostering a racially inclusive environment, kindergartens could better support ethnic minority students' development. This study contributed to the discourse on educational equity and offered insights for policymakers and educators to promote racial harmony in early childhood education settings.

Keywords: ethnic minority students, kindergarten education, inclusivity, racial harmony

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Introduction

Early childhood education is essential for fostering a child's cognitive, social, and emotional development. For ethnic minority (EM) and non-Chinese-speaking (NCS) children in Hong Kong, kindergartens play a pivotal role not only in education but also in introducing them to the broader cultural and linguistic environment. However, the inclusion of these students has long been a contentious and unresolved issue.

Research indicates that many local Chinese-medium kindergartens in Hong Kong are hesitant to admit EM students, citing challenges such as limited resources, insufficient staff training, and language barriers (Equal Opportunities Commission [EOC], 2018; Hong Kong Unison, 2019; Oxfam Hong Kong, 2018). This reluctance has perpetuated the segregation of EM students into a small number of specific kindergartens, contributing to what has been described as “de facto racial segregation” (Hong Kong Unison, 2015, p. 1).

To address these challenges, the Hong Kong Special Administrative Region Government introduced free half-day Chinese-medium kindergarten education in 2017 through the Kindergarten Education Scheme (KES), which was further enhanced in 2019 with the implementation of a five-tiered subsidy system for kindergartens admitting NCS students. These policies were designed to encourage local kindergartens to enroll more EM/ NCS students by offering financial support based on the number of such students admitted. While these measures have led to some progress, significant gaps persist, particularly in kindergartens with fewer than eight NCS students, which have historically received little to no additional support (Oxfam Hong Kong, 2018).

This research contributes to the existing literature by adopting a strengths-based perspective to explore how kindergartens can overcome barriers and create opportunities for EM students. Using the CARE framework — Capability, Aspirations, Resources, and Engagement — the research highlights the strengths of kindergartens and provides actionable recommendations for fostering racial inclusivity in early childhood education.

The findings presented here are drawn from the research project *Admitting Ethnic Minority Kindergarteners: Overcoming Challenges and Identifying Opportunities* conducted by Wong, Lam, and Tong (2022). This manuscript is a condensed and updated version of the original report, and readers are encouraged to consult the full report for comprehensive details.

Background and Context

Challenges in Admitting EM Students

The inclusion of EM students in Hong Kong kindergartens has been hindered by systemic and structural barriers. Studies by the EOC (2017, 2018) and organizations such as Hong Kong Unison (2019) and Oxfam Hong Kong (2018) have pointed to the following issues:

- **Policy Gaps:** Although the government has introduced measures to support EM/ NCS students, implementation has been inconsistent. For example, kindergartens with fewer than eight NCS students have historically received no additional resources. Even following the introduction of the KES in 2017, only kindergartens enrolling more than eight NCS students were eligible for subsidies, equivalent to the annual salary support for one teacher.

- **Resource Limitations:** Many kindergartens lack the financial resources, trained personnel, and infrastructure necessary to meet the linguistic and cultural needs of EM students.
- **Segregation:** As a result, EM students are often concentrated in a few kindergartens, reinforcing inequities and limiting opportunities for integration and cross-cultural exchange.

These challenges led to the introduction of the revised five-tiered subsidy system in 2019, which aimed to address some of these gaps.

The Five-Tiered Subsidy System

The five-tiered subsidy system under the KES provides financial support to local Chinese-medium kindergartens based on the number of NCS students they admit. Unlike the previous system, which required kindergartens to enroll at least eight NCS students to qualify, the new system offers subsidies to kindergartens with as few as one NCS student. The most updated details of the subsidy are shown in Table 1.

Table 1: Five-Tier Subsidy Support for Kindergartens With NCS Students (2024/25)

Tier	Number of NCS Students	Grant Rate	Provisional Full-Year Grant Rate (2024/25)
1	1 to 4	New cash grant of HK\$54,500 per year	HK\$54,500 ¹
2	5 to 7	New subsidy at a rate of 0.5 teacher	HK\$217,890
3	8 to 15	Subsidy at a rate of 1 teacher	HK\$435,780
4	16 to 30	Increased subsidy at a rate of 1.5 teachers	HK\$653,670
5	31 or above	Increased subsidy at a rate of 2 teachers	HK\$871,560

Note. See Education Bureau [EDB], 2024.

The introduction of this system marked a significant policy shift, aiming to broaden the scope of financial support and encourage more kindergartens to admit EM/ NCS students.

The CARE Framework

The CARE framework — Capability, Aspirations, Resources, and Engagement — was developed to evaluate the strengths and opportunities of kindergartens in supporting EM students. It builds on a strengths-based approach, which focuses on leveraging existing assets to overcome challenges (Stavros & Hinrichs, 2009).

- **Capability** refers to the unique strengths and current abilities of kindergartens, including their teaching practices, curricula, and staff expertise.
- **Aspirations** focus on the values, goals, and commitment of kindergartens to fostering an inclusive environment.
- **Resources** examine the availability of financial, human, and material resources to support EM students.
- **Engagement** considers how kindergartens interact with students, parents, and the broader community to promote inclusivity.

¹ US\$1 = HK\$7.8.

This framework formed the basis for the study's methodology, guiding both the survey design and the analysis of findings.

Research Objectives and Methodology

The study aimed to answer three research questions:

- RQ 1. Did the five-tiered subsidy system lead to greater acceptance of EM students?
- RQ 2. What strengths did kindergartens demonstrate in supporting EM students, as viewed through the CARE framework?
- RQ 3. How did kindergartens of different subsidy tiers differ in their strategies and opportunities?

Data Collection

Data were collected through an online survey distributed to 161 kindergartens participating in the KES. The survey included questions based on the CARE framework, covering topics such as admission policies, staff training, resource allocation, and community engagement. Respondents were primarily principals and headteachers, with over 90% having more than 10 years of experience in early childhood education.

In addition to the survey, follow-up telephone interviews were conducted with representatives from 10 purposefully selected kindergartens (one without EM students, three Tier 1 kindergartens, one Tier 2 kindergarten, two Tier 3 kindergartens, two Tier 4 kindergartens, and one Tier 5 kindergarten). These interviews provided qualitative insights into the challenges and strategies reported in the survey.

Key Findings

RQ1: Did the Five-tiered Subsidy System Lead to Greater Acceptance of EM Students?

The results indicate that the introduction of the five-tiered subsidy system significantly increased the acceptance of EM students in kindergartens.

- Among the 107 kindergartens with EM students, nearly half (49.5%) reported admitting more EM students due to the increased financial subsidies. On average, each kindergarten admitted 5.7 more EM students after the policy change.
- For kindergartens without EM students, the primary reasons for not admitting them were the lack of applications (67.4%) and rejection of offered places by EM families (10.9%). Only three kindergartens explicitly stated they would not admit EM students, citing insufficient resources and staff training.

RQ2: What Strengths Did Kindergartens Demonstrate in Supporting EM Students?

Using the CARE framework, the study identified key strengths and gaps in kindergartens' efforts to support EM students:

- **Capability.** Kindergartens demonstrated strong visions and missions for inclusivity, with over 80% agreeing that their program modes and school-based curricula helped attract and support EM students. They provided clear goals for fostering inclusive learning environments. However, challenges such as staff training and language proficiency were noted, especially in kindergartens with fewer resources.

- **Aspirations.** Nearly all respondents (over 93%) agreed that cultivating a racially inclusive environment benefits the development of EM and ethnic Chinese students, as well as teachers, home-school relationships, and the overall growth of kindergartens. Most kindergartens were willing to invest more time and resources into teaching, administration, and staff training (over 88% agreement). These aspirations reflected a commitment to building inclusive communities, even among kindergartens with less experience working with EM students.
- **Resources.** The government was viewed as the primary resource provider, with subsidies used to hire staff, purchase teaching materials, and organize cultural activities (89% agreement). EM parents were also regarded as valuable supporters (76.5% agreement). However, respondents expressed lower confidence in receiving help from ethnic Chinese parents (62.1%), social service organizations (58.5%), and tertiary institutions (51.1%). Those who found resources insufficient particularly hoped for more support from the government (94.7%) and social service organizations (84.2%).
- **Engagement.** Nearly all kindergartens with EM students (97.8%) integrated EM and ethnic Chinese students in classroom activities while also providing additional support to EM students (98.9%) and parents (94.4%). Respondents widely agreed that their efforts to support EM students and families improved their overall capabilities (90.8%), aspirations (97.7%), and resources (88.4%).

RQ3: How Did Kindergartens of Different Subsidy Tiers Differ in Strategies and Opportunities?

The study revealed notable differences in strategies and opportunities among kindergartens across the five subsidy tiers:

- Kindergartens with larger numbers of EM students (Tiers 4 and 5) had greater experience working with EM students, better-trained staff, and access to EM staff to support students and parents. These kindergartens were also more likely to hire full-time staff and organize inclusive cultural activities, leveraging more generous financial support.
- In contrast, kindergartens with fewer EM students (Tiers 1 and 2) relied more on external services, such as translation (up to 58.8%) and part-time teaching staff (up to 64.7%), due to limited funding and fewer resources.
- Kindergartens with eight or more EM students (Tiers 3 to 5) were more proactive in using subsidies to enhance inclusivity, while those with fewer EM students were less likely to prioritize recruiting EM students.

Despite these differences, kindergartens across all tiers shared common challenges, particularly in human resources and home-school communication. Many of them had to rely on their own efforts to address these difficulties, indicating a need for stronger external support systems.

Recommendations

To address these challenges and enhance inclusivity in Hong Kong kindergartens, the following recommendations are proposed:

- **Provide Targeted Support:** Offer additional resources to kindergartens on a needs basis, particularly for those with less experience working with EM students, to strengthen their capacity for promoting racial harmony.

- **Raise Awareness of Subsidy Schemes:** Improve communication and outreach to ensure all kindergartens, especially those without EM students, are aware of available funding opportunities.
- **Facilitate Supportive Networks:** Encourage collaboration between kindergartens, social service organizations, and other sectors by establishing mentorship programs between experienced and less experienced kindergartens and creating “sister schools” to facilitate exchanges and mutual learning.
- **Promote Local Research:** Prioritize research on evidence-based early childhood practices for EM students and allocate funding to support projects addressing curricula, service models, and staff training.
- **Focus on Kindergartens with Fewer EM Students:** Provide tailored guidance and resources to kindergartens with fewer EM students, as they are often just beginning to support these communities.
- **Enhance Resource Accessibility:** Develop a centralized electronic platform to share best practices, research findings, and information on community services while increasing publicity for available support.

Conclusion

This study underscores the progress Hong Kong kindergartens have made in admitting and supporting EM students, highlighting the ongoing challenges that need to be addressed. The CARE framework provides a practical lens for understanding and improving inclusivity in early childhood education. Addressing resource gaps and fostering collaboration will enable kindergartens to play a vital role in promoting racial harmony and equitable education for all.

Acknowledgments

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Contextual Influences on Student Engagement With AI-Assisted Feedback

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Abstract

Student engagement with feedback has garnered increasing attention in higher education because of its positive association with student learning outcomes. However, there is little research on students' contextual needs in different learning environments and the role students play in interpreting information and integrating various types of feedback (i.e., teacher, peer, and AI) in learning. This study conceptualises feedback as a learning process and investigates how different learning environments affect students' perceptions and motivations to use feedback. It also explores the relationship between AI-assisted feedback and learning outcomes in Engineering and non-engineering disciplines. Data was collected through an online survey and semi-structured interviews with purposive sampling among 100 respondents. The Feedback Ecological model (Yang, 2021) is used to explore the complex relationship between students and AI tools and unpack the contextual influences on student engagement with feedback at different stages in learning. Results showed that AI-assisted feedback is effective in bringing more feedback-driven learning opportunities but is unlikely to enhance their learning outcomes due to the lack of personalised interaction and relevant contextualisation of content.

Keywords: context, engagement, AI feedback

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Introduction

Student engagement often refers to students' active involvement in education practices and their commitment to educational goals and learnings (Christenson et al., 2012). This construct comprises behavioural, cognitive, and emotional (Losier et al., 2001; Reeve & Tseng, 2011). The three dimensions correspond to the process of feeling, thinking, and acting (Wang & Eccles, 2013) and can be operationalised and conceptualised as distinct (Reeve & Tseng, 2011; Sinatra et al., 2015). Each individual has psychological needs for autonomy, relatedness, and competence that form motivation for them to engage in a particular activity (Ryan & Deci, 2020). If their engagement in online learning is low, it could be due to less autonomy-supportive environments, insufficient digital competence, and lack of emotional support (Bedenlier et al., 2020; Chiu, 2021).

Student engagement theory stresses that institutions should optimize curriculum design and teaching strategies to construct a good learning context (Hu & Kuh, 2002; Pascarella, 1985). Previous studies focused on students' perception of learning contextual factors, such as challenging intellectual curriculum (Chi et al., 2017) and effective teaching practices (Ryan & Patrick, 2001). When students engage with feedback, they are intrinsically affected by contextual influences – environmental, social, and situational factors that affect their behaviour, practices, and outcomes in different educational contexts (Ajjawi et al., 2017). Understanding these contextual influences is essential for optimizing teaching and learning processes, ensuring that educational practices are responsive to the diverse needs of learners (Ramsden, 1988, p.159), and designing feedback that is tailored to the student's specific needs and circumstances (Ajjawi et al., 2017; Hall & Kidman, 2004). Feedback-Student interaction model describes context as an important variable that influences how students process feedback (Lipnevich & Smith, 2022). This study considers AI technology as a 'new' factor of contextual influence that utterly influences today's educational processes due to higher-degree students' large adoption of AI tools (Wong, 2024).

The COVID-19 pandemic significantly influenced the role of feedback in higher education learning contexts, which have witnessed an increasing use of e-assessment feedback methods — while in-person assessments were replaced with online assessments — including computer-based and technology-enhanced assessments (Barra et al., 2020; Hooda et al., 2022). This crucial shift has prompted the increase of automated feedback that provides immediate responses, helping them understand their performance and areas for improvement in real time (Hooda et al., 2022). The use of AI in analysing students' feedback and engagement allows vast amounts of data to be transformed into meaningful insights (Dann et al., 2024). Recent studies also suggest that AI can generate feedback that recapitulates learners' performance, eventually better than human teachers (Dai et al., 2023). The multiple responses to these questions evince the complex relationship between students and AI tools, variances that are susceptible to the various contextual influences of educational environments. This debate also draws into how learners perceive the effectiveness and the intersection of creativity and artificial intelligence in their educational experiences (Marrone et al., 2022).

Despite AI feedback's emerging use and impact on educational contexts, less is known about students' perceptions of AI feedback (Nazaretsky et al., 2024) and how school contexts influence their engagement with AI feedback. Toward this end, we conducted an online survey to understand the experiences of multidisciplinary undergraduate students using feedback in their assignments. While many suggest that effective feedback can improve

student achievement (Hattie, 2017), little is known about how students perceive, interpret, and use feedback given by external agents (humans and AI-assisted systems) to enhance their learning. Therefore, this study intends to shift the focus from feedback providers to receivers (Hattie & Clarke, 2018; Yang, 2021). We used Yang's (2021) feedback ecological model to understand student engagement and study the adoption of feedback in various contexts through an ecological perspective. One research question that guided this study was:

What contextual influences impact undergraduate students' perceptions of feedback during university?

Literature Review

Recognising the influence of context on learning is crucial to implementing effective improvements and successfully replicating them in education settings. Individuals are not passive recipients of contextual influence but active agents who shape the contexts in which they live (Ottoson & Patterson, 2000). Contextual influences include resources, encouragement, support, opportunity, and authority. Contexts change and develop over time; hence, finding ways to model the reciprocal and dynamic relations between individuals and their environments has been an especially difficult challenge.

Vermunt (2005) argues that different learning styles are influenced by contextual factors such as academic discipline and prior education, and traditional exams may not effectively assess critical and analytical thinking skills, and thus innovative teaching and assessment methods should be explored. Strachan et al. (2009) argue that a well-structured and supportive context in youth sports can lead to positive developmental outcomes and enhance the overall experience for young athletes. Contextual factors such as a supportive environment, empowerment, or feeling of being valued have significantly shaped the experience of young athletes. They integrate Bronfenbrenner's ecological theory and suggest that the interplay between personal attributes and environmental factors over time is crucial for the development of young athletes. Likewise, undergraduate students could feel more valued when they receive supportive learning environments.

Feedback is integral to educational processes as it enhances learning by comparing learner's performance to educational goals (Nazaretsky et al., 2024). The study of feedback in the context of higher education emphasizes the importance of delivering feedback in a supportive manner, focusing on specific actions for improvement, and fostering a collaborative relationship between teachers and learners (Evans, 2013; Schartel, 2012). However, feedback experiences are not limited to the old paradigm — teacher-to-learner feedback — but are also drawn from multiple sources such as self-assessment feedback, peer assessment feedback, and e-assessment feedback, whereas the latter encompasses all kinds of feedback conducted and delivered through information communication technologies (Boud & Molloy, 2012; Carless, 2015; Evans, 2013).

According to Schartel (2012), the key characteristics of effective feedback are that it focuses on the student's performance rather than on the individual personally; the feedback must be specific and detailed providing clear information about the strengths and what needs improvement. On the other hand, feedback effectiveness also relies on the student's feedback literacy, which consists of the understanding, capacities, and dispositions needed to make sense of information and use it to enhance learning strategies (Little et al., 2024). Students have an active role in the feedback process, highlighting that feedback literacy involves the ability to comprehend feedback and the skills to apply it effectively to improve learning

outcomes. This alternative approach involves leveraging students' potential to get multiple sources of feedback, fostering and developing their critical skills (Singh et al., 2024).

Contemporary higher education contexts foster the use of multiple sources of feedback. Along with these new forms of qualitative response, AI-enhanced feedback has been presented as an accessible alternative for learners as the machine served as an additional resource to understand better and identify areas for improvement (Lee, 2023). In the old paradigm, feedback is conceptualised as information delivered to students mainly by teachers (Hattie & Timperley, 2007; Price, Handley, and Millar, 2011), but now students themselves can make meanings of information they get from multiple sources, including AI (Boud & Molloy, 2012; Carless, 2015). Nevertheless, as a broad phenomenon, more studies are still necessary to compare the educational advantages and disadvantages of computer-generated and human-written feedback in learners' outcomes (Leite & Blanco, 2020).

Methodology

The survey was designed to gather responses from students across three different faculties at a state-owned Australian university in Sarawak, Malaysia. It consisted of three sections: Sections A, B, and C. Section A *Demographic* focused on collecting personal details of the participants, such as their study area, gender, and ethnicity. These questions provided background information to categorize participants based on their diverse profiles during the analysis phase.

Section B *Multiple-choice* questions were divided into two parts: Part 1 explored the participants' understanding and awareness of AI-assisted feedback, aiming to gauge their knowledge and prior exposure to this technology. Part 2 addressed the practical application of AI-assisted feedback in daily tasks. Questions in this section sought opinions on how AI-assisted feedback impacts writing processes, enhances creativity, the frequency of use, and reflections on their experiences with technology.

Section C *Reflective* questions concluded the survey by asking participants to reflect on their understanding of AI-feedback technology, particularly in the context of unit assessments.

The survey involved a total of 102 participants drawn from different faculties: Engineering and Science, Business, Humanities and Health Sciences. A random group based on different disciplines was selected for the survey. Prior to participation, students were briefed on the research background by the researchers and given approximately 10-15 minutes to complete the questionnaires.

Results and Discussion

Based on the data collected, the participants in the study are from enrollment years ranging from 2021 to 2024, corresponding to academic Years 1 through 4. The distribution of students across disciplines includes 54.9% from engineering and science, 29.4% from arts, communication, health, and applied sciences, and 15.7% from commerce and business. Regarding gender distribution, the participants comprised 42 males (41.18%) and 60 females (58.82%).

The survey results indicate that 52% of participants perceive feedback as a teacher-centered process, while 38.5% view it as student-centered. A smaller proportion, 9.4%, believe

feedback should be technology aided. These findings suggest that most students still prefer teacher-guided feedback, demonstrating a limited awareness of AI-assisted tools like Grammarly and ChatGPT as feedback mechanisms. This observation is further supported by the fact that 71.6% of students prefer feedback delivered by teachers, while only 5.26% favor feedback evaluated by AI tools. This trend implies that students continue to rely heavily on teacher-provided feedback, appreciating its intuitive, humanized, and easily comprehensible nature.

Another notable finding is that 46.9% of students believe feedback should be evaluative, focusing on their tasks or assignments, while 34% prefer it to be guided, and 17% favor corrective feedback. According to Kutasi (2023), the primary purpose of feedback is to assist students in achieving their learning objectives by highlighting strengths and suggesting areas for improvement. This aligns with the survey results, where 51% of students find written feedback from teachers to be the most effective and helpful (see Table 1). Additionally, 33.3% of students agree that using exemplars helps improve their learning.

The findings also indicate that students are less inclined to favor audio feedback, as evidenced by the low percentages of agreement for peer feedback and teacher feedback in audio form, at 9.4% and 6.25%, respectively.

Table 1: Perception of Students on the Effectiveness of the Different Types of Feedback

No.	Answer	Percentage (%)
1	The use of exemplars	33.33%
2	Peer feedback	9.38%
3	Teacher's feedback in written form	51.04%
4	Teacher's feedback in audio form	6.25%

The method of delivering feedback significantly influences students' learning experiences, as feedback is often closely tied to assessments. Feedback and assessment can be enhanced by adopting a constructive approach, leveraging educational technologies, and employing diverse assessment methods (Tutunaru, 2023). According to the survey, 78.1% of students preferred feedback from assessments to focus on helping them improve and perform better in the future. Another 16.7% expressed a desire for feedback to highlight past mistakes so they can avoid repeating them, while a small group (5.2%) hoped that feedback would also acknowledge their strengths and not solely focus on negatives.

A study by Faulconer et al. (2021) emphasized the importance of high-quality feedback for student success. Their findings revealed that students who received both performance-gap feedback and positive reinforcement achieved, on average, a full letter grade higher than those who were only given performance-gap feedback. In another part of the study, students were asked to share their views on AI-assisted feedback in learning. Table 2 summarizes opinions about AI-assisted feedback and its perceived impact on writing skills. A total of 69% of students agreed that AI feedback improves their writing skills, and approximately 63% believed it enhances creativity. Research by Elfar and Dawood (2023) further supports the role of AI in fostering creativity, noting that it can generate innovative designs and assist artists during the creative process.

Table 2: Students' Opinions on AI-Assisted Feedback in Improving Learning and Teaching

Comments	Does AI-generated feedback improve your writing skills?	Does AI-generated feedback enhance creativity?
Strongly disagree	3.16%	5.26%
Somewhat disagree	6.32%	9.47%
Neutral	21.05%	22.11%
Somewhat agree	50.53%	51.58%
Strongly agree	18.95%	11.58%

The survey also highlighted that 75.6% of students found AI-assisted feedback particularly valuable during the ideation stage, as it provides organized information to help them understand new topics and develop methodologies for deeper exploration. Table 3 shows that some students preferred AI feedback for specific purposes, including academic writing (15.8%), proofreading (11.6%), and creating images (1%). This demonstrates that when used effectively, AI technology can support various aspects of learning and creativity.

Table 3: AI-Assisted Feedback Supports Student Learning in Various Types of Assessments

No.	Answer	Percentage (%)
1	Academic writing	15.79%
2	Generate ideas	71.58%
3	Proofreading	11.58%
4	Create images	1.05%

Concerns have been raised regarding the use of AI-assisted feedback. As shown in Table 4, less than half of the students (48.4%) expressed confidence in utilizing AI technology for feedback purposes. Conversely, 51.6% of students reported a lack of confidence in AI-generated feedback due to several factors. About 21% of students cited restrictive university policies as a deterrent, as these strict guidelines discourage using AI tools in assessments due to potential risks of academic misconduct. Additionally, approximately 30.5% of students found the technology overwhelming, complex, and difficult to use.

Table 4: Student's Confidence Level in Using the AI-Assisted Feedback Technology

No.	Answer	Percentage (%)
1	I am confident in using it	48.42%
2	AI is good, but I don't know how to use it	14.74%
3	I find it overwhelming	15.79%
4	My university prohibits AI-assisted feedback content	21.05%

Another significant concern highlighted by 52.64% of students is the accuracy of information provided by AI-generated feedback. Some students reported instances where the information was inaccurate or unsupported by reliable sources (Venter et al., 2024). This inaccuracy has led to confusion between factual data and misinformation, further diminishing confidence in AI feedback systems.

To address these challenges, an action plan is needed to position AI-assisted feedback as a complementary tool rather than a replacement for human judgment and interaction. Overall, the findings reveal that 86.3% of students prefer feedback generated by humans, such as teachers and peers, over AI-generated feedback. This aligns with a study conducted by Nazaretsky et al. (2024), which found that human feedback providers were consistently rated more credible than AI systems.

Conclusion

Our study gathered feedback from students in actual learning contexts during their undergraduate program, providing us with a detailed understanding of their responses to teacher and AI-assisted feedback. Results showed that lecturers' reluctance to accept AI due to adherence to traditional pedagogies and university policies has a negative influence on students and deters them from using AI-assisted feedback. Other factors include a lack of clear AI integration guidelines, unfair penalties enforced by the university on students whose work was detected by AI, concerns over AI's accuracy, and potential misuse and false indicators by AI detection tools. A significant finding from the study was the relationship between the identity of feedback provider and the learning context of the student. Teachers are always perceived as more credible due to the authoritative role they play in the learning context. This understanding is crucial for the effective integration of generative AI in education and the implementation of AI learning interventions.

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HUCE Engineering Students in Learning a New Language: Challenges and Suggestions

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Abstract

This case study explores the challenges and offers suggestions for Hanoi University of Civil Engineering (HUCE) students who are learning English as a foreign language. While English proficiency is increasingly critical in Vietnam, where international communication is considered essential, especially for engineering students, the current curriculum utilizing “New Headway” at the elementary level - 5th edition, combining partially traditional teaching methods, often fail to engage the students or meet the Ministry of Education’s proficiency requirements. This study, based on 215 student responses, investigates their language skills acquisition, preparation for industry challenges, confidence in classroom discussions, and satisfaction with the training. Findings indicate that most students struggle with vocabulary, grammar, and pronunciation, and lack motivation and effective orientation. Additionally, the study also highlights the need for innovative teaching methods which might later hamper the progress of enhancing their own language proficiency and ultimately improving their employability and success in the engineering profession. At the end, recommendations and suggestions for further studies are mentioned with the aim of fostering a motivating learning environment.

Keywords: language proficiency, language factors, human factors

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Introduction

English has been widely recognized as the global language of communication and the dominant language in the fields of technology, engineering, innovation, and academic and scientific research. Its status means to surpass geographical boundaries and enables individuals to connect, collaborate and then thrive in today's increasingly interconnected world, which leads the language to be integrated into educational curricula in Vietnam at various levels, from primary to higher education.

Once Bodewig et al. (2014) mentioned in their Vietnam Development Report – Main Report that Vietnam has been not only undergoing significant changes and development in its infrastructure but also making substantial local and foreign investments in various infrastructure projects to enhance its transportation networks, urban development, energy facilities, and more. Therefore, high proficiency in English has never been so urgent when it comes to the desire of accessing to a broader range of employment opportunities, especially in multi-national companies or fields which requires international interaction.

According to the report on economic investment of foreign enterprises from the General Statistics Office, Ministry of Planning and Investment of Vietnam (2021, 2022, 2023), international construction enterprises into Vietnam have not only increased in numbers but also enhanced their quality using advanced technologies. These cover a board spectrum, ranging from subterrestrial structures to high-rise buildings by applying diverse materials, modern machinery and equipment, which leads to the industry's growth rate at an impressive 8.7% annually. It was additionally reported that over the past 3 years the number of foreign countries and territories investing in Vietnam increased from 106 countries in 2021, 108 countries in 2022 and 111 countries in 2023. Accordingly, the total investment capital increased from 19.74 billion USD in 2021 to 22.4 billion USD in 2022, and 23.2 billion USD in 2023. Therefore, knowing and using English fluently will help students admit to diverse knowledge and information from global sources and achieve success in their future career.

At Hanoi University of Civil Engineering, the students have distinctive profiles, with almost 70% of students hailing from rural areas where English is not prioritized (statistical data from the student affairs office, university board's monthly oral meeting report, 8/2023). Moreover, English is not one of the subjects used for admission to the university, so students' proficiency in English remains entirely restricted. As a response to this, the curriculum employed in the university is New Headway at the elementary level – 5th edition. During their four years of studying at the university, they need to accomplish two semesters of general English (100 hours) to achieve A2 and another two semesters of TOEIC – Listening and Reading (100 hours) and have to achieve 450 in internal TOEIC – Listening and Reading Test as shown in the university regulation in 2022 before being allowed to carry out the graduation thesis. This is considered “*the key reform*” initiated by the government in general and the university itself, and such subsequent accomplishments, as well as the current challenges, might be realized during the journey to “*a new knowledge-based economy*” (Kataoka et al., 2020).

As a matter of fact, during the teaching and learning process, the majority of the English teachers (all M.A. in English Teaching Methodology or English Linguistics) at the university continue to adhere to conventional teaching approaches. Frequently, they face time constraints and difficulties in organizing the activities due to a big number of students (40-50 students) in one class, aiming to cover the recommended syllabus within three months.

Assessments predominantly occur through written exams (reading, writing and listening skills) at each semester's conclusion. However, this assessment method diminishes the enthusiasm for language learning and renders the sessions monotonous and unproductive. Consequently, numerous engineering students fail to make substantial progress in acquiring the new skills which are necessary for employability in their future careers. The following questions are generated to help find out what challenges the students are facing and some suggestions might be recommended.

- i) Have the students acquired language skills through the English course?
- ii) Are the students being prepared by English professors to tackle industry challenges?
- iii) To what extent do engineering students feel confident in handling job interviews and participating in classroom discussions?
- iv) Do the students express satisfaction in being adequately trained for their future employability?

Literature Review

As English becomes a global lingua franca, the demand for proficiency in non-English speaking countries like Vietnam has surged, especially among students in technical fields such as engineering. Despite this, many HUCE students struggle with language acquisition. This literature review identifies a range of factors contributing to these difficulties, including several aspects such as poor grammar, vocabulary and pronunciation, lack of motivation, and ineffective teaching methods which all later helps to explore how these challenges hinder the development of English skills among them.

In the field of second language acquisition, various scholars have examined the challenges and factors that influence English language learning, particularly in non-native contexts like Vietnam. Chomsky (1965) asserted in his book of *Aspects of the Theory of Syntax* that language learning is not only governed by "*innate linguistic capabilities*" but also is shaped by "*external social factors*". This interplay created a clear view on the back-and-forth relationship between complex linguistic structures that the children acquire effortlessly and rapidly during their early developmental years and their exposure to the language and "*cultural and environmental contexts*" during their growing-up journey.

From different angles, Brown (2000) explored how "*intrinsic motivation*", as well as "*cognitive*" and "*affective strategies*", impact language learning success while Ryan and Deci (2000) thoroughly emphasized the importance of "*self-determination*" and motivation in the learning process, highlighting the need for students to be engaged "*both intrinsically and extrinsically*". Supportively, Elgamal (2019) explored the role of "*cognitive elements*", such as memory and attention, in the acquisition of language skills for both native and non-native speakers.

From a pedagogical perspective, vocabulary and grammar acquisition are widely recognized as essential. Vocabulary enables clear communication of ideas, while grammar provides the structure for coherent sentences. Laufer (2003) demonstrated effective vocabulary acquisition through reading, and later Simon and Taverniers (2011) and Khasinah (2014) identified grammar as a key factor in second language acquisition. Additionally, pronunciation remains "*a critical barrier*" due to English's complex phonetics as Gilakjani and Ahmadi (2011) and Deterding (2010) noted about the challenges Southeast Asian students face in mastering pronunciation norms, meanwhile Shah et al. (2017) and Vu (2016) argued that teachers' beliefs regarding pronunciation significantly affect learners' progress.

Finally, the broader context of education and employability was discussed by Bodewig et al. (2014) and Kataoka et al. (2020) who accentuated the need for language skills in preparing students for the workforce. This aligns with the practical need to equip students with language proficiency to enhance their employability, as well as their ability to engage in international professional environments.

Methodology

Participants, Location, and Instruments

This research was conducted at Hanoi University of Civil Engineering, Vietnam, involving participants from various engineering faculties and classes. The survey was voluntary; amongst 250 questionnaires handed out, 215 completed responses were selected for analysis. The survey aimed to explore students' learning experiences, the methodologies used in English language learning, and their confidence levels in developing language skills for future interviews.

Participants, hailing from different regions of the country, primarily from the north with diverse cultural backgrounds, spent approximately 15 minutes on the survey questionnaire. Additionally, they were encouraged to share their thoughts about the English course in their own words, hopefully providing valuable insights for the study.

Table 1: Participants' Demographic Information
(Total number of participants: 215, nationality: Vietnamese)

<i>Gender</i>	<i>Age</i>	<i>Faculty</i>	<i>Number of Participants</i>	<i>Percentage</i>
Male (87%)	18-22	Faculty of Construction	48	22.4 %
		Faculty of Bridge and Road Engineering	41	19 %
Female (13%)		Faculty of Architecture and Planning	52	24 %
		Faculty of Environmental Science and Engineering	26	12 %
		Faculty of Economics and Construction Management	28	13 %
		Faculty of Information Technology	10	5 %
		Faculty of Mechanical Engineering	5	2.3 %
		Faculty of Marine and Petroleum Engineering	5	2.3 %

Data Analysis

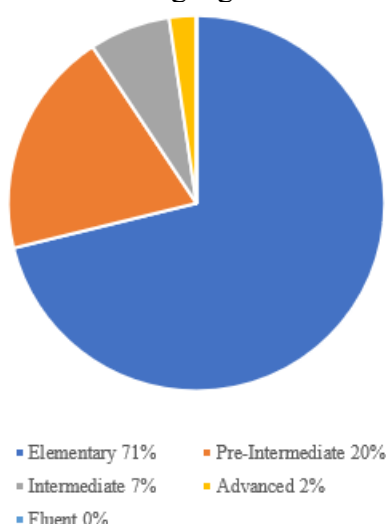
The collected data were analyzed through both quantitative and qualitative methods. The quantitative analysis involves statistical measures and analysis, while the qualitative analysis involved a detailed examination and interpretation of the narrative responses provided in the questionnaires and interviews, which both later help present the findings.

Results and Discussion

Students' English Proficiency

This result provided insights into the current distribution of English proficiency among the student population, allowing informed decisions on language education strategies and interventions.

Figure 1: Students' Language Proficiency (4 skills)



It can be shown from the chart that the majority of students are at the elementary and pre-intermediate levels, which accounts for 91 percent of the total. That highlights a considerable portion of the population in need of foundational and targeted language support. The characteristics of these levels include limited vocabulary, basic grammar knowledge, and elementary communication skills. They may struggle with understanding and forming sentences, and their language usage is often characterized by simplicity.

Having progressed beyond the beginner and pre-intermediate stages, there is a smaller percentage of students, 7% at the intermediate level, 2% at the advanced level, and 0% classified as fluent, which may benefit from more advanced language courses focusing on complex language structures and vocabulary and demonstrate a moderate proficiency in English.

Students' Awareness of Learning the English Language

It can be withdrawn from the questionnaire that while all students acknowledge English's academic importance, 47.3% believe it is unnecessary for their future careers, indicating a disconnect between immediate academic needs and long-term professional relevance. The students appear to view English merely as a tool for passing courses or conducting research, rather than as a critical skill for international collaboration, technical documentation, and effective communication within diverse teams. This perception likely results from limited exposure to real-world applications of English during their education. Thus, the results suggest that the educators should emphasize English's broader career benefits to bridge the gap between academic and professional applications.

Challenges

The study reveals that HUCE engineering students encounter significant language learning challenges due to the specialized demands of their academic field and the inherent complexities of mastering English. It recommends implementing specialized language programs tailored for engineering students, practical real-life language applications, and a supportive curriculum environment to overcome these obstacles. Data from questionnaires and interviews highlighted factors affecting learning experiences, including language-specific and human elements. Overall, the study underscores the need for targeted strategies to enhance language proficiency among engineering students at HUCE and other institutions as well.

Language Factors

Brown (2000) once discussed how the interrelated aspects of language, including grammar, vocabulary, pronunciation, and its significance, need to be addressed in the language learning process. Following this theory, the researcher investigated and confirmed those factors serve as the foundational pillars of language acquisition during the HUCE engineering students' language learning journey even when each presents its own set of challenges.

Table 2: Language Factors Affecting the Students' Language Learning Journey

	Very easy	Easy	Not Easy - Not Complex	Complex	Very complex
Vocabulary & topics	2 0.9%	9 4.2%	28 13%	136 63.3%	40 18.6%
Grammar & structure	15 7%	19 8.8%	22 10.2%	136 63.3%	23 10.7%
Pronunciation	43 20%	32 15%	31 14%	86 40%	23 11%

Examination of the figure reveals that many struggling students are aware of key linguistic factors influencing their learning process. Given their elementary proficiency, the coursebook "New Headway - 5th Edition" is widely regarded as a highly suitable and advantageous strategy for significantly enhancing overall language acquisition.

Throughout this 100-hour learning journey, the textbook introduces everyday vocabulary—covering family, home, daily life, time, and travel—integrated into listening and speaking exercises for practical application. Yet, 81.9% of students find these topics overly complex, highlighting significant retention challenges. Many struggle due to ineffective learning methods: some write words down, others use sticky notes, but these approaches prove insufficient. The numbers above underscore the need for tailored vocabulary strategies that accommodate individual learning styles and improve long-term retention. Overall, a critical gap in current methods calls for innovative, adaptable approaches that effectively engage diverse student preferences.

Next, grammar and structure posed significant challenges, with 159 students (74%) finding them complex. Although the coursebook covers basic grammar (e.g., Present Simple, Present Continuous, and past tenses), many encounter difficulties in applying these rules into real-life communication. Despite years of study, students frequently forget key concepts, hindering

their ability to understand interlocutors and convey ideas effectively. The gap between theoretical learning and practical application underscores the need for targeted instruction and ongoing practice to enhance conversational fluency. Overall, the study highlights the importance of improved pedagogical strategies in communication.

Last but not least, pronunciation seems to be the least challenging aspect compared to vocabulary and grammar, with 75 students (35%) finding it very easy or easy. However, a significant number of students (109 students, which is 51%) still find it complex or very complex.

This insight obviously means that while they recognize the importance of improving pronunciation alongside mastering grammar and vocabulary, 109 of them (51%) clearly report failing to bridge the gap between expressing and understanding the language. Their poor pronunciation creates significant barriers to effective communication by impeding both comprehension and expression, and it fosters a deep reluctance to engage in conversation. This highlights the critical need for focused pronunciation training.

Meanwhile, 35% of students confidently feel that pronunciation is easy or very easy and that they can be understood by others. However, many of these students are unsure about the correctness of their pronunciation, which can undermine the effectiveness of their vocabulary and lead to misunderstandings, potentially resulting in awkward situations. This issue is evident not only among students in Southeast Asia (Deterding, 2010; Gilakjani & Ahmadi, 2011; Shah et al., 2017) but also among students in Vietnam (Vu, 2016). The reason for this is although these students display confidence in pronouncing individual words, this confidence often fails to translate to accurate pronunciation in full sentences, where connected speech, intonation, and stress patterns come into play.

After all, pronunciation still appears as a less complex aspect for the majority of students, in a comparison to vocabulary or grammar and structure which pose more significant difficulties. The data also suggests a need for targeted interventions to simplify and enhance learning in these areas, potentially through more interactive and engaging teaching methods that address these specific difficulties.

Human Factors

Being intertwined with the language factors mentioned previously, the study additionally shows that human factors objectively and subjectively shape, challenge and drive the students' willingness to engage with the language during the learning journey. These factors encompass aspects related to learners, educators, and the learning environment and "give a more dominant contribution in their second language acquisition" (Khasinah, 2014).

In this study involving students' perspectives, the collected data provides an insight into the predominant challenges faced by the students, as represented by the following statistics.

Table 3: Objective Factors That Influence Second Language Acquisition Among the Students

Objective factors	Never	Seldom	Sometimes	Frequent	Always
Orientation	64 (30%)	112 (52%)	18 (8%)	15 (7%)	6 (3%)
Teacher-Motivation	56 (26%)	32 (15%)	86 (40%)	26 (12%)	15 (7%)
New teaching method (tasks, games, role plays, flashcards, presentations, ...)	22 (10.2%)	54 (25.1%)	98 (45.6%)	35 (16.3%)	6 (2.8%)

Objective Factors

The data presents an insightful overview of various objective factors that influence second language acquisition among the students. The frequencies are categorized into five groups: Never, Seldom, Sometimes, Frequent, and Always, for each factor.

First, a large majority of students (176, or 82%) fall into the “Never” and “Seldom” categories for proper language learning orientation, while only 18% receive consistent guidance. This highlights a critical need for improved orientation during their language learning journey. In this scenario, many students are unclear about their current proficiency and do not understand which language skills they have mastered or which require further development in grammar and vocabulary. Without this essential self-awareness, they struggle to identify starting points for their learning and are unable to build on their existing knowledge effectively. This shortage of adequate orientation later leads to unexpected confusion and considerable challenges when it comes to setting effective goals and employing strategic approaches throughout their language acquisition journey.

In the meantime, although the remaining 18% of students appear to have a clearer understanding of their language proficiencies and recognize the importance of orientation in their language learning journey, they still encounter significant obstacles. These students may affirm that orientation is crucial, yet they often fail in setting a clear roadmap of what is expected. They might understand their current abilities but lack the foresight to map out a structured plan for future learning. This absence of a detailed, step-by-step plan can significantly impact their ability to acquire and retain the new language.

Second, motivation is recognized as a crucial factor in second language acquisition. Richards et al. (1985, p. 185) and Ellis (1989) clearly stated that motivation drives an individual’s desire to engage in an activity, categorizing it into “*integrative*” and “*instrumental*” types. This is particularly relevant in language learning, where a student’s success depends significantly on their level of motivation.

Through the results conveyed from the questionnaires, teacher-motivation is recognized inconsistent. While 86 students (40%) report experiencing it “Sometimes”, 88 students (41%) fall into the “Never” and “Seldom” categories. Only a small fraction of students (41, or 19%) experience frequent and consistent teacher motivation. This disparity highlights the critical role of “*instrumental motivation*”—defined by Ellis (1989) as the “*learner’s overall goal or orientation*” - which involves practical reasons for learning a language, such as enhancing career prospects, gaining access to educational resources, or improving academic performance.

Students with strong instrumental motivation understand how language skills will directly impact their future opportunities, making them more likely to maintain a positive attitude, adopt a growth mindset, and engage actively in language learning. These findings clearly indicate that enhanced teacher support and structured motivational strategies are essential for sustaining student engagement and success.

Thirdly, the data regarding the use of new teaching methods reveals a mixed landscape of student experiences in the classroom. Approximately 45.6% of students (98) report that they sometimes engage in innovative tasks such as games, role plays, flashcards, and presentations, while 19% (41) experience these methods frequently or always. This engagement appears to boost motivation and to enhance skill development, fostering positive attitudes toward language learning. However, 35.3% of students rarely or never encounter these innovative strategies, indicating a significant gap in learning experiences. The inconsistent application of modern teaching techniques among lecturers may hinder overall progress and deprive many students of the benefits of varied instructional approaches. Consistent and engaging methods could bridge the gap between theoretical learning and practical application by fostering greater participation and improved language proficiency. Addressing this inconsistency is essential to ensure that all students have access to effective, interactive teaching strategies that support academic growth and prepare them for real-world language challenges.

Finally, utilizing engaging and diverse teaching methods can significantly enhance language learning by making it interactive and enjoyable. These techniques cater to various learning styles, sustaining student interest and motivation. Role plays and games offer practical, low-stress opportunities for language practice, while flashcards and presentations support vocabulary memorization and use. Regular access to such methods creates a balanced and effective learning experience. This approach not only boosts engagement but also reinforces practical communication skills, equipping students to achieve immediate academic success and proficiency.

Subjective Factors

Hence, understanding that these above objective human factors such as orientation, teacher-motivation, and teaching methods are crucial, the researcher firmly realized how the subjective factors like cognitive abilities, self-motivation are equally important and significantly impact the effectiveness of language learning.

Firstly, the researcher identified cognition as “the mental capacities involved in the processes of acquiring knowledge and understanding through thought, experience, and the senses” on Cambridgecognition.com. These abilities also include “*memory, attention, problem-solving, and language skills*”, cited by Chomsky (1965) and Mayer (1992). After collecting and analysing the data, the percentage below helps shed light on how HUCE students rate their own cognitive abilities, specifically in remembering words, structures, and grammar.

Table 4: Cognitive Abilities Affecting the Students' Language Learning Journey

Cognitive Abilities	Very bad	Bad	Medium	Good	Very good
Ability in remembering words, structures and grammar	38 (17.7%)	124 (57.7%)	25 (11.6%)	28 (13%)	0 (0%)

According to the responses, the data on students' self-assessment of their cognitive skills reveal a clear picture of low confidence. A significant portion, 38 students (17.7%), believe their skills are very poor, while an even larger group, 124 students (57.7%), rate their abilities as bad. Together, these two categories comprise over 75% of the respondents, indicating that the majority hold a negative view of their cognitive skills. This widespread lack of confidence may point to deeper issues, including ineffective learning strategies, inadequate support, or an environment that fails to reinforce positive self-perception.

In contrast, only 11.6% of students rate their skills as medium and 13% describe them as good, showing that only a minority feel they have an adequate grasp of their cognitive abilities. Notably, no student rate their skills as very good, underscoring a complete absence of self-confidence. This pattern may reflect an overall climate of underachievement, uncertainty, or insufficient opportunities to experience success and receive positive feedback, all critical for building confidence in academic abilities.

Secondly, self-motivation is a key factor in students' language learning journey, which was analyzed as "*integrative motivation*" as Richards et al. (1985) and Ellis (1989). This involves engaging in an activity for its inherent satisfaction and it helps to drive students to immerse themselves in the learning process out of genuine interest and enjoyment. That engagement is strictly conveyed from the questionnaire and the equations are carefully analyzed.

Table 5: Self-Motivation Affecting the Students' Language Learning Journey

Self Motivation	Never	Seldom	Sometimes	Frequent	Always
Actively spend time studying the language from the coursebook at home	37 (17.2%)	67 (31.2%)	70 (32.6%)	25 (11.6%)	16 (7.4%)
Actively join in the class activities	22 (10.2%)	55 (25.6%)	73 (34%)	33 (15.3%)	32 (14.9%)
Actively join in the language activities outside the class	164 (76.3%)	24 (11.2%)	25 (11.6%)	2 (0.9%)	0 (0%)

The above distribution reveals the self-motivation levels of HUCE students in different language learning activities. Looking at the numbers, there is a significant portion which shows low engagement with coursebook material outside the classroom: 37 students (17.2%) never study at home and 67 (31.2%) seldom do, indicating nearly half engage minimally in independent study. In contrast, 70 students (32.6%) sometimes study at home, while only 25 (11.6%) frequently and 16 (7.4%) always do. These numbers suggest that although the majority recognize the importance of home study, they do not prioritize it, which may adversely affect their overall language acquisition, academic success, and sustained long-term academic growth.

Additionally, in terms of actively joining in-class activities, the participation data implies varying levels of engagement in in-class activities. This reveals varying levels of in-class engagement among HUCE students. Notably, 22 students (10.2%) never participate, and 55 students (25.6%) seldom do, meaning over one-third show minimal involvement during lessons. This lack of active participation can hinder language progress, as in-class activities are essential for practicing and reinforcing new concepts. On the positive side, 73 students (34%) sometimes participate, while 65 students (30.2%) frequently or always engage,

benefiting from more interactive, immersive learning experiences. However, the high percentage of non-participants and infrequent participants suggests that many students are not utilizing class time to enhance their language proficiency.

In terms of extracurricular English activities, the data shows a significant lack of student participation. A large majority (164 students, 76.3%) never engage, while 24 (11.2%) seldom do. Nearly 90% are missing opportunities to practice English outside formal instruction, potentially harming their language development. Only 25 students (11.6%) sometimes participate, and just 2 (0.9%) frequently engage, with no student reporting constant involvement. This overall lack of participation results in missed chances for real-world application and critical practice needed to achieve fluency. This clearly underscores the need for improved engagement.

To finally address these above matters, HUCE could implement interactive teaching methods, support self-study, and encourage extracurricular language activities. Creating a more motivating learning environment would boost class participation and independent study, ultimately improving students' language proficiency and readiness for the global engineering field.

Students' Study Results

After this 100-hour learning course, these students were contacted once again which allowed the researcher gather and generate their scores.

Table 6: The Students' Study Result

Scores	F	D	C	B	A
Number of students	36 (16.7%)	42 (19.5%)	64 (29.8%)	58 (27%)	15 (7%)

It can be easily seen that an analysis of student grades reveals significant challenges in academic performance. Thirty-six students (16.7%) received an F, indicating they are struggling with the course material and will need to retake the course. This highlights the urgent need for improved support and more effective teaching methods.

Among the remaining cohort, 19.5% earned a D, suggesting that while they are close to passing, they lack a solid grasp of essential concepts. Nearly 30% of students scored a C, reflecting only a basic understanding of the subject, which prevents them from reaching their full potential.

In contrast, 27% achieved a B, indicating a good comprehension of the material, whereas only 7% received an A, showing that very few excel at the highest level. This disparity in performance calls for teachers to rethink and enhance their instructional strategies to better meet diverse learning needs.

By incorporating varied teaching methods, such as active learning, group projects, and personalized support, educators can create a more inclusive and engaging environment that promotes deeper understanding and academic success. This performance distribution emphasizes the need for strategic reforms.

Findings

After analyzing the data on the factors which influence the HUCE students' language learning journey, it can be easily seen that only a few have acquired basic language skills, largely due to limited learning duration and insufficient in-class practice. Many students struggle with vocabulary, grammar, and pronunciation; notably, 36 students (16.7%) must retake the course, underscoring their difficulties in mastering the material.

Traditional teaching methods and a lack of emphasis on communication further hinder students' preparation for industry-specific challenges. The curriculum appears misaligned with the practical language demands of the engineering profession, leaving students underprepared for professional communication, technical vocabulary, and real-world application.

Additionally, low self-confidence significantly impacts their progress. Many students are reluctant to engage in interactive language practice—inside or outside the classroom—due to a fear of making mistakes. This hesitancy leads them to avoid in-class activities, group discussions, and role-plays, which are critical for developing fluency. Prioritizing grammatical accuracy over communicative practice only increases self-consciousness, depriving them of essential real-world experience.

Collectively, these issues indicate that students are dissatisfied with their training and feel unprepared for future employability. Their limited language practice, and low confidence contribute to insufficient practical English proficiency needed for job interviews and workplace interactions. Consequently, students are likely to be under-equipped for the language demands of their engineering careers.

As a result, it is reasonable to conclude that students are dissatisfied with their training, as it does not fully equip them with the language abilities which are necessary for enhancing their employability and success in their engineering profession.

Conclusion

Recommendations

After thoroughly analysing all those variables, the researcher confidently suggests several ways to improve the English proficiency of students at Hanoi University of Civil Engineering (HUCE), focusing on curriculum enhancements, teaching methods, and student support.

First, the curriculum needs revision. The current elementary-level materials should be upgraded to more advanced content, including real-life, industry-specific scenarios. This will better prepare students for job interviews and workplace communication in the engineering field.

Second, modern teaching methods such as task-based learning, group discussions, and problem-solving activities should be applied to increase practice opportunities and to make classes more interactive, helping students practice speaking and build confidence, both in-class and extracurricular activities.

Teacher training is another key recommendation. Instructors should deeply understand those considerably effective modern and communication-focused techniques that move beyond grammar accuracy, making the learning process more engaging and efficient for students.

Additionally, creating a judgment-free environment and delivering extra support essential as they help encouraging students to practice without fear of making mistakes.

Last but not least, reducing class sizes is significantly seen as a key recommendation. Smaller class sizes will allow more individual attention, increased participation, and better feedback from instructors.

As a result, the overall outlook suggests that when endorsing those suggested recommendations, each personalized approach from HUCE's lectures can significantly equip students with the skills necessary for their future careers in engineering.

Suggestions for Further Research

To build on the findings of this study and address its identified limitations, future research should aim to take a more expansive and holistic approach.

One primary recommendation is to increase the sample size to include students from different academic levels, departments, and backgrounds. This will yield more representative findings of the HUCE student body and allow exploration of unique language learning challenges among various subgroups.

In addition to a larger sample, future research should supplement self-reported questionnaires with objective language proficiency measures, such as standardized tests, classroom participation, and performance evaluations, to reduce subjectivity.

Moreover, studies should broaden their scope to include external factors like the learning environment, quality of instructional materials, classroom dynamics, and access to language resources.

Exploring the role of peer influence and support systems—such as family, academic advisors, and institutional resources—would also provide insights into how these elements affect language acquisition. By integrating these aspects, future research can offer comprehensive recommendations for improving language education for engineering students at HUCE and similar institutions.

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Appendix

SURVEY QUESTIONNAIRE					
Name:					
Age: Gender:					
Faculty:					
Phone number:					
1. What course book are you using? What unit now?					
2. How you rate your English proficiencies:	Beginner	Pre-Intermediate	Intermediate	Advanced	Fluent
3. How important do you think language proficiency is for your future career as an engineer? (Scale: 1-5)					
4. In the course book, what do you think of ...?					
	Very easy	Easy	Not Easy - Not Complex	Complex	Very complex
Vocabulary & topics					
Grammar & structure					
Pronunciation					
5. How often do you experience ...?					
	Never	Seldom	Sometimes	Frequent	Always
Orientation					
Teacher-Motivation					
New teaching method (tasks, games, role plays, flashcards, presentations, ...)					
6. What other games/ activities does your teacher use during the lessons?					
7. How do you rate your ...?					
	Very bad	Bad	Medium	Good	Very good
Ability in remembering words, structures and grammar					
8. How often do you ...?					
	Never	Seldom	Sometimes	Frequent	Always
Actively spend time studying the language from the coursebook at home					
Actively join in the class activities					

Actively join in the language activities outside the class					
9. Would you be interested in additional language learning opportunities outside regular classes, such as workshops or language clubs? (Scale 1->5)					

Questions for further interviews

1. What additional learning resources or materials would you find helpful in improving your language skills?
2. In your opinion, what teaching methodologies could be more effective in helping engineering students learn a new language?
3. Do you think incorporating more technology into language learning would be beneficial? Why or why not?

Critical Reading in the Classroom Using the Example of Conspiratorial Texts on Environmental Issues

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Abstract

The contemporary media landscape is full of false and alternative truths, often linked to the discourse of conspiracy theories. For example, while some dismiss scientists' warnings about climate change as mere hysteria, others claim that the food industry is poisoning the population. In some respects, it can be difficult for students to navigate through the plethora of conflicting information. Therefore, students must be equipped with critical thinking skills and the ability to evaluate information accurately. This paper first examines the phenomenon of conspiracy theory discourse using climate change as a case study. The empirical basis for this study consists of texts from three German online newspapers - *Rubikon*, *Manova*, and *Nachdenkseiten* - from the years 2022 and 2023. A frequency corpus analysis with the help of *Sketch Engine* is used to examine the vocabulary of conspiracy theories. In a second step, the selected texts are used as examples to analyze the argumentative patterns of conspiratorial texts. Finally, we try to propose methodologies for using the results of this analysis in an educational setting. We propose a methodology for the comparative reading of conspiratorial texts with scholarly sources combined with online research. From a pedagogical point of view, we attempt to propose recommendations for project and active learning. We contend that students will then be able to independently examine the texts, evaluate the information presented, and identify inconsistencies and falsehoods presented to them in the media.

Keywords: critical thinking, critical reading, comparative reading, climate change

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Introduction

The empirical basis for our study is formed by texts from three German online magazines – *Rubikon*, *Manova*, and *Nachdenkseiten* – that are proven to be part of conspiratorial media. The conclusion that these are media disseminating conspiratorial ideas, which are then picked up by other conspiratorial channels, has been reached independently by several experts (Fücks, 2022; Holland-Letz, 2020; Linden, 2022; Müller et al., 2023; Waldmüller, 2022). The corpus was compiled from 191 texts from the mentioned journals from the years 2022 and 2023 and was processed with the help of the corpus-linguistic tool Sketch Engine. The corpus created consists of 382,348 tokens, 323,822 words, and 16,783 sentences and provides a representative basis for our analysis. In the first two steps, we focus on the linguistic perspective. First, we describe the typical issues and vocabulary of conspiratorial discourse on the topic of the environment, focusing on the most frequently used keywords. Then, we elaborate on some of the argumentation patterns and language strategies used in the conspiracy narrative. Based on the linguistic analysis, we will take up the didactic perspective and formulate methodological recommendations for working with conspiratorial texts in the classroom to develop students' critical reading and thinking.

Topics and Vocabulary of the Conspiracy Discourse on Environmental Issues

A look at the most frequently used keywords in the corpus gives us an indication of the dominant topics discussed in the selected online journals in 2022 and 2023 (see Table 1).

Table 1: 50 Most Frequented German Single-Word Keywords (Translated in English)



Lemma	Lemma	Lemma	Lemma
1 LNG	14 nuclear energy	27 PCK	40 Extinction
2 Guyana	15 Wétiko	28 BlackRock	41 gas supply
3 man-made	16 Boric	29 Bohm	42 gas shortage
4 depopulism	17 philanthropist	30 farmer	43 monoculture
5 Cholakian	18 Avatar	31 TWh	44 Carson
6 uranium munitions	19 depopulist	32 ExxonMobil	45 nuclear power
7 WEF	20 exclusive print	33 CO2 budget	46 Machiavelli
8 IPCC	21 transhumanistic	34 fracking-Gas	47 Solawi
9 Venezuelan	22 CGIAR	35 climate sensitivity	48 war in Ukraine
10 Schwedt	23 ConocoPhillips	36 Venezuela	49 Uranium
11 World Economic Forum	24 refinery	37 LNG terminals	50 transhumanism
12 Lithium	25 food supply	38 Sully	
13 Habeck	26 pipeline	39 depleted	

In the German language, these are single-word keywords. For better comprehensibility, all examples and findings from the corpus were translated into English. Terms such as *LNG*, *Schwedt*, *nuclear energy*, *ConocoPhillips*, *refinery*, *pipeline*, *PCK*, *TWh*, *fracking-gas*, *LNG terminals*, *gas supply*, *gas shortage*, *nuclear power*, *war in Ukraine* are linked to the issue of the energy crisis that has resulted in Europe as a consequence of the war in Ukraine. These thematically specified words represent 30% of the most frequently used vocabulary. Energy, oil, and gas resources are also the subject of the conflict between Guyana and Venezuela, to which other keywords such as *Guyana*, *Venezuelan*, *ExxonMobil*, *Venezuela*, etc. refer. The next important thematic complex is related to climate and climate change. This is referred to by terms such as *man-made*, *Cholakian*, *IPCC*, *CO2 budget*, *climate sensitivity*, etc. We can also observe topics and discussions about land use and humanity's general attitude towards nature, which are also closely intertwined with the aspects of overpopulation and food issues. Words such as *depopulism*, *depopulist*, *World Economic Forum*, *Lithium*, *Wétiko*, *philanthropist*, *Avatar*, *Sully*, *transhumanistic*, *farmer*, and *extinction* appear in these topics. This thematic range can also be confirmed by the frequency of German multi-word keywords, which is presented in Table 2.

Table 2: 50 Most-Frequented German Multi-word Terms (Translated in English)

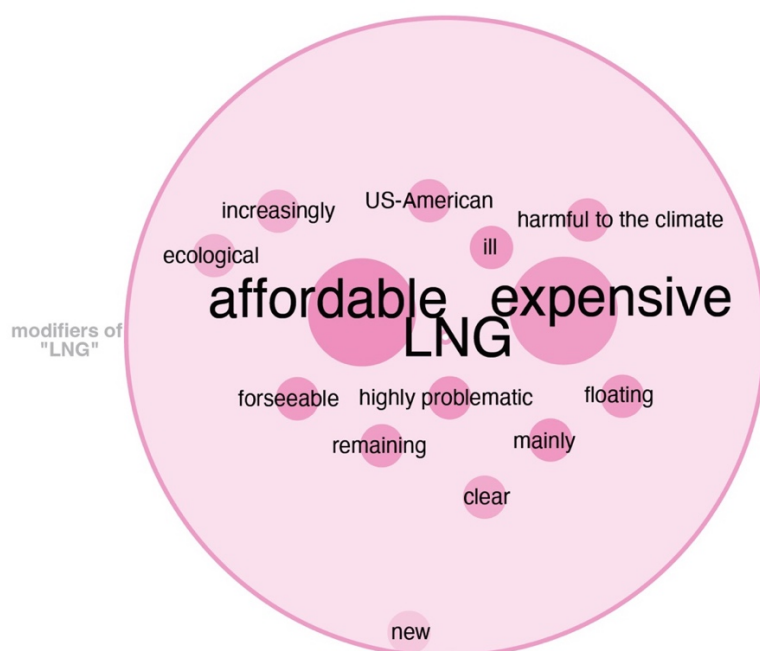


Term	Term	Term
1 Last Generation	18 James Cameron	35 eastern Mediterranean
2 Russian gas	19 Stream 2	36 farmer from India
3 man-made climate change	20 billion cubic meters	37 rule-based order
4 Nord Stream	21 global north	38 Markus Fiedler
5 Great Reset	22 Dutch government	39 little ice age
6 Russian oil	23 Niti Aayog	40 Ulrike Herrmann
7 Extinction Rebellion	24 Stream 1	41 cold fusion
8 Klaus Schwab	25 dirty bomb	42 Russian gas supply
9 industrial agriculture	26 Bill Gates	43 green economy
10 depleted uranium	27 use of uranium ammunition	44 Indian government
11 Indian farmer	28 Jake Sully	45 president Boric
12 Raymond Unger	29 mechanistic world view	46 Russian energy
13 green revolution	30 Rachel Carson	47 Du Mont
14 Egon Cholakian	31 southern hemisphere	48 fossil fuel
15 Pck Schwedt	32 Agenda 2030	49 Yuval Noah Harari
16 Robert Habeck	33 degrees Celsius	50 Noah Harari
17 Bauer Willi	34 Russian natural gas	

The topics identified do not in themselves provide any indication that this is conspiratorial content, as regular media and recognized academics were also interested in these thematic aspects in the analyzed period, and most of the vocabulary generally used may be identical to the corpus we analyzed. For this reason, it is essential to also look at the concordance and the

examples of the use of the words in context. In the first example, we can look at the most common modifiers of the most frequently used single-word keyword *LNG* (see Figure 1):

Figure 1: The Most Frequent Modifiers of the Keyword *LNG*



Statistically, the greatest attention is paid to the economic aspect and the affordability or expensiveness of LNG. The ecological dimension is also discussed by pointing out the harmfulness of fracking to the environment and human health, so that the whole topic can be interpreted as *highly problematic*. The expressions *mainly* or *increasingly* serve to emphasize the claims, which are understood as *clear* or *foreseeable*. This emphasis is intended to contribute to the plausibility and reliability of the statements made. The inclusion of the geopolitical aspect in the debate also plays an important role, as can be seen from the repeated mentions of the United States. Only terms such as *floating* or *new* are neutrally used in this case without any specific intention. The use of vocabulary and the choice of phrasing becomes more evident when we examine an entire passage from one of the texts on LNG:

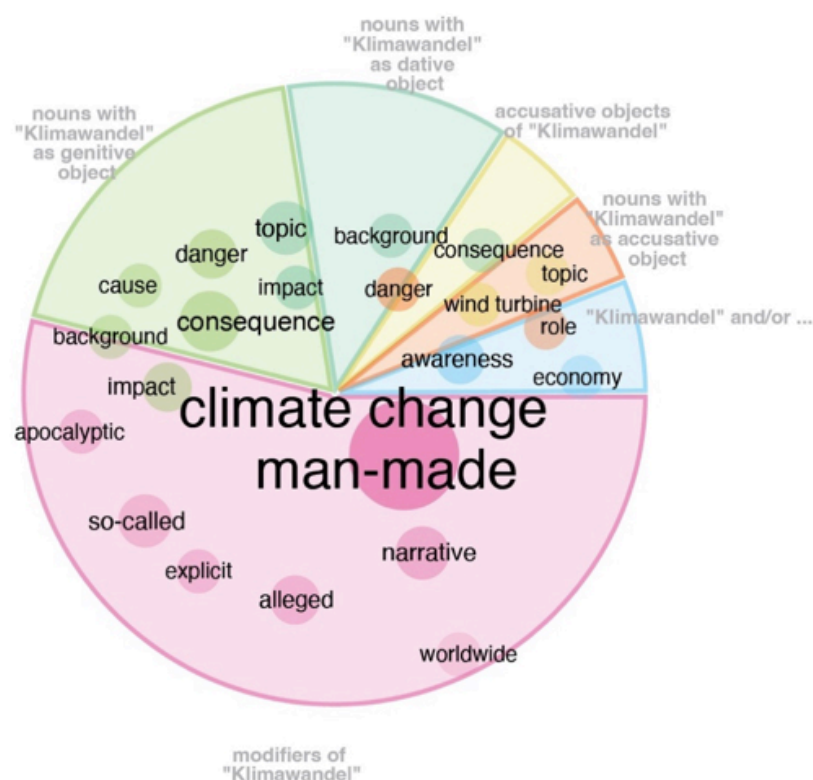
With rising oil and gas prices, the fracking boom - especially in the USA - continues. Climate protection? That falls by the wayside at times. Bad luck. Protection of people? The disadvantaged population in the production areas and around the pipelines and LNG terminals will play a subordinate role in the bigger picture. This is because US President Joe Biden supports further expansion and is sweeping everything out of the way that might be progressive and friendly to the environment and people [...]. The euphoria of the greedy is taking on frightening proportions. Business is humming and the interested large companies are successful and enormously influential: through high donations to decision-makers and with massive PR campaigns. With the current increase in LNG exports, further desires are being aroused, and the industry is pushing the USA towards even more fracking, despite all the consequences for the climate and despite the poisoning of the population in the extraction areas. [...] All shyness has been pushed aside. There would be no requirements for companies to reduce CO₂ despite ambitious climate targets [...]. The fact that at the same time we are becoming totally dependent on American energy

companies and are transferring billions and billions to the USA for the foreseeable future does not fit the picture very well and could raise uncomfortable questions. (Blenz, 2022, para. 2)

The truly problematic issue of fracking – a specific method of extracting gas and oil – which is disputed by many experts, is explained in a one-sided manner without referring to the evidence-based facts. Instead, US President Joe Biden and the mining industry are described with a series of negative connotations. Words such as *greedy*, *frightening*, *pushing*, *sweeping out*, *enormously influential*, *totally dependent*, etc., are used. The text also has a slightly sarcastic tone, especially in places where rhetorical questions are asked. For example, *Climate protection? [...] Bad luck*. At the same time, sarcasm can be achieved with a neutral vocabulary. In addition, unproven assumptions are made, such as: *There would be no requirements for companies to reduce CO2*. The highly polarizing issue of fracking is also used to spread certain false claims related to the anti-American discourse, which plays a key role in many conspiracy narratives and populist rhetoric in Europe. In the context of LNG, the most common misinformation includes, firstly, the fact that America has persuaded European countries to buy the more expensive LNG. Secondly, Russian gas prices were cheap compared to the competitors. Thirdly, the increasing supply of US LNG is making Europe geopolitically dependent on the USA. However, all three claims can be debunked with a range of arguments and facts (Sabadus, 2023).

We can also observe a deliberate choice and use of words on the topic of climate and climate change that is intended to trivialize and undermine the problem. An analysis of the modifiers that accompany the term *climate change* in particular shows that words such as *apocalyptic*, *alleged*, *danger*, *so-called*, and others are frequently used (see Figure 2).

Figure 2: The Most Frequent Modifiers of the Term *Climate Change*



The undisputed fact of climate change all around the world is declared to be a narratively created pseudo-problem. It is primarily the fact that climatic changes are caused by human activities that is called into question. This is also demonstrated by the predominance of the term *man-made* among the most frequently modifying words. It occurs in the analyzed corpus in the following examples: *propaganda for purely man-made climate change; because there are a handful of simple truths about man-made climate change – it is not man-made; under the climate change knout; narrative of man-made climate change; story of man-made climate change; supposedly man-made climate change* and in many others. Words such as *propaganda, story, supposedly*, etc. contribute to the fact that what is said is doubted and negated. Many expressions that contribute to the expressiveness of the texts are also commonly used, as can also be shown in the following passage:

The urgent need to protect the environment has been hijacked by the global oligarch caste and re-declared as climate protection, intending to bury the last remnants of personal freedom through individual CO2 budgets. The eco-totalitarianism of a blinding “green economy” is increasingly dominating everyday life. The climate change panic orchestra drowns out the coronavirus narrative and warmongering. [...] The narrative of the climate apocalypse is based on lies, embezzlement, and manipulation by a corrupt scientific establishment. (Regenauer, 2023, para. 2)

It involves nouns (*caste, eco-totalitarianism, panic orchestra, apocalypse, lies, embezzlement, manipulation*) as well as adjectives (*corrupt*) and verbs (*hijack, bury, manipulate, dominate*), so different word classes can contribute to the exaggerated – especially negatively connoted – emotivity of the language. Such negative connotations and expressivity are often also associated with the frequently represented proper names – names of politicians, philosophers and entrepreneurs or institutions and organizations that appear among the most frequent single-word and multi-word keywords in Tables 1 and 2 (*WEF, IPCC, Habeck, Boric, ConocoPhillips, PCK, ExxonMobil, Bill Gates*, etc.). Among these, a particularly important group is represented by activist non-governmental organizations, which are often attacked in conspiratorial texts. The group *Last Generation* takes first place among the multi-word terms. Also mentioned are *Extinction Rebellion* and *Fridays for Future*. In the context of these names, terms such as *human denier, propaganda, fearmongering, radicalization*, etc., are used. They are also portrayed as *manipulated* and *dependent* and as not being real activists.

Argumentative Patterns and Conspiratorial Context

The specific choice of words, exaggeration, and the use of negative connotations are some of the frequent linguistic elements that are typical of conspiratorial narration and that contribute to its strategy of persuasion. Certain persuasion strategies are, of course, also inherent in other public and institutional discourses. In the context of the previously mentioned controversial environmental issue of fracking, Williams, Macnaghten, Davies, and Curtis, for example, examine institutional framings of fracking in comparison with public perception and public understanding of the topic. They show, among other things, that institutional rhetoric reflects to some extent the so-called one-way model of scientific communication:

According to this approach – known as the deficit model of science communication – it is assumed that public unease is caused primarily by a lack of sufficient knowledge (a deficit of understanding) and that the best way to overcome this is through the provision of accurate and didactic communication of scientific knowledge [...] The

role prescribed for ‘local communities’ [...] remains a largely passive one of receiving information. (Williams et al., 2017, p. 91)

The conspiratorial texts also have a quasi-didactic, instructive, and informative aspect as they aim to fill a gap in their recipients' knowledge. In contrast to the deficit model of communication cited above, the authors of conspiratorial texts do not count on the passivity of their recipients. Instead, they want to evoke at least some kind of emotional reaction, be it fear, outrage, disgust, or anger. In this way, they attempt to form an opinion/political opposition to the ruling elites. The arguments used often go back to a few major themes of the conspiracy discourse. In our compiled and analyzed corpus, it is primarily the conspiracy theory of the Great Reset (term no. 5 of the multi-word terms, see Table 2). The Great Reset is the name of an initiative launched by the World Economic Forum. Klaus Schwab, Chairman of the WEF, and economist Thierry Mallert present a utopian vision according to which the pandemic crisis should be used as an opportunity to rethink and radically change the way we do business. Justice, society and sustainability should be given greater focus, with the various economic and political elites taking responsibility for these changes (Schwab & Mallert, 2020). However, these theories and ideas were very quickly appropriated by the conspiracy scene. The conspirators interpret the Great Reset as an effort by the elites to bring the whole world under their absolute control. The richest and most powerful are allegedly seeking to reduce the world's population. The artificially created pandemic is one of the tools used to achieve these goals, depopulating the world on the one hand and enabling leaders and authorities to restrict the basic freedoms of the population on the other. The confrontation with and clarification of the presumed idea of depopulation can also be found in the analyzed corpus, which can be illustrated by the following example:

Who and what, on the other hand, is not detected at all as a danger by the leading media are those people who do not speak the simple language of the population but want to reduce the population in terms of quantity. We therefore call them “depopulists”. Appearing in the guise of humanism, philanthropy and popular science, they enjoy their reputation in the left-liberal-green affluent milieu and disguise their inhuman ideology of depopulism behind flowery and meaningless phrases and vocabulary of “science” perverted into religion. (Riedl, 2023, para. 14)

In the process of argumentation, the leading media are declared to be complicit in the goal of depopulation, with even terms such as humanism or philanthropy being given negative connotations and science being associated with the term *perverted*. In addition, ecological initiatives and environmental protection measures are also considered as means of reducing the population:

The earth is groaning under the weight of billions of people and at the same time the various elite castes are taking advantage of this fact to promote depopulism for their benefit under the cover of ecology, with the associated methodical procedures for - sneaking - population reduction. (Riedl, 2023, para. 2)

Another alleged way to combat and reduce overpopulation is through interventions and changes in agriculture, which leads to a reduction in food production and, in this way, to a reduction in population. This theme and argumentation are also evident in the examples of the most frequented words such as *food supply*, *farmer*, *industrial agriculture*, or *farmer from India* (see Table 1 and 2). The search for different connections and, above all, their construction, as well as the connection of unrelated causes and effects, are some of the typical

patterns of argumentation in conspiracy narratives. In addition to causality and correlation, the components of conspiracies also include intentionality, secrecy, deception, and the slippery slope fallacy. The lack of evidence is also often understood as confirmation of the conspiracy (Webb, 2024, pp. 55–58). Other methods of argumentation include the imitation of scientific language and reasoning. In the following example from the text corpus, the author tries to confirm the fact that climate change is not a real threat and that it is not caused by human activity:

Regardless of this background and the fact that global warming has tended to stagnate since 2010, that there have been significantly warmer periods in the history of civilization, that Lake Constance dried up in 1540, for example, without any industrialization, and that more than 500 prominent scientists wrote an open letter to the UN Secretary-General in 2019 stating that a climate emergency does not exist, the corresponding narrative of the allegedly imminent “tipping points” and the man-made climate apocalypse continues to be drummed through the press unabated. Supported by the controlled opposition of activist groups such as the “Last Generation”, “Fridays for Future”, or “Extinction Rebellion”. (Regenauer, 2023, para. 16)

Besides the emotive and defamatory rhetoric (manipulative media, controlled activist groups, apocalypse) already described above, this passage documents one of the current widespread conspiracy theories, which states that climate change does not exist. The reference to various experts is typical of this line of argument. In recent climate debates, references have been made to the World Climate Declaration, which casts doubt on the seriousness of climate change and formulates several theses regarding the climate. The four most important are:

- “Earth's climate has varied as long as the planet has existed, with natural cold and warm phases... Therefore, it is no surprise that we are now experiencing a period of warming. [...]
- The world has warmed significantly less than predicted by IPCC based on modeled anthropogenic forcing... Climate policy relies on inadequate models. [...]
- More CO₂ is favorable for nature, greening our planet. Additional CO₂ in the air has promoted growth in global plant biomass. [...]
- There is no statistical evidence that global warming is intensifying hurricanes, floods, droughts and suchlike natural disasters, or making them more frequent.”

All four have already been debunked by different scientists using several arguments and facts. It could also be proven that of the 1,200 (or 1,500 according to some sources) alleged experts who signed the declaration, only a few are researching the climate. Instead, the signatories are geophysicists, geologists, engineers, fishermen, pilots, sommeliers, musicians, etc. (Lloyd Parry, 2022).

From what has already been said, it is clear that the conspirators not only use a certain language but also different patterns of argumentation to make their views and theses credible. Sometimes, it can even be difficult to see through their deceptions. Critical thinking and reading play an essential role in the evaluation of information and texts, therefore, it is necessary to pay more attention to these skills and their development.

Critical Reading in the Classroom and Conspiratorial Texts

Critical reading is a component of literacy, which is one of the key competencies for lifelong learning. In the European Union's competence framework, literacy is defined as:

The ability to identify, understand, express, create, and interpret concepts, feelings, facts and opinions in both oral and written forms, using visual, sound/audio and digital materials across disciplines and contexts [...] This competence also includes the abilities to distinguish and use different types of sources, to search for, collect and process information [...] It encompasses critical thinking and ability to assess and work with information. (Council of the European Union, 2018, p. 8)

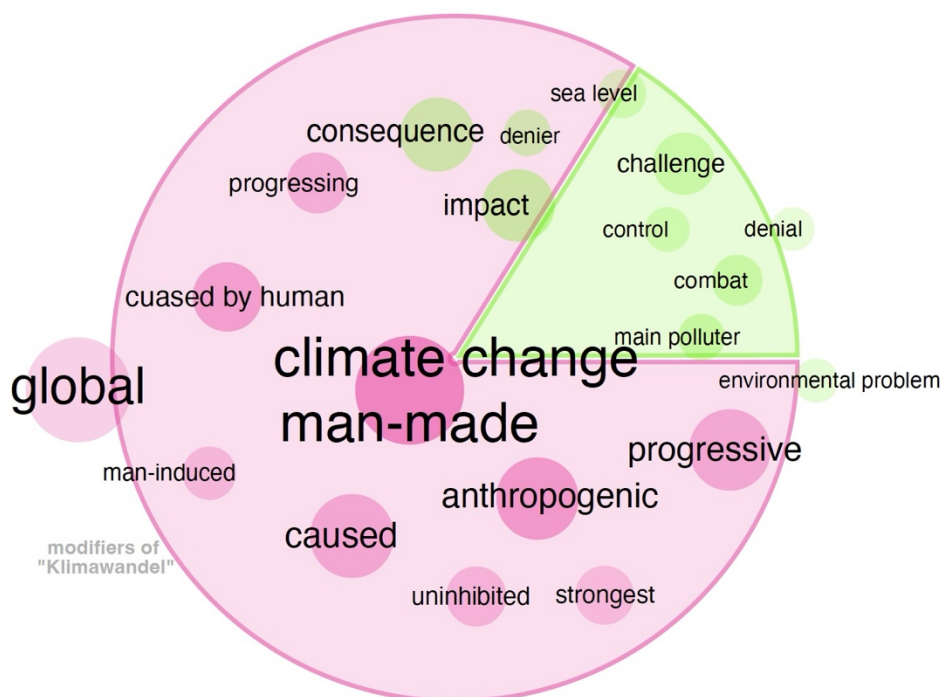
Several aspects of literacy point to its close link with digital literacy, especially nowadays when conspiracy theories are spread online and via social media. This means that the development of critical reading is unthinkable without the development of digital competence.

Due to their nature, conspiratorial texts are ideally suited for the development of these skills. In many educational manuals, conspiracies are usually approached from “above”. For example, one of the EU's guidelines recommends the following approach to conspiracy theories:

Have students first research online what conspiracy theories are and steer them (requires teacher preparation work) to old conspiracy theories that are somewhat non-controversial in today's world. Who spreads these theories? How were they spread? Why were they spread – for what aims? What were the consequences? [...] Ask students to identify what all these conspiracy theories have in common. What kinds of emotions did they appeal to? Subsequently, ask students how these conspiracy theories differ from most other disinformation. Ask students how to distinguish between true conspiracies (they do exist) and those that have no basis in reality. (European Commission, 2022, p. 32)

Learners should first study the nature and character of conspiracy theories to familiarize themselves with them. Based on the corpus of conspiratorial texts on environmental issues that we have collected, we would recommend a different approach. The following graphic (see Figure 3), which shows the most frequent modifiers of the word climate change in the German corpus German Web 2020 (deTenTen20), could be used as a starting point. Based on this, learners could carry out research on the following questions: What is climate change? How is it caused? What role do humans play in it? What are the consequences of climate change, etc.?

Figure 3: The Most Frequent Modifiers of the Term *Climate Change* in the Corpus deTenTen20



When searching for information, the teacher should play a supporting role and help the learners to check the reliability of the sources. The learners are then asked to present the collected knowledge about climate change. In the second step, conspiratorial texts should be selected (by the teacher). While reading these texts, the learners compare their previous findings with the content of the texts. This step can logically lead to certain irritations. Based on this experience, the learners then familiarize themselves with the character and typical elements of the conspiratorial texts. In doing so, specific questions can be asked to examine the credibility of the text. With their help, the process of evaluating the text can be structured. For example, the following aspects can be questioned (see also Amon et al., 2021, p. 14 and OSCE, 2019, p. 6):

- Authorship: Who are the authors? What is their background?
- Context: What is the context?
- Origin: Where was the story first published?
- Content: Can the facts presented be distinguished from assertions?
- Sources used: Does the text give sources? Where does the information come from?
- Language: Is the language factual or emotional? What are its characteristics?
- Pictures: Where do they come from? Do they show what is claimed?

In this way, learners are not only exposed to one of the most widespread conspiracy theories on the environment – denying the climate crisis and doubting the fact that it is man-made – but can also discover the language strategies and argumentations of the conspirators. One of the most challenging aspects of analyzing and understanding the operation of conspiracy theories is the fact that they mimic the character of scientific language, pointing to different studies, figures, and scientists. Here, it is necessary to teach learners which sources and which resources meet scientific standards. An important indicator here is also the verifiability and consistency of the sources.

Special attention should also be paid to the use of language in conspiracy narratives. Raising awareness of the specific, persuasive use of language can also be useful for the future recognition of verbal manipulation, not only in conspiracy theories. Linguistic corpus analyses could also be a helpful tool for teachers. Our findings from the analysis of the keywords (see Tables 1 and 2) show some very concrete examples of the use of vocabulary. The students could look at the terms that are new or interesting to them. First, they should research their meaning and then look at the specific contexts and use of the words in the conspiratorial texts. When looking at the names of organizations, institutions, scientists, etc., attention should also be paid to their emotional connotation. It is precisely the strong emotional aspect and the frequent negativity and negation in conspiratorial texts that are the most obvious indicators of conspiratorial content. For example, learners could look at the texts and passages in which the conspirators address the activist organizations or committed individuals (such as Last Generation and Extinction Rebellion). For example, have learners present an environmental organization or activist group of their choosing and then compare the presentation with the image of that organization/person in the conspiratorial texts. The young learners usually sympathize with the activists, which could then help them to identify the defamatory claims made against these figures. It is also important in this context to educate learners that their preconceptions (whether sympathetic or antisympathetic) may lead to less critical or even uncritical reading.

The critical reading of the texts leads and should logically lead to a discussion of the text contents, which are confronted with one's knowledge but also with one's own moral, political, religious, and other opinions and beliefs. According to Cheema (2021) in addition to important questions such as: "Where did you get this information from?" or "Who told you this?", questions about motivation should also be asked to maintain a dialog: "Why do you believe this is true?" or "How does this belief help you?" Therefore, a non-revealing pedagogy against conspiracy narratives is recommended (p. 52). It is precisely the emotional aspects and the proximity to beliefs that make dealing with conspiracy theories a bigger challenge. Conspiracy theories are also particularly predisposed to what is known as the continued influence effect. People continue to rely on the wrong information when interpreting information, drawing conclusions, and making judgments. Therefore, more careful attention is often required when addressing conspiracy theories with learners (European Commission, 2022, pp. 32–33). Nevertheless, it is necessary to include this topic in lessons and curricula. Empirical psychological studies show that the development of critical thinking and reading skills contributes to combating conspiracy theories. Prooijen (2017), for example, proves that:

By teaching children analytic thinking skills along with the insight that societal problems often have no simple solutions, by stimulating a sense of control, and by promoting a sense that one is a valued member of society, education is likely to install the mental tools that are needed to approach far-fetched conspiracy theories with a healthy dose of scepticism. (p. 57)

Conclusion

Critical reading should first and foremost be comparative and confrontational reading. The facts presented should be compared with other independent sources and texts and confronted with one's own opinions and beliefs. Special attention should be paid to the often emotional tone of the conspiratorial texts and their ability to imitate scientific language. The texts on environmental issues could be well-suited for dealing with the topic of conspiracy theories in

class, as they are not necessarily as controversial and opinion-dividing as other topics (e.g., vaccination, war, etc.). Nevertheless, more sensitivity from the teacher is required when dealing with the topic in class. The tools of corpus linguistics could also be relevant and useful for demonstrating the different linguistic features of the conspiracy narrative. With their help, larger text corpora can be processed, and the tools for analyzing frequency, collocations, and concordance could serve to better visualize the typical language of conspiracies.

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Promoting Action Research Through a Sustainable Research Capability and Productivity (ReCaP) Building Program: A Mixed-Methods Study

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Abstract

Action research (AR) plays a vital role within an institution, enabling educators to reflect and assess their own practices. Given its significant impact, this study was conducted to evaluate the activities undertaken from the development, implementation, and evaluation of the Research Capability and Productivity (ReCaP) Building Program. ReCaP is composed of a series of webinar-workshops that provide opportunities to acquire knowledge, tools, and necessary skills to conduct AR. Employing an action research design with a mixed-methods approach, this study includes $N_1 = 26$ volunteer educators who attended the webinars and $N_2 = 260$, colloquium attendees. Furthermore, the study uses the Perceptions on Action Research Questionnaire (PARQ) to assess educators' views on AR, researcher-made tools to gather feedback on the conduct of each program session, and to assess the program's culmination, the colloquium. Findings show that PARQ is a reliable instrument to measure the AR views of educators and is useful in developing AR training programs. ReCaP has also demonstrated the value of the Plan-Do-Study-Act (PDSA) cycle as a research paradigm. Additionally, the commitment and passion of the participants in completing the program, along with the positive colloquium feedback, affirm that ReCaP can enhance the research capabilities of educators and foster a research-oriented community. These results are instrumental in establishing the ReCaP framework, ensuring the long-term sustainability of the program.

Keywords: research program, action research, research capability building, professional development

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Introduction

Action research (AR) has been regarded as an integral component of any educational institution (Torrato et al., 2021). It enables educators, school leaders, counselors, and other stakeholders invested in education to collect data about school operations, teaching methods, and student learning processes (Mills, 2011, as cited in Hine, 2013). While “AR focuses on driving change, it is also a mindset—a way of being in the classroom and school—and a lifelong habit of inquiry” (Pine, 2008). Educators recognize that AR strengthens their professional growth, fosters self-reflection, and deepens their accountability in teaching. As a result, “AR serves as a powerful tool for empowering educators to take an active role in driving school improvement” (Hopkins, 2008).

The significance of conducting research is widely acknowledged across various disciplines. According to Hine (2013), “educators who engage in a continuous cycle of reflection, inquiry, and action can create positive changes in their teaching practices”. This approach to self-reflection and collaborative inquiry allows teachers to tackle specific issues or challenges within their teaching and learning environments.

While teaching and research are generally considered to complement each other in the roles and professional identities of educators, not all teachers possess the necessary skills to conduct research effectively. Additionally, research suggests that the overall quality of academic work in this area needs enhancement (Murray & Vanassche, 2019). Hence, research capacity building has been identified as an essential component in strengthening the research skills of educators. Rees et al. (2007) emphasize the need to strengthen researchers' abilities to conduct empirical studies. This involves refining the research design, enhancing data collection and analysis methods, and improving strategies for effectively disseminating results, particularly to end users.

Research capacity building programs play a significant role in developing and enhancing the essential research skills of educators. As noted in the study by Rees et al. (2007), the establishment of robust research capacity-building initiatives represents a more systematic effort not only to ensure that professional learning occurs but also to shape its content and implementation. Furthermore, these programs equip educators with the knowledge, tools, and skills necessary to conduct research effectively while also enriching their teaching methodologies. Educators proficient in research can share their knowledge with students, thereby improving the overall quality of education.

Given the significant effect of action research in enabling educators to reflect and assess their own practices and taking into consideration the significant role of capacity building in enhancing the research skills of educators, the Research Office of La Salle Green Hills has developed and initiated the first Institutional Research Program, known as the Research Capability and Productivity (ReCaP) Building Program. ReCaP is a training program that aims to promote a culture of research and to encourage and inspire the community to undertake quality action research.

ReCaP primarily aims to cultivate a research culture and increase research productivity by equipping educators with the skills necessary to conduct action research, enabling them to undertake and share high-quality research efficiently and effectively and to establish a purposeful partnership between the research office and the school community.

Objectives

To continually assist the school in strengthening the quality of education through the promotion of a research culture, this study was conducted to:

1. Evaluate the implementation of the ReCaP Program
2. Develop a sustainable research program framework
3. Define recommendations to ensure the sustainability of the ReCaP program

Research Questions

Specifically, this paper aims to answer the following questions:

1. What are the perceptions of the ReCaP participants regarding the principles, attitudes, and processes involved in doing action research?
2. Is there a significant difference between the perceptions of the participants before and after the implementation of the program?
3. How do ReCaP participants perceive the conduct of the training sessions?
4. What were the attendees' or audience's evaluations of the research colloquium or ReCaP's culminating event?
5. What recommendations can be made to ensure the sustainability of the research program?

Figure 1: Research Paradigm



The PDSA Cycle by Dr. W. Edwards Deming

The PDSA cycle by Dr. Edwards Deming (1993) as shown in Figure 1, was used as a research paradigm of this study. The Plan, Do, Study, Act (PDSA) cycle, also referred to as the Deming Wheel, can be iterated repeatedly, forming an ongoing process of continuous learning and improvement. In this study, Step 1-Plan - ReCaP was conceptualized. Goals and objectives were identified, and an implementation plan was developed. Step 2-Do - the program was launched, and data collection methods were established. Step 3-Study - data was analyzed to assess the effectiveness of the program. Step 4-Act – learnings were applied. Actions were recommended to further improve and enhance the program.

Similarly, as seen in Table 1, the PDSA cycle was also used in the implementation of the ReCaP Program. ReCaP was composed of 8 online training sessions conducted on Saturdays

from 8:30 AM – 11:30AM. The culminating activity of the program (session 9), which is the research colloquium, was conducted in-person. The matrix below shows the detailed schedule of activities.

Table 1: ReCaP Webinar -Workshop Series

Module	Topic Outline	Expected Output
PLAN	Session 1: Principles of Action Research	Action Research Problem
Module 1: Writing the Action Plan for the Action Research Project	Session 2: The PDSA Model (Plan-Do-Study-Act) Strategies in Conducting Systematic Reviews	Action Research Plan
	Session 3: Research Ethics, Marketing Tools; Title, Abstract and Keywords	Abstract, Title and keywords
DO	Session 4: Data Gathering in Action Research, Developing Questionnaire, Interview and/or Focus Group Discussion Protocol, Checklist for Document Analysis	Instruments for Gathering Data in Action research
Module 2: Using Appropriate Protocols and Tools to Gather Data		
STUDY	Quantitative Data: Presentation, Analyses using SPSS, Data Interpretation and/or Discussion	Instruments for Quantitative Data and Plan for Analysis
Analyses of Data	Session 6: Qualitative Data: Presentation, Analyzing Verbal Data, Interpretation	Qualitative Data Instruments
ACT	Session 7: Writing the Action Research Manuscript Introduction, Methods, Results, Discussion, Conclusions, and Implications	AR Proposal/Report Draft
Module 3: Writing and Disseminating the Action Research Report	Session 8: Writing for Publication Research Dissemination, Participation in Research Fora/Conferences	
	Session 9: Research Presentation: Action Research Proposal/Completed Work, Virtual Closing Program	AR Proposal/Report

Methodology

Design

A mixed methods action research design has been conducted to gain a deeper understanding of the topic. Both quantitative and qualitative data were collected and analyzed to achieve a better understanding and a complete picture of the topic under investigation.

Participants

A total of 26 educators voluntarily participated and completed the series of webinar-workshops named Research Capability and Productivity Building Program (ReCaP 1.0). They are composed of 6 administrators, 18 faculty, and 2 support staff personnel. A volunteer participant must be a full-time employee and willing to work beyond official school time. The second part of the study includes 260 participants, where 243 are faculty and 17 are support staff evaluated the culminating activity of ReCaP or the colloquium.

Instruments

The Perceptions on AR Questionnaire (PARQ) (Prudente & Aguja, 2018) is used to assess the pre and post perceptions of the ReCaP participants toward action research. It is composed of 30 items divided into 3 components: AR Principles with 9 items, Attitudes Toward Doing AR with 10 items, and Processes Involved in Doing AR with 11 items. It utilizes a 4-point Likert Scale ranging from 1-strongly disagree, 2-disagree, 3-agree, and 4-strongly agree. To measure the internal consistency and reliability of PARQ, Cronbach α was computed at $\alpha = 0.839$ (Pretest N = 26; number of items = 30) and $\alpha = 0.801$ (Post-test N = 26; number of items = 30).

Session Feedback Form. A researcher-made evaluation is used to assess the preparation, content, and delivery of the different sessions of ReCaP. The 10-item questionnaire utilizes a 4-point Likert scale to determine the level of agreement to the statements ranging from 1-strongly disagree, 2-disagree, 3-agree, and 4-strongly agree. Also included in the questionnaire are 2 open-ended questions that inquire about the additional insights and suggestions of the participants regarding the program.

Research Colloquium Evaluation Form. The culminating activity of the ReCaP Program is a research colloquium where the ReCaP participants share the results of their studies. A researcher-made tool is used to assess the objectives and goals, content, framework, and overall proceedings of the colloquium. It is composed of 13 items where the audience indicates their degree of agreement or satisfaction. Two open-ended questions are also included to gather the comments of the audience regarding the most valuable part of the colloquium and what needs to be improved.

Data Gathering Procedure. The PARQ, session feedback form, and colloquium evaluation forms were administered online through Google forms, while the feedback form was administered after every ReCaP session. Lastly, reflections and insights regarding the ReCaP program were collected at the end of the 8th online training session.

Data Analysis. The responses to the questionnaires were computed using Microsoft Excel and SPSS version 26. Descriptive statistics were used to analyze the responses obtained from the PARQ questionnaire, feedback form, and colloquium evaluation form, while independent t-tests were used to determine the significant differences in the responses. Qualitative data were examined using thematic analysis.

Results and Discussion

Table 2 displays the pre and post-test mean ratings of each item and category of PARQ, adapted from Prudente and Aguja (2018).

Table 2: Category and Item Mean Ratings of PARQ

Category	Items	Pretest Mean N = 26	Pretest SD	Post-test Mean N = 26	Post-test SD
Action Research Principles	1. Action research is done within the context of the teacher's environment.	3.61	0.667	3.95	0.218
	2. Action research is a challenging endeavor.	3.68	0.702	3.81	0.402
	3. Action research aims to explain why we do things.	3.61	0.667	3.90	0.301
	4. Action research links educational theory with professional practice.	3.74	0.631	3.95	0.218
	5. Action research is focused on studying one's own practices to bring about change.	3.68	0.702	3.90	0.301
	6. Action research involves collaborative methods to generate data that inform changes in practice.	3.71	0.643	3.95	0.218
	7. The conduct of action research is a good measure of the teacher's professional commitment.	3.48	0.890	3.71	0.463
	8. An action plan is needed in trying out the improvement theory.	3.61	0.715	3.81	0.402
	9. Results of action research studies should be shared and disseminated.	3.77	0.617	4.00	0.000
Category Mean		3.66	0.690	3.89	0.314
Attitudes Toward doing AR	1. I find enjoyment in trying out new things in teaching.	3.65	0.661	3.76	0.436
	2. I believe that doing action research is part of my duties as a teacher.	3.32	0.832	3.57	0.746
	3. I have a positive feeling that by doing action research, I can become a more effective teacher.	3.65	0.661	3.67	0.577
	4. Doing action research can be emancipating for the teacher.	3.35	0.755	3.67	0.577
	5. Planning for future instruction is the end of the cycle for action research. *	2.06	1.181	1.95	1.203
	6. Teachers can find the time to do action research. *	2.16	1.036	2.29	1.146
	7. Teachers are given enough training on how to do action research.	2.55	0.995	3.33	0.796
	8. Through action research, teachers become professional knowledge makers.	3.45	0.723	3.81	0.402
	9. I am convinced that doing action research can improve my teaching practice.	3.55	0.675	3.71	0.561
	10. The amount of work I do in school does not prevents me from doing action research. *	1.68	0.748	1.90	0.944

Category	Items	Pretest Mean N = 26	Pretest SD	Post-test Mean N = 26	Post-test SD
	Category Mean	2.94	1.093	3.16	1.07
Processes Involved in Doing AR	1. Action research starts at assessing the current situation.	3.71	0.643	3.71	0.717
	2. Action research does not investigate learners' behavior. *	1.45	0.768	1.52	0.981
	3. Action research follows an iterative process.	3.52	0.769	3.81	0.402
	4. Reflection is done in all the stages of the action research process.	3.77	0.617	3.86	0.359
	5. A concept test is enough evidence to measure learners' understanding. *	2.23	1.087	2.19	1.167
	6. In analyzing effects of the action implemented, it is necessary to have quantitative data as evidence. *	1.81	0.946	1.76	0.995
	7. Action research does not follow a linear process. *	2.48	1.122	2.10	1.179
	8. The action plan is based on the root causes of the problem of practice.	3.45	0.850	3.81	0.402
	9. Action research does not involve the implementation of predetermined answers. *	2.32	1.045	2.19	1.209
	10. Action research improves educational processes through change.	3.58	0.720	3.76	0.436
	11. Researchers doing action research articulate the process of reflection in their discussions to allow others to follow the sense-making processes.	3.61	0.715	3.86	0.359
	<i>*Negative statements</i>				
	Category Mean	2.90	1.176	2.96	1.236
	Overall Mean Rating	3.19	1.092	3.30	1.060

Mean Interpretation: 1.00 – 1.75: Strongly Disagree, 1.76 – 2.50: Disagree, 2.51 – 3.25: Agree, 3.26 – 4.00; Strongly Agree

As defined by Stringer (2008), AR equips educators in enhancing their educational practices and addressing critical challenges that will help improve their students' learning. Looking at Table 2, results show that the AR principles got the highest level of agreement from the respondents (M = 3.66, 3.89, SA). Results show that for both pretest and posttest, respondents strongly agree that AR is done within the context of the teacher's environment (M = 3.61, 3.95, SA), it explains why we do things (M = 3.61, 3.90, SA), and it links education theory with professional practice (3.74, 3.95, SA). This result gives positive feedback that the respondents see the connection between theory and practice (M = 3.74, 3.95, SA). In addition, respondents strongly agree that AR is focused on studying one's own practices to bring about change (M = 3.68, 3.90, SA). Despite knowing that doing AR is challenging, results revealed that the respondents understand and recognize the principles of AR. This indicates that the purpose of doing AR is clear to the teachers and administrators. This generated level of agreement was also observed in the study of Prudente and Aguja (2018) and Torrato et al. (2021). These two studies show that teachers generally have a high level of agreement and understanding toward the principles of AR.

Attitudes, on the other hand, are evaluations associated with an object, while perceptions involve the interpretation of meaning (Maio et al., 2019). They are related and can influence each other. Positive attitudes and motivation towards AR can lead to increased engagement and empowerment in problem-solving (Eagly & Chaiken, 1993). As seen on Table 2, results show that respondents strongly agree that they find joy in trying out new teaching methods ($M = 3.65, 3.76, SA$), see AR as part of their duties as teachers ($M = 3.32, 3.57, SA$), believe that AR can make them more effective teachers ($M = 3.65, 3.67, SA$), and think it can be emancipating ($M = 3.35, 3.67, SA$). However, respondents strongly disagree that their workload does not prevent them from doing AR ($M = 1.68, 1.90, D$) and that they can easily find time for it ($M = 2.16, 2.29, D$). Respondents agree to strongly agree in saying that they have received enough training on how to conduct AR ($M = 2.55, 3.33, A, SA$), while they strongly agree that AR can make them professional knowledge makers ($M = 3.45, 3.81, SA$), and think it can improve their teaching practice ($M = 3.55, 3.71, SA$). Furthermore, respondents are somewhat confused about whether planning for future instruction is already the endpoint of AR. This confusion indicates that they may be thinking that AR projects can be addressed in one cycle, that involves identifying the research problem, collecting data, analyzing, and interpreting it, disseminating results, and developing an action plan, as defined by Fraenkel et al. (2013) or that AR is cyclical and does not have a clearly defined endpoint which is the correct definition of AR. Parsons and Brown (2002) describe AR as the “process of “observing-doing-observing-adjusting” and then doing it again”. In general, there is a considerable high agreement leaning towards a positive attitude in the conduct of AR ($M = 2.94, 3.16, A$).

The third category of the PARQ is about the processes involved in doing research. Table 2, respondents strongly agree ($M = 3.71, 3.71, SA$) that AR starts at assessing the current situation but somewhat disagree that AR does not investigate learners’ behaviors ($M = 1.45, 1.52, D$). Fraenkel (2005) notes that “AR goes beyond analyzing learner behavior—its core purpose is to improve practices, solve problems, and foster positive change in education”. Moreover, results show that respondents are confused on whether AR follows an iterative process ($M = 3.52, 3.81, SA$) or a linear process ($M = 2.48, 2.10, A$), indicating confusion among respondents about the action process. Several authors describe the research process as cyclical, with AR as a spiral of activity, as explained by Kemmis et al. (2013), or as a helix, with “look, think, act” continually recycling, as presented by Stringer (2008). Further, respondents strongly agree that researchers doing AR explain the process of reflection in their discussions and that reflection is done in all stages of the AR process. These results align with Mertler's (2009) argument that systematic reflection is essential for critically examining one's practice. The mean rating of the third category ($M = 2.90, 2.96, A$) indicates that the respondents may still need further training in the different processes.

Generally, the overall mean rating of the three categories shows that there is a positive increase from the pretest to the posttest. This suggests that respondents developed an increase in their level of concurrence in perceiving the benefits and advantages of doing action research.

Table 3: Independent t-Test Analysis of PARQ Pre and Post-test Results

Category		N	Mean	SD	t	Sig. (2-tailed)
Action Research	Pretest	26	3.66	0.690	-	.000
	Post-test	26	3.89	0.314	5.473	
Principles	Pretest	26	2.94	1.093	-	.195
	Post-test	26	3.17	1.072	1.347	
Attitudes Toward doing AR	Pretest	26	2.90	1.176	-.148	.884
	Post-test	26	2.96	1.236		

The mean difference is significant at 0.05 level.

Table 3 reveals that at the start of the program, the respondents already had a high positive perception regarding action research. After completing the program, posttest results show that there is an increase in the perception of the participants in the conduct of action research. Further analysis also shows that using an independent t-test, the perception of the participants regarding action research principles yielded a significant difference ($t = -5.473$, $p\text{-value} = .000$) between pretest and post-test results. Participants seem to have strengthened their knowledge of the principles and nature of action research. They show improved appreciation of the benefits and advantages of conducting action research in their area of practice.

Table 4: Descriptive Statistics of the Evaluation of the 8 Online Training Sessions

		Items	Mean	St. Dev	Interpretation
Preparation	1.	The objectives of the session were clearly defined.	3.97	0.160	SA
	2.	The session was well-organized.	3.97	0.184	SA
	3.	The speaker was well-prepared.	3.97	0.160	SA
Content	4.	The information and/or skills presented were relevant and useful.	3.97	0.184	SA
	5.	This training session increased my knowledge and skills in doing action research.	3.98	0.131	SA
	6.	The training session, as presented, was consistent with the workshop description.	3.99	0.093	SA
Delivery	7.	The speaker provided adequate time for questions and answered them satisfactorily.	3.97	0.160	SA
	8.	The speaker allowed me to work with and learn from others.	3.94	0.240	SA
	9.	The speaker facilitated and prepared activity that is relevant to the topic.	3.98	0.131	SA
	10.	The speaker is knowledgeable in the topic.	3.99	0.093	SA

Mean Interpretation: 1.00 – 1.75: Strongly Disagree, 1.76 – 2.50: Disagree, 2.51 – 3.25: Agree, 3.26 – 4.00: Strongly Agree

The results obtained from the feedback of the participants got a mean range of 3.94 to 3.99 as shown in Table 4. This indicates that the preparation, content, and delivery of each ReCaP online session were conducted effectively. In addition, Tables 5, 6, and 7 show some feedback and sample reflections shared by the participants.

Table 5: Online Session Feedback
 “What did you like most in the session today?”

Themes	Verbatim Responses
Quality of Content and Presentations	<ul style="list-style-type: none"> • <i>The topics were clearly and properly discussed.</i> • <i>The examples and samples provided were helpful.</i> • <i>The discussion on how to write the AR paper, methodology, results, and discussion segments.</i> • <i>Tips for accomplishing the manuscript for action research.</i> • <i>Presentation and tips on conducting research.</i> • <i>Lecture on quantitative research methods.</i> • <i>Research techniques and styles for writing and formulating research questionnaires.</i>
Resource Speakers and Expertise	<ul style="list-style-type: none"> • <i>The resource speakers were knowledgeable, engaging, and thorough in their discussions.</i> • <i>The selflessness of the speakers in sharing their expertise.</i> • <i>The live critiquing and mentoring sessions by Dr. Prudente and Dr. Aguja.</i>
Practical Application and Workshops	<ul style="list-style-type: none"> • <i>The enthusiasm and valuable learnings from the speakers</i> • <i>The workshop and critiquing of outputs.</i> • <i>The actual critiques and feedback provided.</i> • <i>The presentation of samples and output with feedback.</i> • <i>The scaffolding session for abstract, title, and keywords.</i> • <i>The educational action research model.</i>
Collaboration and Engagement	<ul style="list-style-type: none"> • <i>The collaboration among participants.</i> • <i>The engagement of participants during discussions.</i> • <i>The welcoming approach of the consultants.</i> • <i>The opportunity to clarify questions and share practical tips.</i>
Learning and Insights	<ul style="list-style-type: none"> • <i>The reflection part of the session.</i> • <i>Learning how to write action research competently.</i> • <i>Insights on how to interpret data and use resources.</i> • <i>Learning how to use statistical tools like SPSS and JAS.</i> • <i>- Understanding qualitative and quantitative analysis.</i>

Table 6: Online Session Feedback

“What more can be improved or what would you want to be included in the succeeding training session?”

Themes	Verbatim Responses
Time Management and Scheduling	<ul style="list-style-type: none"> • <i>Requests for morning sessions instead of after-work hours.</i> • <i>More time for sessions and discussions.</i> • <i>Time allotment for participants to work on their papers.</i> • <i>Avoid scheduling sessions after work due to fatigue.</i>
Additional Sessions and Topics	<ul style="list-style-type: none"> • <i>More sessions on specific topics (e.g., qualitative methods)</i> • <i>Sample oral presentations and ARs in the Philippine education setting.</i> • <i>Demo on the use of software for data analysis.</i> • <i>Discussion on how to organize findings in convergent/triangulation analysis.</i>
Workshops and Hands-On Activities	<ul style="list-style-type: none"> • <i>More workshops and hands-on activities.</i> • <i>Short workshops to deepen understanding of concepts.</i> • <i>One-on-one feedback sessions with speakers.</i> • <i>More time for private consultations.</i>
Participant Readiness and Support	<ul style="list-style-type: none"> • <i>Address participants' readiness, confidence, and mental health in doing research.</i> • <i>Provide a "Research Recovery Program" to help participants regain confidence.</i> • <i>Refresher courses on writing RRLs (Review of Related Literature).</i> • <i>Address workload and work-life balance, especially for teaching faculty.</i>
Access to Resources	<ul style="list-style-type: none"> • <i>Provision of sample action research papers.</i> • <i>Access to good online research databases.</i> • <i>Sharing of PowerPoint slides for annotation.</i>
Feedback and Consultation	<ul style="list-style-type: none"> • <i>More time for feedback and consultation.</i> • <i>Availability of consultants outside training sessions for advising.</i> • <i>Address anxiety and stress related to research.</i>

Table 7: Sample Verbatim Reflection of Participants

Reflection 1: Cecilia Bugayong <i>People from the research office motivated me to participate. The experience from the program went way beyond my expectations po. The sessions served as a reminder that there is always something new and that the desire to learn must be there in all stages of the life of an educator. Thus, it would be great if there were another round of ReCaP. Thank you so much po to the research office team, to our consultants Doc Prudente and Doc Aguja.</i>	Reflection 2: Tess Abarabar <i>This Recap session 1.0 was truly effective and helpful. I learned a lot, but in my personal end, I really need time to come up with my paper since I am also attending to yearbook tasks as well as working and implementing the new LG guides and plans this school year. The recorded videos were helpful. I just hope that even if the program is done already, the recorded videos and presentation stay so that when time allows me to work and sit down for my paper, I have these to refer to.</i>	Reflection 3: Paz Corsino <i>Thank you for conceptualizing this program. Very useful, fruitful, engaging, and enriching. The speakers are competent, experiential, patient, and inspiring. Please offer this again, especially to the administrators and the LMTA members. They'll surely appreciate this and will be moved to renew their love for research.</i>
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The valuable feedback and insights of the participants show that the program has made them appreciate research and that this can be further improved and be implemented again.

Table 8: Research Colloquium Evaluation Summary

Area	Mean Rating N = 260	Remarks
Objectives and Goals	4.78	Excellent
Content	4.67	Excellent
Framework	4.75	Excellent
Proceedings	4.63	Excellent

Mean Interpretation: 1.00 – 1.49: Poor, 1.50 – 2.49: Fair, 2.50 – 3.39: Good, 3.50 – 4.49: Very Good, 4.50 – 5.00 Excellent

As shown in Table 18, results indicate that the objectives and goals were well received. The theme was clear and relevant, the topics were relevant to LSGH's educational and institutional practices, it fostered a research culture and facilitated valuable learning experiences. The content of the colloquium was also highly rated, with the respondents assessing the format, structure, and flow of the program as excellent. Similarly, the respondents assessed the topics presented during poster and paper presentations as excellent. The framework of the event, including the program overview, venue, and schedule, was also highly regarded. Overall, the organization and the proceedings of the research colloquium were deemed excellent. Comments were also gathered through open-ended questions. Table 19 shows the themes generated from the feedback of the audience.

Table 9: Themes Generated on the Research Colloquium Feedback

Themes	Remarks
Relevance and Practical Application	The research presented was highly relevant to attendees' professional practice and offered practical applications for improving teaching and learning.
Inspiration and Continuous Learning	The colloquium inspired attendees to engage in research and emphasized the importance of continuous learning.
Community Building and Collaboration	The event fostered a sense of community and encouraged collaboration among educators
Time Management and Event Logistics	Attendees suggested improvements in time management, particularly for presentations and poster viewing.
Presentation Quality and Audience Engagement	There is a need to enhance the quality of presentations and provide more opportunities for audience interaction.
Diversity and Scope of Research	Attendees recommended broadening the scope of research topics to include more diverse perspectives and areas of interest.

The research colloquium was well-received for its practical relevance, inspiration, and community-building aspects. Attendees appreciated the opportunity to learn from their peers and apply research findings to their professional practice. However, suggestions for improvement included better time management, enhanced presentation quality, and increased audience engagement. Expanding the diversity and scope of research topics was also recommended to further enrich the event. Overall, the colloquium was seen as a valuable and motivating experience, with room for refinement in certain areas.

Conclusion

The study reveals that the ReCaP program is effective in enhancing educators' research skills and promoting a research culture within the institution. Key findings indicate that participants developed a stronger understanding of action research principles, displayed positive attitudes toward conducting research, and gained confidence in the processes involved in doing action research. The Perceptions on Action Research Questionnaire (PARQ) is also a reliable instrument in measuring the AR views of educators and is useful in developing AR training programs. The structured approach of ReCaP, grounded on the Plan-Do-Study-Act (PDSA) cycle, provided a clear framework for continuous improvement and practical application.

Feedback from the training sessions and the colloquium highlighted the program's relevance, content quality, and the expertise of the facilitators, further validating its impact. Additionally, the insights and reflections from ReCaP participants demonstrate their appreciation for the training program. The ReCaP initiative effectively addressed the need for building research capacity among educators, empowering them to integrate research into their professional practice. The positive reception of the colloquium reinforced the value of collaborative learning and knowledge-sharing, emphasizing the role of the program in establishing a research-oriented community within the institution.

Recommendations

A culture of research is essential for fostering innovation and promoting academic growth. The successful implementation of ReCaP is a demonstration of the dedication and drive of educators to improve their practice and program offerings, which contribute significantly to academic excellence and career advancement. Hence, to ensure sustainability and further improvement of the ReCaP program, it is recommended that its implementation is expanded by encouraging more teachers and administrators to join the program. Also, the provision of a protected time where the participants can focus on completing their papers is recommended. Moreover, providing a reasonable workload and research incentives are positive ways of acknowledging the efforts and grit of the program participants. By implementing these recommendations, the ReCaP program can continue to evolve as a model for research capacity building, ultimately contributing to the professional growth of educators and the advancement of educational practices.

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Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

In finalizing the paper, the authors used AI tools such as Grammarly, ChatGPT, and Gemini to improve grammar and sentence structure. Themes were also generated with the assistance of the AI tool DeepSeek. After using these tools, the authors reviewed and edited the full paper and will take full responsibility for all its contents.

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Fostering Criticality Through Academic Listening

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Abstract

With lectures being the dominant mode of instruction in higher education (HE), proficiency in listening comprehension is essential for academic success. This skill, however, may pose significant challenges for students from traditional, rote-based educational backgrounds—such as those examined in this study—when transitioning to degree programs at international universities. In these educational contexts, listening instruction is often limited to assessing comprehension without fostering critical engagement with the audio material. In contrast, students at international universities are typically expected to critically engage with the content. This discrepancy presents a challenge for English for Academic Purposes (EAP) professionals, who aim to equip students with effective learning strategies to cultivate a more critical approach to academic listening and facilitate their integration into the academic discourse community. This paper examines the implementation of metacognitive strategy-based instruction to teaching academic listening in EAP classes at British University Vietnam, where most students have been educated in traditional Vietnamese schools and whose listening strategies in their second language tend to be influenced by exam-oriented learning. The adoption of this instructional approach aims to scaffold students' ability to critically engage with academic listening materials and support their transition to university-level study. The research employs a mixed-methods approach, incorporating quantitative data from students' diagnostic, formative, and summative listening assessments, alongside qualitative analysis of both scaffolded and unguided student reflections on their learning experiences. Preliminary findings indicate that metacognitive strategy has a positive impact on both students' academic listening skills and their ability to engage critically with audio content.

Keywords: EAP, critical thinking, academic listening, metacognitive listening strategies

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Introduction

While the globalisation of education has strengthened the position of English as the main medium of instruction (EMI) in HE (J. Huang, 2005; L. Huang, 2010; Miller, 2014), the process has not been homogeneous in Asia. Countries such as Hong Kong, Malaysia, and Singapore seem to have fully integrated English in teaching at both secondary and tertiary levels (Miller, 2014); South Korea, China, and Japan are increasing the focus on English within their high school and university curricula (Miller, 2014). Vietnam, however, maintains a strong tradition of delivering the national curriculum in Vietnamese. With the recent top-down policy to improve English proficiency in Vietnam (Sahan et al., 2022), the popularity of International English Language Testing System (IELTS) cannot be underestimated. The test has become mandatory for both school and university graduates, which has reflected on the approaches to teaching and learning English. As a result, there has been evidence of IELTS negative washback on both students' motivation to learn English (Nguyen, 2023) and their language skills development.

The teaching context of the current study includes an international university, providing British degree programmes in Vietnam, where student demographics is mostly Vietnamese students coming from traditional, often rote-based educational backgrounds with no or limited prior experience of studying through EMI. The new university learning environment often includes novel engaging classroom teaching approaches, students might not be familiar with, as well as expectations to complete tasks targeting higher order thinking skills and critically engage with the content. It also involves longer talks in English in the context of unfamiliar academic genres – such as lectures, seminars and tutorials. This creates a clash of learning cultures and previous learning experiences with new expectations, forming a gap in skills that is usually left for EAP lecturers to bridge.

Academic Listening in Higher Education: Nature and Challenges

Although lecture is by far the most common means of university instruction throughout the world (Gomez & Fortuno, 2005; Lynch, 2011; Malavska, 2016; Rahimirad & Monini, 2015), academic listening is yet the least researched of the four macro skills (Lynch, 2011; Miller, 2014), which could potentially be due to both the complex nature of the skill itself and the complexities of the context, where it is realised, i.e. academic discourse. The challenges associated with transitioning from monolingual L1-based secondary education to the tertiary level with EMI are not limited to progressing from listening comprehension in L2 to critical engagement with the content in L2, they also involve constructing new schemata for genres students have not been exposed to previously.

When writing about academic listening comprehension through L2, Lynch (2011) identifies *listener-related* (e.g. distractions, emotional response to the speaker etc); *speaker-related* (e.g. accent, cultural references etc) and *content-related* (e.g. unfamiliar content, new expressions etc) difficulties. They all seem to be intensified by in the context of academic discourse that may involve genres, task types and expectations students are not familiar with.

Regardless of whether the communication is in L1 or L2 and the type of context it is realised in, the process of listening includes four overlapping types of listening processing - *neurological, linguistic, semantic and pragmatic* (Rost, 2013). *Neurological processing* involves attention initiation, meaning construction and memory; it is the attention that differentiates listening from hearing (Rost, 2013). *Linguistic processing* requires input from a

linguistic source (Rost, 2013) such as prosodic features of speech, differentiation between formal and informal register, genre and text features, discourse and stance markers etc. Lack of such linguistic awareness might cause lapses in comprehension, which becomes particularly important in the context of academic listening through L2. *Semantic processing* integrates prior experience into understanding events (Rost, 2013); listeners' schemata are activated and even if there is a linguistic challenge, they are still able to construct the meaning because of their background knowledge or previous experience. Schemata, that are key to top-down processing, are, however, culture specific (Minsky, 1975; Tannen, 1993) which could either interfere or contribute to meaning construction. In academic discourse schemata may support or hinder the process of navigation of the novel genres by students. For example, those who have been previously exposed to critical thinking task types are more likely to complete them despite the linguistic challenge. *Pragmatic processing* occurs when a listener takes an active role in identifying relevant factors in verbal and non-verbal input and injects their own intentions into the process of constructing meaning (Rost, 2013), this prompts critical engagement with the content, inference and understanding perspectives and the stance of a speaker.

Lecture, as the core oral academic genre, is characterised by “intertextuality”, that is references to multiple texts along with texts created by the lecturer (Malavaska, 2016), which could potentially support or interfere with semantic processing. To perform its communicative purpose of explaining and delivering new information to a large number of students, this genre also combines features of both spoken and written discourse as well as its own structural patterns (Gomez & Fortuno, 2005). Not only may these factors lead to lack of comprehension but also hinder students' critical engagement with its content.

Critical Thinking in Higher Education

The ability to develop an argument and make sound judgements is crucial for academic success as well as for future employability (Andrews, 2015; Bagheri, 2015; Davies & Barnett, 2015). It has, therefore, become a “goal of modern education” as it equips students with the skills necessary to adapt to the fast-changing world (Ku, 2009). Thus, a particularly strong emphasis is placed on critical thinking development in western HE (Moore, 2013; Wilson, 2016) with expectations for students to demonstrate the ability to read and write critically (Wilson, 2016).

The problem of critical thinking definition, identification of its composites and ways of its measurement has been a long focus of research, as a result, three different perspectives- philosophical, psychological and educational (Lai, 2011) have been identified. For educational purposes, Bloom et al. (1964) divided critical thinking skills into higher- and lower-order thinking skills; this approach was revised in 2001 and reflected the order of skills in the well-known Bloom's taxonomy pyramid (Anderson & Krathwohl, 2001), which has been widely used by educators.

Ennis (1985) added reflecting thinking to the domain for critical thinking and then identified critical thinking dispositions and abilities (Ennis, 2015). Summarising the existing approaches, Davies and Barnett (2015) classify critical thinking skills into -lower level, higher level, complex and metacognitive thinking skills. To link theory and practice, Thomas and Lok (2015) developed an operational framework of Disposition-Skills-Knowledge for teaching critical thinking. It has eventually become apparent that critical thinking goes beyond just cognitive ability. Thus, in the context of HE, a broader term- criticality (Davies

& Barnett, 2015) seems more appropriate as it encompasses critical thinking, critical reflection and critical action; it does not limit the role of HE to only demonstration of critical thinking but stimulates students to develop a stance and their critical orientation in the society and the world (Davies & Barnett, 2015).

In the context of current study, it is important to mention that links have been previously made to criticality and culture (Atkinson, 1997) and the ability or inability of students of certain cultures to critically engage in classes. Some researchers (Bali, 2015; Floyd, 2011), however, believe that it is rather expressing critical thinking through L2 that presents a challenge than a student's culture. That brings criticality into the scope of EAP, a supporting discipline, assisting students from various cultural backgrounds with their study through L2 and takes it beyond the acquisition of the four macro skills - reading, writing, listening and speaking-by incorporating criticality. In response to the changing role of EAP in the globalisation context, Benesch (2009) makes a case for critical EAP - critical teaching and learning in a broader sociopolitical context.

Criticality in Academic Listening in EAP Classes: Problems and Strategies

Traditionally, academic listening tasks have been limited to comprehension checking questions, which only target lower order thinking skills, that is understanding of an audio text, and do not promote critical engagement with it (Gyenes & Santos, 2021; Xu et al., 2021). It is, however, high-order thinking skills of analysing, synthesising, predicting and complex thinking skills of inference, evaluation, reason and problem-solving, alongside metacognitive skills (Davies & Barnett, 2015) that students at university level are expected to demonstrate, especially in the context of western HE traditions.

Gyenes and Santos (2021) present an integrated model of employing top-down and bottom up listening and critical thinking processes to enable criticality in academic talks, where criticality is not seen as a separate task that is performed after comprehension tasks but rather is integrated into all of the processes following a similar bottom-up and top-down path. This model could be transferred onto other oral academic genres explored in EAP classes and scaffold better preparation for a broader context such as discipline-specific lectures.

The problem potentially associated with the approach application, is that EAP students come from different educational backgrounds with already developed metacognitive listening strategies in L2. These strategies involve managing the learning process, planning, concentrating (O'Malley et al., 1989) and presumably are shaped by students previous learning experience and environment. Some students might have experienced an exam preparation negative backwash, especially in countries where international proficiency tests are mandatory such as IELTS Academic module in Vietnam (Nguyen, 2023) and therefore, have only been exposed to comprehension-based listening instruction (Xu et al., 2021), which only involves listening for the correct answer without open discussion questions or any interpretations involved. Some international proficiency tests include only a certain number of comprehension question types e.g. 10 question types of IELTS, which in the context of exam negative backwash influence the development of students metacognitive listening strategies that would be shaped by these comprehension questions only. Such teaching-for-exam practices may also lead to students not forming relevant schemata for approaching different task types, such as inference or other critical engagement with the content.

The metacognitive strategy-based instruction (Goh & Vandergrift, 2021), however, incorporates higher-order, complex and metacognitive thinking skills of reflection, evaluation, problem solving and not only does it promote learner autonomy (Xu et al., 2021) but also fosters criticality. It also supports the shift of focus from teachers and teaching to learners and learning, a crucial step in modern higher education (Bagheri, 2015). Metacognitive strategies provide a context for interpretation and, therefore, assist listeners with goals selection, supervise their improvement, and assess learning results, as well as considerably facilitate and accelerate listening performance or develop self-regulated learning (Rahimirad & Moini, 2015).

For the purpose of fostering criticality through academic listening in EAP classes, metacognitive strategy-based instruction appears to be the most effective as it allows room for facilitating bottom-up and top-down processing and prompts higher order thinking skills of *predicting*, *analysing*, *synthesising*; complex thinking skills- *inferring* (meaning, attitude), *evaluating* (arguments), *identifying* a stance/perspective, key and supporting ideas, *reasoning* (justifying), *problem solving* and metacognitive thinking skills - *reflecting* on their learning experience.

Context and Methodology of the Research

The need for the current research stems from the analysis of EAP students' diagnostic test results from 2021-2024 at British University Vietnam. This period coincides with IELTS becoming mandatory for high school and university students in Vietnam and, therefore, the shift of the entire EFL industry nationwide to test preparation.

The EAP diagnostic listening test results consistently identified successful completion of the comprehension checking section but lack of responses to open questions or questions involving inference. Both qualitative and quantitative research methods were employed to investigate the situation and the reasons behind such performance. Quantitative analysis involved diagnostic, ongoing and summative assessment results in academic listening and quantitative incorporated students' questionnaires as well as their guided and unguided reflections.

Quantitative Analysis Results: Diagnostic Listening Tests

The analysis of students' diagnostic test in academic listening from 2021-2024 has identified task types that appeared to be particularly challenging for EAP students. These task types could be grouped as follows:

- **identifying a reason** (e.g. *Why did they research?*);
- **inference** (e.g. *According to the speaker, is this trend likely to continue in the future?*);
- **identifying a stance** (e.g. *Does the speaker support the trend?*);
- **identifying a perspective** (e.g. *Which perspective does the speaker present?*);
- **comparing and contrasting** (e.g. *How does the concept of the American Dream compare to how people in your country feel about achievement and success?*);
- **identifying relations between concepts** (e.g. *How does the theory of gatekeeping in media relate to the example made about marketing?*);
- **identifying main and supporting arguments** (e.g. *What is the key point identified in the research?*)

- **evaluation** (e.g. *To what extent can we trust the media to provide us with unbiased news?*).

These question types are classified according to the skill they are targeting and as can be noticed, they all belong to the domain of higher order thinking skill.

Qualitative Analysis: Identifying the Reasons

The next step of the research was to offer students a questionnaire with the questions from the listening test, asking them to reflect on the reasons why they found these particular questions difficult. The most common responses were that they did not hear the “correct answer” or that they had never done such tasks before or that they did not know “how to answer the question”. There was also a significant number of comments stating that the tasks were different from IELTS listening questions.

To support students in developing their critical thinking skill through academic listening tasks and mitigate the effects of IELTS negative backwash, the following steps were introduced to EAP teaching:

- evaluation of current teaching materials;
- development classroom strategies for fostering criticality through academic listening;
- gathering qualitative and quantitative data for preliminary results.

Evaluation of the Teaching Materials

Alongside the in-house materials, Oxford University Press EAP series (Chazal & McCarter, 2012) are used as the main textbook for EAP classes, particularly at the B2 level. From the perspective of critical thinking development, the listening sections consistently feature tasks fostering metacognitive strategies, for example a foreword on the importance of prediction when listening to a lecture and stating the aims for the class, which helps manage students’ expectations and activate metacognitive skills of reflection on their learning. Prediction is also employed at the pre-listening stage, often through visual prompts, which initiates top-down processing and activates students’ schemata. It also engages a higher order thinking skill of *prediction* and a complex skill of *inference* when they need to infer meaning from a visual.

There are also tasks explicitly stating “critical thinking” that also contributes to students’ metacognitive skills development; however, those could have been integrated into the comprehension task for a more natural process of engagement with audio content.

Another important strategy is that after each listening task in the textbook students are invited to compare their answers in pairs, which is in line with Vygotsky’s (1978) sociocultural theory that sees learning as an outcome of dialogic interaction or scaffolding.

There are, however, areas for better integration of critical thinking-focused tasks into listening comprehension sections. For example, certain tasks create conditions for development of higher order thinking skills (e.g. tick the words you might hear in the lecture) but do not provide space for students’ own ideas, which would involve such complex skills as *reasoning* and *evaluation*. The dominance of tasks targeting lower order thinking skills (*understanding* the content, *applying* the information from the content). The language content

of the listening sections creates multiple opportunities for bottom-up processing but those do not seem to always be fully explored.

Material analysis has demonstrated that adaptations needed to be made to the existing resources and new classroom strategies needed to be implemented to support students with critical thinking development through academic listening.

Classroom Strategies to Fostering Criticality Through EAP Listening

The literature review, analysis of teaching materials, students' tests and questionnaires prompted the development of the following strategies to be applied to planning and delivery of academic listening lessons to foster critical thinking:

- 1) facilitation of **bottom -up processing** (*signposting phrases, stance markers, language of perspective, key vocabulary etc*);
- 2) creation of opportunities for **top-down processing** (*schemata activation- e.g. tasks like prediction at the pre-listening stage*);
- 3) introduction of tasks targeting **higher-order thinking skills** (*predicting, analysing, synthesising, comparing and contrasting*);
- 4) introduction of tasks aiming at **complex thinking skills** (*inference, evaluation, reasoning, problem solving*);
- 5) providing “*delicate scaffolding*” (Wilson, 2016) assistance with higher-order and complex thinking skills-oriented tasks throughout the sequence of steps;
- 6) involving **metacognitive skills** (*reflection on the learning experience*), when students are invited to reflect on their task completion and on their overall listening performance after each lesson. They start with guided reflections and as the course progresses, they gradually begin to reflect without prompts, evaluate their progress in class and the course and identify potential areas for improvement. Their reflections are submitted through the class page on the Learning Management System, which allows students to return to their previous submissions and reflect on the overall progress.

Preliminary Results

Although the research is still in progress and the suggested scheme of work would need to be tested on a larger population of students, some preliminary findings are already available. The quantitative data of ongoing and final assessment results have demonstrated improvements in students' performance in certain task types, particularly in tasks targeting higher- order thinking skills as well as some tasks aiming at complex thinking skills, mainly inference and some evaluation.

The analysis of guided and unguided student reflections has revealed a few important points for future adaptations of the strategies. Firstly, students find useful tasks facilitating bottom-up processing such as introduction of signposting language to support with audio content navigation, or hedging device to help identify the stance of the speaker. Prediction and scaffolding tasks have also been identified as crucial for effective listening assignments completion. Additionally, students' reflections have confirmed that the critical thinking tasks are perceived as less challenging when scaffolding stages are included and bottom-up is utilised.

As part of the metacognitive listening strategies development, students were invited to reflect on their reflection practices and, interestingly, most stated that planning how they would approach a task before doing a listening task helps them complete the task more effectively. Most have also emphasised that guided reflections are more helpful than autonomous ones.

Conclusions

With the growing popularity of the IELTS test, most students starting degree programmes through EMI experience negative washback, as their previous learning experience is often limited to test-specific strategies rather than broader cognitive development. This results in a lack of prior exposure to tasks that require higher-order thinking skills, reinforcing a reliance on comprehension-based strategies that primarily target lower-order thinking (*understanding, applying*) in the EAP contexts.

To facilitate critical engagement with academic audio content, a metacognitive strategy-based approach to teaching academic listening has been developed. The introduced scheme of work incorporates bottom-up and top-down processing as well as metacognitive listening strategies.

This allows learners to focus on decoding linguistic elements that scaffold meaning construction as well as interpret information within broader contexts using schemata activation (top-down processing). Metacognitive strategies of self-evaluation and self-reflection were incorporated to support the process of development of critical thinking through academic listening. Although the research is still at its early stage, some preliminary findings prove that the approach fosters deeper cognitive engagement with the content and equips students with the critical thinking skills necessary for academic success beyond standardised test performance.

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The Pedagogical Philosophy Course to Integrate History Through Online Learning Applications

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Abstract

Integrative learning Philosophy and History anticipated learners to develop various soft skills; logical thinking, integrative thinking, brainstorming, and opinion's expression through classroom's activity. Nevertheless, the advancements in technology has led to transform in others various learning approach. Online learning application rapidly replaced the traditional approach wholly. In this study, authors applied effective online learning applications to design learning experiences for Grade 10th students of the KOSEN program, King Mongkut's University of Technology Thonburi, Thailand to enhance their comprehension of integrative philosophy and history context. In addition, the soft skills were developed by the Afterlife's belief activity and assessed learning outcomes through the assignment which integrating philosophical idea with historical context in each civilization by using Mentimeter, Padlet as applications. According to the learning achievement, and the self-assessment of soft skills derived, founded that majority of learners could develop the soft skills and gain a deeper comprehension in term of the conceptual basis after learning The Design of Pedagogical Philosophy Course to integrate History through Online Learning Applications, PHOA approach significantly. The statistic significant findings is ($p < 0.05$). In addition, the majority of learners had a positive attitude toward this learning approach, it can be concluded that the Philosophy Course to integrate History through Online Learning Applications is another pedagogy develop philosophy studies.

Keywords: afterlife, online learning application, philosophy

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Introduction

The Story-based learning defined as the curriculum which involves organizing World historical events and various humankind stories in chronological order. It is divided into 6 timeline which's based on historical periods and eras. Knowledge's content from other disciplines, such as Physics, Chemistry, Biology, Mathematics, and other subjects is integrated and linked together according to the chronological sequence. Some parts also involve linking knowledge from subjects that are not confined to specific historical periods or eras. However, integrating and connecting that knowledge with history, it enables learners to understand the origins of all things through history and to link it coherently with other areas of knowledge.

In the KOSEN KMUTT curriculum, studying philosophy is a learning process designed to develop students' critical thinking skills. It trained them to express their opinions on various issues reasonably and logically. Importantly, the philosophy course is integrated with historical content as well. Applied philosophy is made for the questions of our “everyday life”. More specifically, we can say applied philosophy enhances the quality and quantity of pure philosophy on the groups of its practical aspects (Buchanan et al., 2022). Therefore, the philosophy's topic that learners studied in these curricula during Grade 10 would focus on the meaning of Life. These topics often included the questions about the purpose of life, the value of life, death, life after death, and what happens after death. In particular, the topic of life after death, which is related to the history of Egyptian Civilization that learners were required to study. Learners explored and analyzed beliefs about life after death within the context of Egyptian Civilization, as well as perspectives from Buddhism, Christianity, Islam, and other cultures or civilizations. For instance, The Day of the Dead is traditionally in Mexico, Toraja Funerals – Life, Death in Indonesia.

The recent advances in technology have opened up new avenues in each domain of life. The Education sector has also immensely benefited from the use of technology, Especially, the COVID-19 pandemic was around (Pratama et al., 2020). Since the pandemic of COVID-19, the teaching methods have been adapted to incorporate technology more extensively, especially through applications that enhance student engagement in learning. There were many applications that could be used as learning media, one of which is Mentimeter application media (Pribilová & Beňo, 2024). The Mentimeter application allowed learners to brainstorm and vote on topics they interested, For the Padlet application enabled learners to share their opinions and allow both learners and teachers to view these opinions quickly and easily. The use of applications thus becomes an important tool that can be used to learn philosophy, particularly the topic of life after death. It allowed learners to practice a logical process, express their opinions, and critique. Additionally, it provided an opportunity to practice using technology in learning.

Related Studies

Learning Philosophy

Philosophy originally defined as “Love of Wisdom” in Ancient Greek. It considered as a systematic study of general and fundamental questions concerning topics like existence, reason, knowledge, value, mind, and language. It is the fundamental science of many individual science, such as Physics and Psychology. According to the definition of Philosophy, learning philosophy is necessary for both of instructor and learner to understand

nature of knowledge and human-need Similar to Urrete, opined that Philosophy is the fundamental of knowledge and science (Urrere, 2023). In addition, it divided into many branches of philosophy are epistemology, ethics, logic, and metaphysics. It is the applied or practical philosophy concerned with the nature and aims of education and the philosophical problems arising from educational theory and practice. According to the definition, it enhances a person's problem-solving capacities. In addition, it helps instructor to analyze concepts, definitions, arguments, and problems. It contributes to our capacity to organize ideas and issues, to deal with questions of value, and to extract what is essential from large quantities of information. In the same time, this approach also synthesize a variety of views or perspectives into one unified whole.

Philosophy is considered as a subject of great importance and has been the foundation of learning since ancient times until the present day. Nevertheless, they were questioned as to whether studying philosophy is necessary in the present day. Particularly, in the 21st Century. Alwali focused on how Philosophical questions have been changed overtime (Alwali, 2018). Similar to Burgh, he opined that Philosophy's considered as a core learning approach that support education curriculum design (Burgh, 2002). In addition, In this current, there are various tool and technology promoting Philosophy learning especially after the epidemic of Covid-19. Senad Orhani opined that e-learning and m-learning promoted more dynamic and interactive approach to learner (Senad Orhani, 2023).

Online Learning Application

The online application can be categorized an indispensable part of daily life that can't be avoided. Especially in the current decade, mobile phones are a crucial part of every activity, including work, study, daily life, and even driving. In particular, learning. Therefore, online learning's considered as a normal learning approaches inevitably. It developed from online learning to the interactive learning through various platform. Abuhassna defined online application as an Online learning app is installed on the smartphone and can be used anytime (Abuhassna et al., 2020). In addition, It gives access to both live sessions and pre-recorded classes to students. Trainers use audio- visual mode for teaching. Students engage in the online classroom and interact with other students very easily.

There are many online learning apps offering millions of courses. They have continuously developed for many years in particular after the epidemic of Covid-19, Online learning rapidly replaced the traditional learning approach. Lazaro & Duart divided trend of online learning in latest year into 6 method; More personalized learning, Gamification, Microlearning, Artificial intelligence, Mobile learning, and Assessment Changes (Lazaro & Duart, 2023). According to numerous trends mentioned to, Katarina opined that e-learning disrupted traditional method completely. In the rapidly developing world of education, eLearning trends are changing how we approach teaching and learning (Gambari et al., 2017).

Online learning applications were integrated into teaching and also support learning both inside and outside the classroom. Due to the variety of options, The study of philosophy therefore required the use of applications that are appropriate and aligned with the learning content. Yusubov et al designed Philosophy learning through LMS Moodle in ordered that learners could learn in form of practice-oriented (Yusubov et al., 2021). Similar to Louis, opined that this learning approach could develop learning in this manner can help learners better understand their own thoughts. It's appropriate with learning in Philosophy course. In

addition, Ipek and Ziatdinov applied IDT, Instructional Development Technology as another process creating pedagogical philosophy (Ipek & Ziatdinov, 2017).

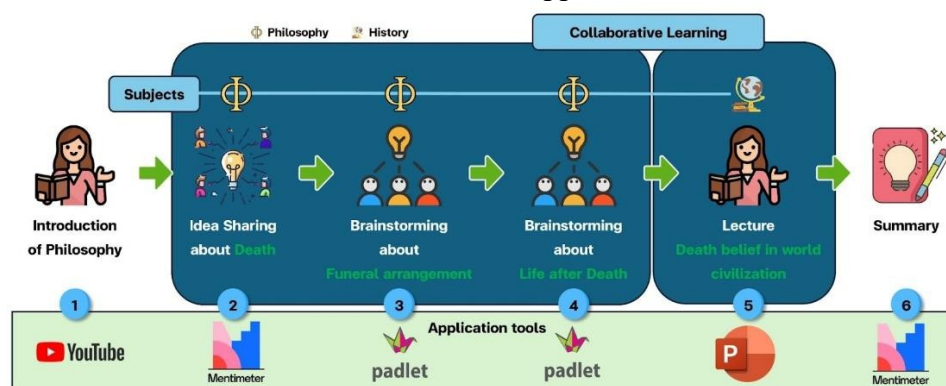
Description of Pedagogical Philosophy Course to Integrate History Through Online Education Applications

Background and Overall Structure

Philosophy is one of the topics in the KOS111 THE RECIPE OF THE COSMOS course, which is an integrated course combining mathematics and social studies within the story-based learning curriculum of the KOSEN KMUTT, King Monkut's University of Technology Thonburi. This course is offered in the first semester for grade 10 students. In this topic, students will learn about human philosophical beliefs regarding life after death in various religions and cultures. This will be explained through the different funeral rituals of each religion. The learning will be designed through classroom activities using various applications as tools. These include watching videos on YouTube, brainstorming through Mentimeter, and collaborating on Padlet. The objective of this topic is that by the end of the learning session, students will understand and be able to explain human thought processes related to concepts of life after death in various religions and civilizations, from the prehistoric period through historical periods and continuing into the present day.

This learning session will last 2 hours and will be divided into 7 steps. In the first step, the instructor will deliver a lecture on the basics of philosophy and have students watch a video about philosophy on YouTube, which will take approximately 15 minutes. In the next step, the instructor will have students brainstorm and discuss the topic "What is death?" using the Mentimeter application for about 10 minutes and then summarize the ideas gathered from the students. After that, students will discuss the topic of how they have observed the handling of death or corpses and compare it with the handling of death or corpses in various religions such as Buddhism, Christianity, and Islam. This discussion will be conducted using the Padlet application for approximately 40 minutes. Next, students will use the information gathered from the brainstorming session to answer the question: "What is life after death according to the students' perspectives?". When the students begin to understand the concept of life after death, the teacher will explain the afterlife beliefs of different civilizations to the students. This includes the ancient Egyptian practices for handling corpses, the Torajan death rituals in Indonesia, the Mexican Day of the Dead festival, and Korean funeral customs, allowing approximately 25 minutes for this task. After that, the instructor will ask students to choose one belief about life after death to write an essay on for homework. In the final step, the instructor will assess students' learning outcomes through their participation in classroom activities, as demonstrated in the essays written as homework. Students will also complete an assessment to evaluate their understanding of philosophical concepts before and after the understanding of philosophical concepts before and after the activity. The entire process described will be shown in Figure 1.

Figure 1: The Overalls of Pedagogical Philosophy Course to Integrate History Through Online Education Applications



Design of Learning Activities Process

The design of the learning activities in this study will ensure that all activities are completed within 2 hours, divided into 6 steps. In each step, the instructor will design activities that encourage students to use their own thinking, utilizing various applications as tools. This approach aims to help students understand and achieve the learning outcomes of this topic, as shown in Table 1.

Table 1: Learning Processing in Philosophy Class

Step	Time	Activity	Particular	Application tool
1	15	Introduction of Philosophy	Instructor lectured on the basics of philosophy and assigned the learners listen to a song written about a cancer patient who knows they are going to die soon.	Youtube
2	10	Idea sharing about death	After the lecture on the basics and listening to the song, instructor asked to share their thoughts and brainstorm on the topic What is death?	Mentimeter
3	20	Brainstorming about funeral arrangement	After learners shared their thoughts on what death is, the instructor would ask them to brainstorm and address the following questions: How learners experienced the management of death or corpses? And how is death or corpse management approached in Buddhism, Christianity, and Islam?	Padlet

Table 1: Continued

Step	Time	Activity	Particular	Application tool
4	20	Brainstorming about life after death	Instructor guided the learners to the question of what they think about life after death is like, asked them to use the information gathered from the previous brainstorming session to help answer this question.	Padlet
5	25	Lecture death belief in world civilization	Instructor lectured the theory of beliefs about the afterlife from different civilizations and religions; Ancient Egyptian, Torajan in Indonesia, Mexican Day of the Death and Korean funeral customs.	Powerpoint
6	10	Summary	<p>-Instructor summarized the overall activities and concepts of the afterlife beliefs of each civilization. Learners will then choose one belief about the afterlife that them believed</p> <ol style="list-style-type: none"> 1. After death the spirit will go to live in another land and wait to be reborn. 2. After death the spirit will go to live in another land forever. 3. There is no spirit, death is the end, it is empty. 4. After death the spirit will be reborn immediately. <p>After that, Students will choose one belief about the afterlife that they believed or interested the most and write an essay. In their essay, they should explain their preferences, agreement, or impression of that belief, and relate it to their own experiences with that belief.</p>	Mentimeter
7	20	Assignment/ Homework	The teacher will evaluate the students' learning outcomes in philosophy by reviewing the essays they have written. Additionally, the students will assess their own understanding of philosophy both before and after participating in the activity.	


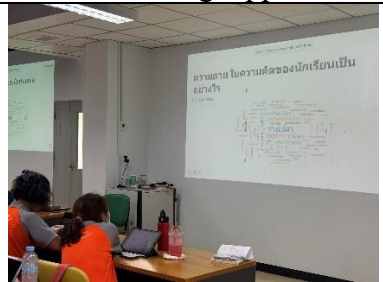

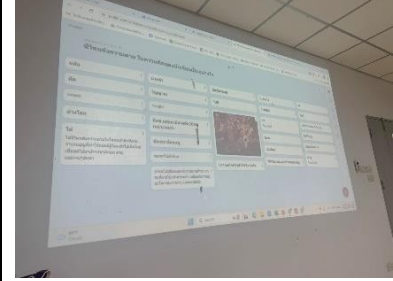
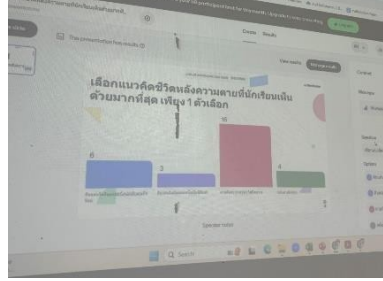

Research Design

Participants

The participants in this study were 76 students in grade 10th of KOSEN KMUTT (Automation Engineering and BioEngineering), King Mongkut's University of Technology Thonburi. All participants enrolled in KOS111 THE RECIPE OF THE COSMOS course. All participants have mobile phones and internet access for use during the 2-hour study philosophy class.

Procedure

Figure 2: Learning Process in Philosophy Course to Integrate History Through Online Learning Applications

		
<ul style="list-style-type: none"> - Listen to a song written about a cancer patient who knows they are going to die soon on Youtube. - Students scan QRCode for sharing ideas on Mentimete. 	<p>Idea sharing about death on Mentimete.</p>	<p>Brainstorming about funeral arrangements on Padlet.</p>
		
<p>Brainstorming about life after death on Padlet.</p>	<p>Lecture death beliefs in world civilization and students choose one belief about the afterlife that they believed.</p>	<p>Assignment/ Homework (Writing essays)</p>

Data Collection and Data Analysis

The data collection for this study will be done in two ways. The first one is grading the students' essays by the teacher. Scoring includes a scoring rubric to assess student understanding about philosophy and history. The second one is for students to complete a self-assessment before and after the activity. The questions used for the students' self-assessment will be those where

students rate themselves on a scale of 1 to 5. After that, the result of self-assessment was analyzed with the SPSS program by using paired t-tests.

Result and Discussion

Learning Achievement Form Essay Writing

Based on the teacher evaluated students by a rubric on the comprehension of philosophy and history that occurs during activities in the class from writing the essay. It was found that out of a total of 76 students, 18 students received a B+ grade and 58 students received an A grade. The average score of the student was 87.68 ± 9.52 , it indicates that most students understood the meaning of philosophy and were able to apply it to their own thinking processes or experiences.

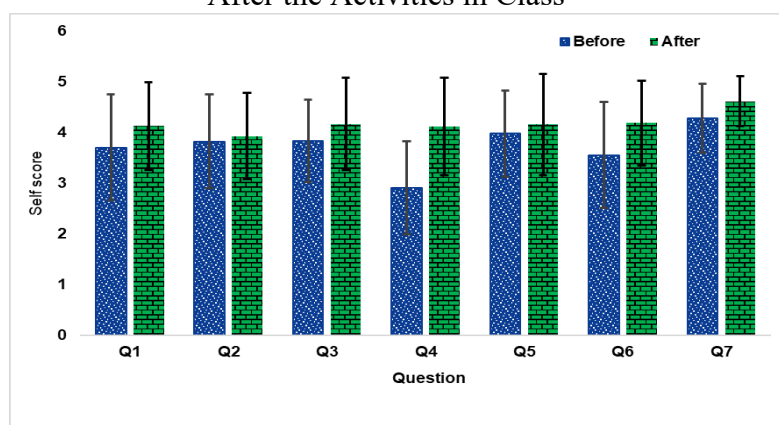
Student Self-Evaluation Score

From the self-assessment scores before and after the activity on various questions, it was found that most students rated themselves at a higher level for each question after the activity, as shown in Figure 1 and Table 2.

Table 2: Student Self-Evaluation Score Compared With Before and After the Activities in Class

Question	Experiment	n	Mean \pm SD	t	P
1. Does philosophy help students understand themselves and society?	Before	76	3.71 ± 1.04	2.97	0.004
	After		4.13 ± 0.86		
2. Does philosophy help students develop systematic thinking?	Before	76	3.83 ± 0.92	0.74	0.46
	After		3.93 ± 0.85		
3. Can the study of life after death be connected to historical content?	Before	76	3.84 ± 0.81	2.22	0.029
	After		4.17 ± 0.91		
4. Have students' knowledge of afterlife beliefs increased?	Before	76	2.91 ± 0.92	7.43	0.015
	After		4.12 ± 0.96		
5. Using technology as a tool for exchanging and expressing opinions on philosophy topics (life after death) enhances students' learning?	Before	76	3.89 ± 0.85	1.78	0.079
	After		4.16 ± 1.00		
6. Do tools like music, Mentimeter, and Padlet enhance students' learning about life after death?	Before	76	3.56 ± 1.04	4.21	0.042
	After		4.19 ± 0.83		
7. Do students think their knowledge and understanding of life after death will be after completing the activity?	Before	76	4.28 ± 0.68	3.42	0.001
	After		4.62 ± 0.49		

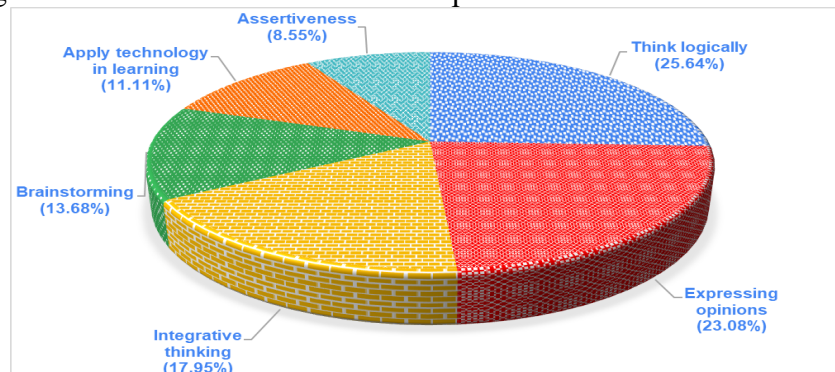
Figure 3: Student Self-Evaluation Score Compared With Before and After the Activities in Class



Students' Soft Skills Development

When the designed learning model was implemented in classroom teaching, it was found that this learning model could enhance the development of various skills in students after participating in activities. According to the self-assessment results of the students after the activities, most students believed that their ability to think logically increased, accounting for 25.64% of all students. This was followed by the skills of expressing opinions at 23.08%, integrative thinking at 17.95%, brainstorming ability at 13.68%, the ability to apply technology in learning at 11.11%, and assertiveness at 8.55%, as shown in Figure 4.

Figure 4: Students' Soft Skills Development After the Activities in Class



Conclusion

This study aims to analyze how the beliefs about life after death from different civilizations can help students understand the meaning of philosophy. This is to enable students to develop various soft skills, such as their own thinking processes, ability to express their opinions, brainstorming and self-understanding abilities as well as the ability to apply technology in learning, by using applications or online platforms as tools. According to the result, it conclude that learners could develop and increase in both knowledge content and soft skill from those pedagogy significantly. Nevertheless, this learning approach were also adapted in with others topics and learning lessons which will be the future study.

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Leveraging Game-Based Learning for Enhanced Knowledge Retention and Collaborative Learning Among Novice Computer Science Students

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Abstract

As novice students start learning the concepts of computer science, they struggle to master the content immediately. Even when they have eventually gained some understanding of the subject matter, students tend to have low knowledge retention, especially as the classroom lessons progress to other chapters. This causes fragmented understanding and poor academic performance. Additionally, the lack of peer cohesion and collaborative engagement hinders the exchange of ideas and subsequently results in limited problem-solving strategies. The literature review strengthens the role of gamification in improving engagement and academic performances and that student engagement and interest are key factors in enhancing learning outcomes. Technology is highlighted as a valuable tool for creating authentic learning environments, diversifying learning experiences, and promoting active learning. This study aims to develop an interactive learning tool that integrates education with play, enhancing conceptual understanding and student engagement while encouraging peer collaboration and underpinning the constructivist framework. The game-based learning model deployed in this study is called 'Tech Traverse', modified from the Snake and Ladder game and the concept of scoresheet adapted from the chess game. A phenomenological qualitative study was conducted where participants answered open-ended questions anonymously via Google Forms. The qualitative data was then analysed thematically to identify common trends, insights, and areas for enhancement in the game design. Four major themes emerged from the data analysis: Learning Experiences, Engagement and Enjoyment, Game Structure and Mechanics, and Collaboration and Teamwork. Study findings state that Tech Traverse has improved information recalling and retention, teamwork, and engagement.

Keywords: game-based learning, novice programmers, collaborative engagement

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Introduction

Background of Study

Learning programming presents a significant challenge for novices, particularly in logical thinking and abstraction. Programming is a high-level cognitive activity that demands the ability to manipulate interrelated abstractions and apply logical-verbal reasoning. Many students struggle with immediate content mastery, and even when they grasp fundamental concepts, knowledge retention remains low as lessons progress. This results in fragmented understanding, affecting their ability to apply learned concepts in problem-solving tasks. Additionally, a lack of peer collaboration and interactive learning environments limits knowledge sharing and teamwork, further hindering problem-solving development. The literature highlights gamification as a promising approach to increase motivation, engagement, and learning performance as well as to lower learning barriers (Kucak & Kucak, 2022; Marín et al., 2018; Rojas-López et al., 2019). By incorporating the game elements into education, gamification boosts interaction and creates an effective students-centred learning environment that fosters collaboration, knowledge retention and problem-solving skills. To address these issues and to leverage the game-based learning approach, this study introduces Tech Traverse, a game-based learning tool designed to bridge the gap between conceptual learning and practical application. Inspired by Snakes and Ladders and incorporating scorekeeping mechanics from the chess game, Tech Traverse integrates challenges, rewards, and setbacks to reinforce computational thinking while promoting collaborative engagement. By implementing Tech Traverse within a student-centred, constructivist framework, this study aims to explore how game-based learning can enhance conceptual understanding, problem-solving abilities, and teamwork among novice programming students. Given that student-centred learning has been encouraged in educational institutions to improve student accountability, student engagement, and active learning, Tech Traverse can be implemented to meet the demands of the knowledge and skills learners are expected to obtain. The approach allows students to collaborate, providing them more time to engage in the classroom and thus improving knowledge retention.

Problem Statements

In learning programming languages, students lack peer cohesion and collaborative engagement as teachers spend a substantial amount of time in direct instruction (Peters & Pears, 2013). Consequently, the limited exchange of ideas and problem-solving strategies affects knowledge-building and hinders the development of teamwork and communication skills. Gamification has been found to increase engagement and motivation, and it is increasingly being recognised as an approach for encouraging user involvement, drive, and enjoyment in non-gaming environments. In education, it can foster an engaging learning environment that, when combined with promising instructional approaches, improves the overall student learning experience (Ahmad et al., 2020). However, despite its benefits, many programming courses lack structured gamified approaches that promote concept mastery and peer collaboration. Existing models focus primarily on motivation rather than systematic improvements in retention and problem-solving (Zhan et al., 2022). Tech Traverse has been built to encourage peer interaction through collaborative gameplay, prompting students to work together, share insights, and create a supportive community.

Poor knowledge retention remains another significant challenge among novice programming students, hindering their ability to develop problem-solving skills in computer science (Cheah,

2020). While they may grasp syntax theoretically, they struggle to apply concepts effectively, leading to weak analytical thinking and inefficient solutions. This issue is further compounded by varying levels of prior knowledge, making it difficult for students to achieve conceptual mastery and long-term retention. Foundational knowledge in programming is cumulative. As a result, failure to effectively integrate and retain knowledge jeopardises pupils' long-term academic success. Existing direct instructional methods focus more on content delivery rather than reinforcing retention through active engagement. Gamification in education promotes long-term retention through practical application (Brull et al., 2017; Putz & Treiblmaier, 2019; Smirani & Yamani, 2024). While gamification has been acknowledged as a method to improve student involvement, few studies have examined how well non-digital games work to guarantee greater retention of information. Tech Traverse has been designed to promote continuous revisiting of key ideas, helping students to build a stronger cognitive connection and improve retention.

Research Questions

1. What is the role of Tech Traverse in improving constructive communication and collaboration between peers?
2. How does the implementation of Tech Traverse contribute to strengthening programming knowledge retention among novice programming students?

Research Objectives

Main Objective:

- To relate the implementation of Tech Traverse and the knowledge retention and collaborative learning among the Malaysian Matriculation Programme computer science students

Specific Objectives:

1. To explore the role of Tech Traverse in improving constructive communication and collaboration between peers
2. To discover the contribution of Tech Traverse in strengthening programming knowledge retention among novice programming students
3. To understand the role of Tech Traverse in reducing the stress faced by novice programming students when learning computer programming

Literature Review

Gamification in Programming Education

Gamification is a design method incorporating game elements and frameworks into non-game situations, such as education. Gamification in education tries to use the motivational power of games in educational processes, encouraging students to continue in the face of adversity (Stott & Neustaedter, 2013). By leveraging mechanics like points, challenges, leaderboards, and rewards to encourage participation and persistence, gamification significantly affects students' motivation and academic achievement. Studies have revealed that gamification creates a positive learning atmosphere, contributing to students' interest in learning. Furthermore, gamification promotes active learning by moving the emphasis away from passive instruction and towards an adventurous and immersive learning process. Rewards and progress tracking give students a sense of accomplishment and purpose,

encouraging them to persevere in adversity. Specifically, gamification has been shown to enhance students' programming skills and academic performance (Abdul Rahman et al., 2018; Smirani & Yamani, 2024; Yun et al., 2020). Gamification promotes collaborative learning by fostering peer engagement, knowledge sharing, and teamwork, all of which are required for problem-solving in programming education. The combination of quick feedback and adaptive challenges enables students to reflect on their failures and alter their learning tactics, resulting in greater conceptual understanding.

Collaborative Learning

According to Laal and Ghodsi (2012), Collaborative learning (CL) is a method of teaching and learning in which groups of students work together to solve a problem, accomplish a task, or create a product. This technique emphasises learners being responsible for one another and their learning, so the success of one student encourages others to be successful. The core principle of collaborative learning is centred on consensus building through cooperation among group members rather than rivalry. Academically, it promotes deep learning, critical thinking, and problem-solving by engaging students in active conversations and peer interactions, resulting in increased accomplishment and productivity. CL also improves assessment techniques by providing alternate evaluation methods, encouraging self-reflection, and enabling educators to customise instruction based on group dynamics. Overall, CL improves engagement, performance, and resource accessibility, resulting in a comprehensive educational approach that helps students outside the classroom (Nokes-Malach et al., 2015; Qureshi et al., 2023). Collaborative learning (CL) in programming involves students working together to solve coding challenges, debug programs, and build computational thinking skills. Tech Traverse encourages team-based problem solving, where students analyse difficulties, debug mistakes, and make collective judgements. The game promotes active engagement, communication, and a better knowledge of programming ideas through peer conversation, shared techniques, and interactive gameplay.

Knowledge Retention

Knowledge retention is a learner's ability to remember and apply acquired knowledge over time, allowing for more straightforward recall and practical application of concepts. Gamification, interactive pedagogies, and retrieval-based learning have all been demonstrated to improve retention by reinforcing information with engaging and repetitive tasks (Shuxratovna, 2024). Marín et al. (2018), Nokes-Malach et al. (2015) and Rathna Sekhar & Goud (2024) state that collaborative learning, active participation, and repeated practice all help to improve knowledge retention. Discussing and educating others improves comprehension, whereas real-world applications and retrieval practice improve memory. Gamification and interactive methods engage learners while reinforcing topics through repetition. Observational learning, error correction, and explanation within groups help to cement information. Furthermore, technology facilitates personalised learning, allowing students to advance at their own pace and improve retention. Structured feedback, continuous assessments, and peer evaluations further support long-term retention by enabling learners to reflect on their progress and adjust their learning strategies accordingly. Integrating multimodal learning experiences, such as visual, auditory, and kinesthetic activities, reinforces knowledge through multiple pathways, enhancing recall and practical application.

Method

Research Design

Interpretivism is used in this study to gather feedback on learners' experiences using Tech Traverse. The researcher functions as a social actor, analysing the various viewpoints of participants and reflecting on their insights to improve the game's design and implementation. This study takes a mixed-method research approach, with data collected in the form of words and numerical representations. Qualitative research investigates a central phenomenon by asking wide questions and allowing participants to provide detailed viewpoints (Jackson et al., 2007). Because this research aims to understand better learners' engagement, collaboration, and knowledge retention using Tech Traverse, collecting comprehensive, descriptive data is critical to its success. A phenomenological research design was utilised to investigate the lived experiences of novice programming students who engaged with Tech Traverse. This approach ensures that the study accurately captures student experiences while minimising the researcher's preconceived notions. The quantitative component included pre-and post-tests to assess students' knowledge retention before and after using Tech Traverse. This method allows for an objective assessment of learning gains, which supplements the qualitative interview insights. By integrating the two methodologies, the study provides a more complete picture of how Tech Traverse affects student motivation, engagement, and problem-solving abilities. Furthermore, the findings help to improve the game's structure, ensuring its usefulness in teaching novice learners programming fundamentals. This design sheds more light on Tech Traverse's usefulness in improving programming instruction by analysing learners' involvement, motivation, and problem-solving tactics during games. Furthermore, it influences changes to the game's structure, ensuring that it is effectively intended to help novice learners master programming principles.

Design and Development of Tech Traverse

Tech Traverse was developed using a systematic design process with the goal of increasing participation, cooperation, and knowledge retention in programming instruction. Tech Traverse, which is inspired by the Snakes and Ladders board game and incorporates aspects from chess-style scorekeeping, uses game-based learning approaches to make programming ideas more dynamic and accessible to beginning learners.

The game is intended to teach essential programming concepts such as data types, variables, control structures, arrays, and methods. Students participate in team-based gameplay, moving through three zones: Knowledge Boost, Challenge Zone, and Trouble Zone, each with programming-related challenges that involve critical thinking and problem-solving. The game promotes collaborative problem-solving, in which students work collaboratively to predict the output of a given program segment, identify answers for theoretical aspects of Java programming and/or uncover syntax, logic, or runtime issues while strengthening computational thinking skills.

A sequence of task cards is created to efficiently structure learning, each of which contains a programming-related question or challenge. The Knowledge Boost portion contains foundational questions reinforcing fundamental concepts, whilst the Challenge Zone includes problem-solving challenges requiring deeper comprehension. The Trouble Zone delivers obstacles that halt students' progress. It adapts the 'snake' element of the Snake and Ladder game. QR codes are included in select cards to provide just-in-time tips, allowing students to

seek help as needed while encouraging self-directed learning. Each team is allowed to scan the QR code at the back of the task card only twice during the entire game. Figure 1 shows the examples of task cards from each of the zone.

Knowledge Boost

- Players must answer the question on the task card within two minutes
- For each correct answer, the team gets to progress two steps forwards

Challenge Zone

- Players must answer the question on the task card within two minutes
- For each correct answer, the team gets to progress two steps forwards
- For any incorrect answer, the team is required to move one step back

Trouble Zone

- The team is required to move back according to the number of steps indicated on the task card

Figure 1: Examples of Task Card From Each of the Zone



Figure 2: Scoresheet

Tech Traverse Scoresheet

Turn	Dice Roll	Start Square	Landed Square	Answer	Result	Notes/Reflection

A scorecard is used to track pupils' progress, noting dice rolls, zones visited, responses given, and correctness of answers. This progress-tracking method allows students to reflect on their

learning experiences, emphasising the value of perseverance and revision. The teacher facilitates gameplay through scaffolding. Figure 2 shows the scoresheet used in the game.

Data Collection

This study included 41 of 73 computer science students from Sarawak Matriculation College. The sampling centred on students learning programming for the first time as part of their public test curricula. A purposeful sampling strategy, namely criterion sampling, was used to ensure that participants met specific criteria. These criteria were voluntary engagement in the study, no prior experience studying programming for examination purposes before enrolling in the Matriculation program, and attendance of at least 90% of programming classes during the semester. This method ensured that the chosen participants had a consistent learning background, allowing for more reliable evaluations of their involvement, collaboration, and information retention while utilising Tech Traverse.

The data collection for this study included pre-and post-tests to assess knowledge retention, as well as focus group interviews to assess student collaboration and participation while using Tech Traverse. To collect detailed participant responses, each interview was instantly transcribed, complete with behaviour observations, phonetic transcriptions of dialects, and filler words. (Plummer-D'Amato, 2013) Recommends four to five focus groups for qualitative research. In this study, seven groups of five and one group of eight were recruited. Interviews lasted up to 60 minutes, as suggested by (Gibbs, 1997). Data was collected within four weeks after the gaming session to ensure that responses reflected current and authentic student experiences with the learning tool.

Data Analysis

This study used a mixed-methods approach to investigate students' experiences with Tech Traverse, with a particular emphasis on its effects on information retention, engagement, and collaboration. The statistics were evaluated numerically and qualitatively to provide a thorough understanding of the game's effectiveness. The quantitative analysis used a pre-test and post-test to assess students' knowledge retention after playing the game. Descriptive statistics, such as mean scores and percentage differences, were used to evaluate students' performance before and after the game. The results revealed if the game served to strengthen students' understanding of the subject matter. The qualitative study employed a topic analysis to evaluate students' perceptions of the game-based learning experience. The responses to open-ended questions were sorted and organised into major themes. The analysis followed Braun and Clarke's (2006) six-step process, which included familiarising with the data, developing preliminary codes, identifying themes, reviewing themes, defining themes, and drafting the final report. Direct student quotes were included to back up the findings, which provided valuable insights into their experiences.

Discussion

Thematic analysis results show that Tech Traverse encouraged positive student discussion and collaboration. The game facilitated meaningful interactions that contributed to a shared learning experience by encouraging group discussions, peer learning, and team bonding.

Research Question 1: What is the role of Tech Traverse in improving constructive communication and collaboration between peers?

The study discovered that students actively engaged in talks while striving to tackle game-based challenges. The planned activities encouraged students to express themselves, discuss ideas, and critically evaluate multiple points of view before reaching an accord. One kid said, "Yes, because we discussed the questions and shared our ideas." This collaborative effort increased their understanding of the problem and their ability to communicate their reasoning effectively.

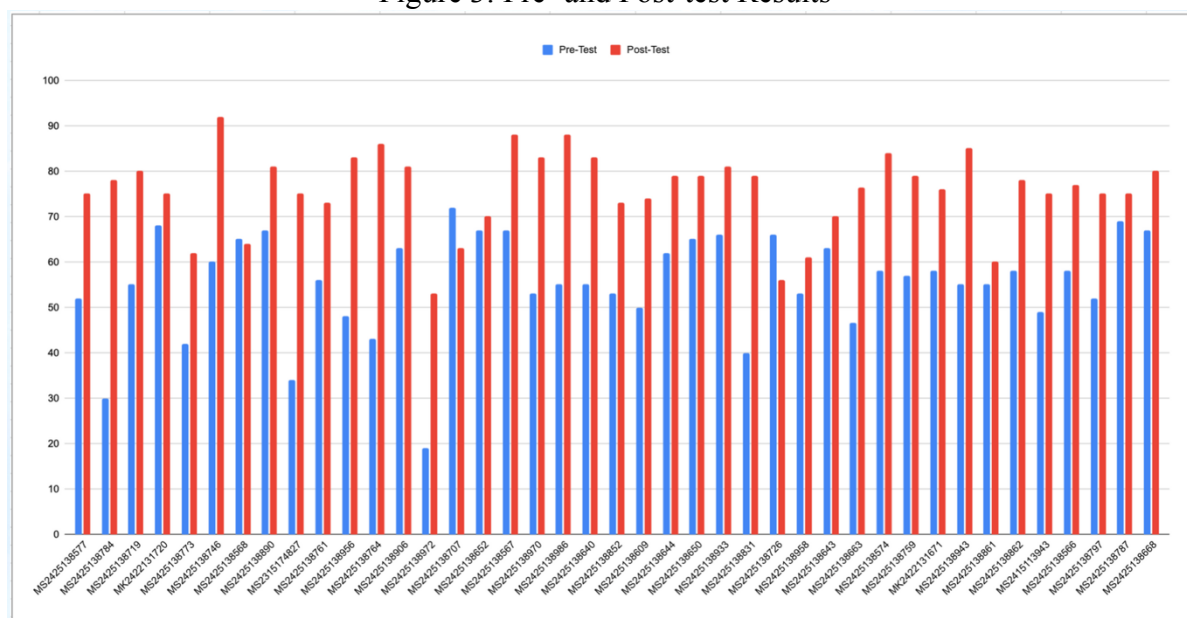
Tech Traverse has allowed peer-to-peer learning and shared understanding, with students assisting one another in comprehending complex concepts. The game environment encouraged spontaneous knowledge-sharing, as seen by students' feedback: "Yes, my peers and I collaborate to answer the question, and everyone contributes their ideas about the answers." This demonstrates that the game fostered a culture of learning from one another, reducing the emphasis on individual achievement and creating a more welcoming learning environment. Students reinforced their own learning by participating in discussions and clarifying topics for their peers, as well as gaining from the perspectives of others.

Aside from knowledge exchange, Tech Traverse promoted interpersonal interactions and team cohesion. Students said that working towards a common goal boosted their sense of belonging and trust in their peers. One participant added, "We work as a team to achieve the same goal. It strengthens the connections of friendship". This implies that the game not only served as an academic tool but also improved students' social growth by allowing them to create meaningful relationships that could last beyond the classroom.

Research Question 2: How does the implementation of Tech Traverse contribute to strengthening programming knowledge retention among novice programming students?

Figure 3 shows the pre-and post-test results.

Figure 3: Pre- and Post-test Results



The examination of pre-test and post-test results, as depicted in the bar chart, shows that Tech Traverse improved programming knowledge retention among novice programming students. The post-test scores are consistently higher than pre-test scores across all but

three participants, indicating that the game-based learning strategy improves students' information retention. The data shows a significant rise in test results from pre-test to post-test, suggesting that students retained more programming principles after utilising Tech Traverse. The majority of students who scored lower on the pre-test demonstrated significant improvement on the post-test. This suggests that the game's interactive and problem-solving aspect helped them learn and remember fundamental programming ideas.

Conclusion

Tech Traverse, a gamified learning approach inspired by Snakes and Ladders, enhances knowledge retention and collaborative learning among novice computer science students by integrating game mechanics, aesthetics, and game-based thinking. The game addresses challenges in programming education, such as low motivation and poor retention. It incorporates Knowledge Boost, Challenge Zone, and Trouble Zone cards to promote critical thinking, while QR codes provide timely hints for self-directed learning. Findings indicate that Tech Traverse fosters peer interaction, teamwork, and a deeper understanding of programming concepts within a student-centered learning environment. By encouraging accountability and constructive communication, it helps students develop essential skills for academic and professional success. While the results are promising, further research is needed to explore its applicability in diverse educational contexts and assess its long-term impact.

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Enhancing Emergent Literacy in an Online Distance Learning

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Abstract

Despite the benefits online distance learning offers, such as cost efficiency, accessibility, and flexibility, it poses challenges to early childhood education teachers and beginning readers. Teachers' experiences delivering lessons online and the difficulties they face that impact the young learners' literacy development are underexplored. The present study examined how preschool teachers in the Philippines teach reading and the challenges they encounter in an online learning environment. Six preschool teachers participated in a semi-structured interview. Qualitative data were analyzed using three major stages: open coding, axial coding, and selective coding. Four major themes were drawn: online instruction, student engagement, parent involvement, and online setbacks. Findings show that integrating technology played a significant role in delivering lessons using conferencing tools and online applications that young students can easily manipulate. Traditional instruction reading materials are useful such as sand writing, letter cardboards, and puzzles that teachers show virtually. Students actively participated in their synchronous activities like circle times, singing, and recitations. However, challenges included technical issues due to poor internet connection and excessive parental involvement that may diminish student work credibility. Parents assisted their children in online submissions and there are instances when they coach their children in answering questions both in oral and written. This study contributes to designing programs for the improvement of online engagement and literacy instruction, and training programs that will equip educators in online teaching. Further studies on assessing students' learning, the effectiveness of materials, and the efficiency of teachers' strategies are recommended.

Keywords: emergent literacy, online learning, reading

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Introduction

The outbreak of the 2019 novel coronavirus has led to schools closing in an attempt to prevent the spread of the disease (Li & Lalani, 2020). Social isolation measures forced Universities to shift to online distance learning because face-to-face learning poses a threat in the spread of this deadly virus. Schools availed online learning management systems and online applications to ensure continuous education amid the pandemic (Linney, 2020). Teachers are becoming increasingly knowledgeable about various online educational tools that facilitate learning, which was not previously given attention in a face-to-face classroom. Technology and the Internet have become undeniably essential in the modern educational system. Web conferencing, visual presentations, and audio-visual materials have become teachers' companions in their online distance teaching.

Online distance learning encompasses a range of learning environments, including synchronous, asynchronous, and hybrid models. The synchronous learning environment enables real-time, simultaneous interaction between teachers and students through web conferencing tools and other electronic media (Salmon, 2013). In an asynchronous learning environment, teachers provide materials and activities that students can complete at their own pace. A hybrid learning environment blends synchronous sessions with asynchronous sets of activities (Perveen, 2016).

In the Philippines, both private and public schools joined the global shift to online distance education. The Department of Education released the Most Essential Learning Competencies for Kindergarten to Senior High School, which schools should focus on for the 2020-2021 school year. This adjusted curriculum prioritized the necessary skills for the next grade level.

Continuing students in basic education may be able to adjust and adapt to this makeshift situation, mainly if they have already acquired and developed fundamental literacy skills. However, for children who are just beginning to learn, those who will enter kindergarten, the acquisition of basic literacy skills such as reading and writing is in question.

The preschool years are crucial for developing emergent literacy skills and ensuring a smooth transition into formal reading (Pullen & Justice, 2003). Rohde (2015) claims that children learn the function and process of reading before reading a book. This implies that learned emergent literacy skills before schooling need to be strengthened in formal education. To prevent reading problems, it is essential to support the development of preschool children's literacy experiences and to promote reading success (Oncu & Onluer, 2015). This suggests that preschool children also require a presence in online learning if educators believe they should have a foundation for literacy development.

Teachers may not have issues with preschoolers' use of technology to communicate and facilitate learning. It plays a big part in enhancing their literacy skills. In the 21st century, preschoolers are no strangers to using technology. They are well-versed in online applications that can be played on their mobile devices, which serve either entertainment or educational purposes. Using devices seems to be fun for young learners. DaCunha (2016) stated that children enjoyed using iPads during their free time. Being able to manipulate their devices is an advantage in teaching preschoolers the reading skills needed to become independent readers. Other technologies, such as applications of Augmented Reality, have been shown as a possible source of cognitive development for young learners (Oranc & Kuntay, 2019). Liu, Toki, and Pange (2014) cited Lovari and Charalambous (2006) in their findings, which

suggest that the use of Information and Computer Technology in Preschool education is significant. When appropriately used by educators (Lupu & Laurențiu, 2015), it can become a valuable tool for teaching and learning.

Allvin (2020) argues, however, that “preschool is about relationships and the learning that occurs between children and teachers, as well as among the children themselves.” Torres, Domitrovich, and Bierman (2015) note that “positive interpersonal relationships in preschool also predict kindergarten achievement.” Digital technologies can support early education, but educators must understand their limitations. Training for teachers on early literacy is essential, and on how to maximize the use of technology tools for emergent literacy activities (Oncu & Onluer, 2015). This statement may be supported by the works of Verhoeven, Voeten, Setten, and Segers (2020) and Evans, Nowak, Burek, and Willoughby (2017). Their meta-analysis of computer-assisted early literacy interventions found that strict phonological awareness training, combined with phonological awareness and letter training, and the use of e-books, yielded small positive effects across languages differing in orthographic depth. Additionally, the use of Alphabet e-books in preschoolers was associated with less engagement in letter-related behaviors.

Herold (2020) believes that developing fundamental reading tasks is already challenging for educators, even in face-to-face learning settings. Teaching reading skills online, without the ability to interact with students in person, is a daunting challenge. Miller, McLaren, and Xu (2020) noted a shortfall in online learning. It seems that students have low engagement in class, which may affect their academic performance. Sun and Rueda (2012) attributed low student engagement to students' physical absence in class, while Tuckman (2007) attributed it to teachers being physically distant from online courses.

According to Mader (2020), learning experiences are critical for preschoolers. Students learn about emotions, friendships, and the development of social and psychomotor skills, which cannot be replicated in online learning. Dong, Cao, and Li (2020) report that parents of early childhood learners reject online learning due to its shortcomings, inadequacy of self-regulation, and their “lack of time and professional knowledge in supporting children’s online learning.” They still prefer traditional settings over online education.

Several studies present debatable claims that favor traditional learning over online education. Kearns (2016) notes the notable impacts on faculty innovation across various online teaching delivery methods. Teachers become more focused on how their students acquire knowledge, become well-acquainted with online technologies, and demonstrate a clear distinction between the activities they can facilitate in class and those that can be done outside of class time. On the other hand, Mishra, Gupta, and Shree (2020) reported that teachers faced difficulty in conducting online practical classes, as it required a methodical demonstration of the complete procedure in the presence of learners. Song (2016) cites challenges concerning the implementation of online learning assessment that include understanding student engagement, higher-order thinking skills, activities design, and online teaching evaluation and efficiency. A study by Støle, Mangen, and Schwippert (2020) found that young children performed significantly better on a reading test presented on paper than on a screen. Moreover, Lily, Ismail, Abunasser, and Alqahtani (2020) accounts for some consequences of online distance learning in terms of pedagogy and psychology. Some problems in online teaching that parents and teachers have disclosed include the lack of social skills development and increased screen time resulting from synchronous teaching (Jan, 2020). Problems with staying home may prevent both students and teachers from learning and

teaching effectively. In a US National survey reported by Moser, Wei, and Brenner (2020), language teachers from preschool to grade 12 with experiences in distance education expressed concerns about learners' outcomes, although several adjustments in their usual procedures policies, and expectations are made while engaging in online distance learning.

While the presented studies provide a glimpse into the need for online learning amid a pandemic, the use of technology that may enhance early literacy among preschool learners, and some issues and adverse effects that both parents and teachers expressed in weighing online and traditional learning, few studies focused on the teachers' practices to develop young learners' early literacy. Several factors at home that affect learning have been magnified, but the teachers' strategies and techniques in delivering lessons online are underexplored.

Theoretical Support

Emergent Literacy (EL), introduced by Marie Clay in the 1960s, includes knowledge and abilities related to the alphabet, phonological awareness, symbolic representations, and communication. Understanding these concepts begins in infancy and continues through age five (Rohde, 2015). EL theory posits that children acquire language, reading, and writing knowledge before entering school (Research Starters, 2014). Teale and Sulzby (1986) explain that EL encompasses all the skills, knowledge, and attitudes that are assumed to be precursors to traditional forms and the environments that support learners' improvements. Assessment of EL skills encompasses evaluations of all aspects of early literacy, including reading, writing, speaking, listening, and thinking.

Continuing the development of emergent literacy skills in an online learning environment is a challenging feat, where the internet serves as the primary tool for delivering online instruction. Online learning is often used interchangeably with e-learning and encompasses a range of learning environments, including synchronous, asynchronous, and hybrid learning models (Perveen, 2016). Remote learning, as a response to the global crisis, emanates from Vygotsky's sociocultural theory, which states that cognitive development stems from social interaction and guided learning within the zone of proximal development, as children and their partners co-construct knowledge (Ajabsir, 2018). Even during the pandemic, guided learning remains essential for the development of early learners' English language (EL) skills.

Statement of the Problem

This paper examines how preschool teachers enhance children's early literacy in online distance learning.

Specifically, it seeks to answer the following questions:

1. How do preschool teachers teach Reading in an online class?
2. What are the challenges that teachers face in teaching Reading online?

Methodology

Research Design

This study used a qualitative research design following a basic interpretive qualitative approach. According to Merriam (2002), in this approach, researchers define what participants construct and interpret in their experiences. This study focuses on the instruction of reading by preschool teachers to emergent learners and the challenges they encounter in an online learning environment. Semi-structured interviews were conducted to examine the strategies and materials they used uncommonly in face-to-face learning, as well as some issues faced in an online learning environment.

Participants and Sampling

The participants were chosen using purposive sampling and possessed the following criteria: 1) preschool teachers teaching in an online learning modality; 2) teaching reading to children aged five to six years old; and 3) using online application tools in their classes. The participants were all from private schools. Their consent was asked in recording interviews. They were assured that the researcher would observe anonymity and confidentiality. They were given codes labeled P1 to P6.

Data Collection Technique and Procedure

The mode of inquiry in this study was the use of interviews. Interviewing facilitates participants in making meaning through language; its goal is for the participant to reconstruct their experience within the topic in a discussion (Seidman, 2006). An interview protocol was prepared to guide the researcher in conducting semi-structured interviews. The interviews were recorded and transcribed following the denaturalized transcription approach. According to Oliver et al. (2005), as cited by Nascimento and Steinbruch (2019), this approach constantly corrects grammar, removes noise in the interviews, such as fillers and other unnecessary words, and standardizes non-standard speech and accents.

Before interviewing the participants, the researcher asked for their consent via email, personal messaging, or text messaging. They were assured of their confidentiality and anonymity. The schedule was set based on their availability. Permission to record the interviews was also requested. Zoom and Google Meet were the platforms that used recording features. Recording began after the researcher explained the nature and purpose of the interview in detail. Interviews were then transcribed and analyzed.

Data Analysis

Three major stages were followed in analyzing qualitative data. These were open coding, axial coding, and selective coding (Creswell, 2007). Reviewing the interview transcripts encoded in the Microsoft Word application, open coding was conducted by writing notes and comments in the margins where significant statements were identified. From these significant statements, initial codes were determined. Open coding was performed repeatedly on all participants' transcripts, yielding an average of 6 initial codes. Similar concepts drawn from the initial codes of each transcript were merged through axial coding, where eight master lists of categories were classified and subjected to selective coding. Four categories or themes were generated through selective coding, embodying the study's findings. These categories

were finalized based on the criteria set by Merriam (2002), which is also known as CERES, an acronym coined by Ballena and Liwag (2019). These criteria were (1) Conceptual congruence, (2) Exclusivity, (3) Responsiveness, (4) Exhaustiveness, and (5) Sensitivity. Conceptual congruence was observed when the equal grammatical structure was used in the finalizing categories. Exclusivity was maintained when the themes focused on each concept, ensuring no redundancy was introduced in the final categories. The responsiveness criterion was met by ensuring that the identified themes were related to the answers to the research questions. When all the relevant details, taken into account in the transcript, were found to be adequate, exhaustiveness was observed. Sensitivity was maintained throughout, as all themes reflected the study's qualitative data.

Trustworthiness

The following sections outline the strategies employed to enhance trustworthiness in this study by the criteria established by Lincoln and Guba (1985). Trustworthiness occurs when a researcher conducts research with findings that are credible and approved by the participants (Lincoln & Guba, 1985). The four criteria are credibility, transferability, dependability, and confirmability. To promote the credibility of the qualitative study, a member check was employed by asking participants to review the data collected during the interviews. The researcher took some time to confirm their responses to interview questions. Another strategy used was prolonged engagement. The interview did not end unless the researcher reached data saturation. Transferability in this study burdens the reader more than the researcher (Lincoln & Guba, 1985). Readers may determine whether this study can be applied to other contexts. The researcher may provide detailed descriptions so that this criterion can be considered by readers (Lincoln & Guba, 1985). Dependability and confirmability were established through an inquiry audit. Comments and suggestions were considered, ranging from interview protocols and transcriptions to open coding and identifying themes and categories, as examined by external qualitative researchers.

Results and Discussion

Four significant themes show how preschool teachers teach Reading to emergent learners and the challenges they face in an online learning modality. These are 1) Online Instruction, 2) Student Engagement, 3) Parent Involvement, and 4) Online Learning Drawbacks.

Online Instruction

Amid the COVID-19 pandemic, preschool teachers have become increasingly knowledgeable about using technology to teach reading online. They utilized their institutions' preferred learning management system, where learning materials, including PowerPoint presentations, videos, worksheets, and assessments, were uploaded to be readily accessible to students and parents. Unlike free subscriptions with limited features, these learning management systems are typically purchased or subscribed to in order to utilize their full range of features. All participants followed the competencies stated in the Department of Education's Most Essential Learning Competencies. Some teachers developed their teaching modules, while others preferred using textbooks with digital copies that could be shared on their chosen video conferencing platform. They met their students virtually through online conference applications such as Zoom and Google Meet. They spent an average of one hour a day only following the prescribed screen time for preschoolers (aacap.org, 2020). Some teachers utilized interactive online applications during their asynchronous time to help students better

understand the Reading lessons; however, these efforts were limited because the students were emergent learners, ranging from five to six years old, who could not yet fully manipulate their devices. One participant did not use them at all. She said, “Right now, we do not use online applications because they might have a hard time navigating them, but we do have games. We use whiteboards and paper sometimes” (P2). All participants still used traditional learning materials, such as flashcards and whiteboards, when presenting Reading lessons, including letter recognition and consonant-vowel-consonant (CVC) words. They showed these through their virtual class.

All participants administered their assessments in one-on-one sessions to ensure that students acquired the Reading knowledge and skills taught. They allocated individual schedules and developed systems to validate the results of the assessments. In this case, they needed to be assured that parents would not coach their children. P3 shared, “We opted for one-on-one because it is more authentic in measuring their knowledge of the lessons or understanding of the concepts than doing it synchronously.” P1 opted for students to use headphones while taking the assessment. She remarked, “We have a one-on-one oral exam. Their parents will not assist them. They have their headsets. We will present a PowerPoint presentation without the questions, but the choices will be displayed. I will give the question orally; then, the pupil will choose the answer orally. Nevertheless, there are questions to which they will write their answers. They will use their notebook and then show it to me. After that, I have a blank bond paper numbered with the number of items. For example, I will put a checkmark if the student gets number 1 correctly. Then, if number two is not answered correctly, I will mark it wrong.” Students’ performance tasks were submitted by sending pictures or videos of their performances and outputs in their Learning Management Systems or through email and personal messaging. They all contended the importance of providing immediate feedback on these assessments.

Student Engagement

All the participants shared that their students’ participation was remarkable. They were seen to be very active and energetic despite the limitations of online learning. They all recited in class and were eager to share their thoughts; they also loved discussing topics in class. Teachers did not find them misbehaving in the online class, although there were instances that they became distracted by what was happening at home. However, they focused again when their attention was called. They understood that preschoolers have a short attention span. P5 did not consider this a behavioral problem. She commented, “I do not call it behavioral problems.” However, I call it off-task behavior, which is normal for kids. The environment at home is different. There were times when they needed to be prompted to focus. On a few occasions, students exhibited tantrums, but their parents and caregivers were present to calm them.

Parent Involvement

In online distance education, parents became more involved in their children’s school activities. They assisted them with the technical aspects of synchronous classes, such as logging in, navigating online applications, accessing uploaded materials and assessments in the schools’ learning management systems, and submitting requirements through the platform preferred by their teachers. Teachers also conducted one-on-one conferences with parents to provide feedback and discuss their children’s concerns. It has also become easier for them to set an appointment, as conferences are now held virtually. Keeping parents informed about

their children's schedules, activities, and other important events has become a regular task for teachers, which strengthens teacher-parent engagement. P6 mentioned, "Parents can ask questions at any time during school hours." They Viber us, call us, email us, and PM us. There are many platforms. Furthermore, the policy states that you need to respond to them within 24 hours of working days.

Online Setbacks

Though positive accounts can be drawn in online learning, teachers also encounter challenges. All participants found that parents become too involved in their children's learning, including their assessments. Teachers administered their assessments using different tactics to ensure authentic learning. However, all the participants observed instances in which parents coached their children. P2 recounted, "The parents coach their children. We cannot fully assess if they learn the lessons." Moreover, teachers became conscious of delivering their lessons during online instruction because they knew parents also listened to their discussions. P3 reckoned, "It is very challenging for us in so many ways, not only in teaching but also in decorum and management, which makes us conscious because we know that the whole family may be listening to us."

Students got easily distracted at home, which posed a problem for teachers. Sometimes, these distractions became the cause of the children's tantrums, which would eventually pause or delay the activities prepared by the teachers, who were also pressured to make their students learn how to read when the school year ended.

Another setback in online teaching is that teachers also suffer from excessive screen time when they check their students' submissions. Since submissions were made online, they had to review them on their desktops or devices and provide feedback immediately. P4 said, "Teachers have challenges. We experience headaches due to excessive screen time from checking. We get migraine."

P5 added that another setback of online learning is the unused materials purchased before the pandemic. This also impacted how they delivered their reading lessons. "Of course, we are play-based. In our original approach, we have numerous materials in school that cannot be done now."

The technical issue that all the participants encountered was internet instability. They all perceived this as hindering them from delivering their lessons and students' learning when they had a poor internet connection. Although this has become normal in online learning, a strong connection can make their teaching more efficient.

The four themes were drawn from this qualitative data: Online Instruction, Student Engagement, Parent Involvement, and Online drawbacks. Teachers teach Reading online the way they teach Reading in a face-to-face classroom. Only in this manner are the students at home, while the teacher is at the other end of their device's monitor or screens. The strategies for teaching children how to read, and the sequence of the lesson are the same in a traditional setting, but in online learning, technology is integrated. Technology has become a very useful tool in delivering lessons supported by the applications made available by educational technology developers and interestingly combined with traditional materials and methods. These tools become valuable when used appropriately by educators (Lupu and Laurențiu (2015). Student engagement in online learning becomes teachers' basis on how students

respond to the materials presented to them and how effective their techniques are. They prove what Allvin (2020) argues about preschool on building relationships and learning in the classroom. Their active participation makes it worth noting that they intend to establish a connection between them and their teachers, as well as among other children. Parent Involvement becomes more evident in online learning. Their presence is not limited to conferences. They become more involved in their children's learning process. Online drawbacks are also perceived not only by teachers but also by parents. Based on the report of Dong, Cao, and Li (2020), parents of preschoolers find that online learning has shortcomings. They prefer a traditional setting to online learning. But due to the pandemic, they have no choice. Teachers experience challenges in teaching online, which also causes frustration. These drawbacks include technical issues, excessive parental involvement, and students' and teachers' fatigue.

Conclusions and Recommendations

Teaching Reading to emergent learners is no easy task in a face-to-face setup; teaching it online makes it more challenging. Technology plays an important role in delivering lessons. Knowledge of online applications, and the ability to manipulate them serve as an advantage to ensure children's learning. There may be changes in a learning environment, but learning objectives remain consistent: to make children read and eventually write. Adjustments are not only made by teachers and students, but also by parents. Though faced with challenges, teachers continue to carry out their duties, and parents' support is offered more than ever.

For future research, assessing students' learning in an online environment may be explored. This study is limited to how teachers present their Reading lessons and how students respond to their strategies. Identifying learners' acquisition of skills, the effectiveness of teachers' pedagogy, and the efficiency of materials may be investigated for further studies.

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Design and Preliminary Evaluation of a Generative AI-Supported Scenario-Based Travel Planning Training Game With Simulated Dialogues

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Abstract

In tourism education, developing the professional skill of customer demand-oriented travel planning is essential. However, the diverse and complex nature of customer needs often makes it challenging to simulate realistic customer service scenarios in the classroom due to limitations in classroom space, a lack of realistic role-playing, or restricted interaction time. Therefore, this study designs an online scenario-based interactive simulation game that utilizes scenario-driven Generative AI (GAI) Non-Player Character (NPC) technology to create two highly interactive NPC customers with personalized needs. Learners can interact with these two NPCs through dialogue to understand different customer needs. The above design is expected to enhance the realism and challenge of the dialogues, to strengthen students' learning experience in the simulated environment. The study participants were 21 college students, all aged 20 or older, from a university in Taiwan. Quantitative data results indicated that learners' scores for flow experience, learning motivation, and perceived game fidelity were significantly higher than the median (i.e., 3) on a 5-point Likert scale, and their activity anxiety scores were lower than 3. In addition, qualitative feedback showed that 61% of learners found the dialogue content of GAI NPCs to be realistic, and 57% of learners interacting with GAI NPCs helped them understand the needs of travelers. The two AI characters in the game exhibited high realism, surpassing the authenticity of general-purpose GPT models. The realistic nature of the two AI characters made learners feel as if they were interacting face-to-face with real travelers, enhancing their sense of immersion.

Keywords: situated simulation, travel planning, Generative AI, ChatGPT, digital game-based learning

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Introduction

Generative AI has demonstrated various potential applications and challenges in education research, covering various areas such as language teaching and learning, higher education, teacher development, and student learning styles. Generative AI can mimic human creativity by producing text, images, and sounds, providing students with opportunities for personalized learning, real-time feedback, and innovative curriculum design (Baek et al., 2024; Gruenhagen et al., 2024). Lan and Chen (2024) propose a generative AI-based teaching agent model that utilizes personalized learning solutions to effectively address various challenges in education, while Jiang (2024) explores how multimodal generative technologies can change the learning process of students and enhance their ability to develop critical literacy in artificial intelligence. AI-assisted role-playing and interactive design in educational games can help enhance immersion and storytelling (Ashby et al., 2023).

Traditional education and training methods have long relied on classroom lectures, static textbooks, and pre-recorded videos, which are adequate in transferring knowledge but inadequate in terms of interactivity and immediate feedback, so learners tend to be passive recipients of information and lack the opportunity to apply what they have learned in dynamic contexts, resulting in a gap between knowledge transfer and practical application skills (Khan et al., 2023).

This study designed an online contextual interactive simulation game for travel planning using the ChatGPT-NPC Framework (Chen & Hou, 2024), specifically designed for educational games. Through the RAG framework, we added a plug-in module for character sets, knowledge text setting, and diagnosing off-topic questioning while adjusting various parameters to promote dialogue fidelity.

This framework can solve the problem of GAI responses not matching the context (Wei et al., 2024). This study creates two highly interactive and personalized NPC customer personas. Through dialogue with these two NPCs, learners can gain a deeper understanding of the needs of different customers. In addition, the game is paired with Google Forms to allow learners to make game design decisions based on customer needs. This design aims to enhance the realism and challenge of the dialogues, further enhance the learners' learning experience in the simulated environment and stimulate their learning motivation.

Research Purposes and Questions

This study aims to design and evaluate a contextual travel planning training game incorporating generative AI (GAI) to simulate customer dialogues and overcome the challenges of insufficient contextual realism, limited interaction time, and venue constraints commonly found in traditional classroom simulations. Using contextual generative AI technology, we create highly interactive and personalized NPC customer personas, enabling learners to practice trip planning in a simulated context.

This study expects to enhance learners' understanding of diverse customer needs, increase their immersion and flow experience in simulated situations, promote learning transfer and practical application skills, and evaluate the effectiveness of games in reducing learning anxiety and increasing dialogue fidelity and learning motivation.

The question of this study is: Is the GAI's contextual journey planning training game, which simulates customer dialogue, effective in providing learners with a high level of flow experience and learning motivation and reducing their learning anxiety?

Method

The researchers initially tested this study with a case study involving 21 students (6 males and 15 females) aged 20 or above from the Department of Tourism at a university in Taiwan.

They used contextual Generative AI (GAI) technology to design two NPC travelers with highly interactive and personalized needs, allowing learners to engage in dialogues with these NPCs to explore and understand different customer needs.

The research started with explaining the activity process and rules to the learners (15 minutes). The learners used GAI to talk to the two NPC travelers to ask about the travelers' needs and then completed the itinerary planning (60 minutes), as shown in Fig. 1. After asking the NPCs about their needs, learners went to Google Forms to make arrangements for the third day of the tour, as shown in Figure 2.

Figure 1: Learners’ Interaction With NPC Travelers



Figure 2: Learners Use Google Forms to Plan Traveler Itineraries

Ximending is now mainly visited by young people and international tourists. Today's World Yukon Centre, formerly known as Ximending, was the first department store in the north to combine commerce and entertainment.



Which attraction would you arrange for the grandchildren to visit after their visit to Ximending? *

- ☐ Yehliu Geopark
- ☐ The National Palace Museum
- ☐ Keelung-Zhengbin Fishing Harbor

Located in the upper reaches of the Keelung River, the Sandiaoling Waterfall Trail is 2.71 kilometers long, and along the way, you can enjoy the Sandiaoling Waterfalls. The Sandiaoling Waterfalls, consisting of the first tier of the 'Hegu Waterfall', the second tier of the 'Motian Waterfall,' and the third tier of the 'Pipadong Waterfall' are collectively known as the 'Three Tiers of Waterfalls,' and are the most crucial feature of the trail. Walking on the San Diao Ling Trail, you can explore waterfall formations within the forest.



What next attraction would you arrange based on your communication with your grandmother and granddaughter? *

- ☐ Beiguan Tidal Park
- ☐ Toucheng Leisure Farm
- ☐ Dofu Cape Recreation Area

The learner completes a needs analysis through Google Forms based on the results of conversations with two NPC travelers to plan an itinerary that best meets the travelers' needs

In this study, the flow scale revised by Kiili (2006) and translated by Hou and Li (2014) was referred to, which consisted of 22 questions and contained flow scales, including flow antecedents and flow experience dimensions, and the internal consistency of the flow questionnaire had a Cronbach's alpha of 0.937.

For the learning motivation part, the ARCS Motivation Pattern Questionnaire proposed by Keller (1987) was referred to, which consisted of 32 questions, and Cronbach's alpha for the internal consistency of the learning motivation was 0.982.

In order to investigate the fidelity that GenAI games bring to the learners, the game fidelity questionnaire with reference to Chan et al. (2023) was used, which contains four dimensions of Operation fidelity, Character fidelity, Story fidelity, and Scene fidelity, with four questions, and the internal consistency of the Cronbach's alpha of the fidelity is 0.858.

For the assessment of learner anxiety, the Affective Filter Hypothesis developed by Krashen (1982) was used as a reference, and the Chinese version was adapted to the Learning Experience Scale by Hong (2001), which was modified to make the description more consistent with the present study. Cronbach's alpha was 0.932, which indicated that the questionnaire was highly reliable. All scales were rated on a five-point Likert scale.

Results and Discussions

Learners' state of flow after completing the task according to the single-sample Wilcoxon Signed-Rank analysis (e.g., Table 1), learners achieved high mean values for all the constructs of flow experience, and all the constructs were statistically significant ($p < 0.05$). Learners' mean values for overall flow ($M = 4.16$, $SD = 0.61$), flow antecedents ($M = 4.18$, $SD = 0.61$), flow experience ($M = 4.15$, $SD = 0.64$), and all dimensions of mindfulness were above the median of the scale (i.e., 3).

This contextual interactive design can effectively promote learners' flow experience and increase their concentration and engagement in the learning process. The mean value of its dimensions, such as center flow antecedents, challenge-skill balance, goals of an activity, unambiguous feedback, sense of control, action-awareness merging, flow experience, concentration and autotelic experience, is higher than 4.00, which indicates that the overall game design mechanism, which allows learners to be clear about the goals of the activity and actively engage in the game to complete the task generates a high level of flow, and a high level of flow means that the learners are highly engaged in the learning activity (Chien et al., 2023).

Table 1: The Mean and Standard Deviation of Learners' Flow ($N = 21$)

	<i>M</i>	<i>SD</i>	<i>Z</i>	<i>Sig.</i>
Overall Flow	4.16	0.61	4.017***	0.000
Flow antecedents	4.18	0.61	4.018***	0.000
Challenge-skill balance	4.00	0.69	3.753***	0.000
Goals of an activity	4.26	0.83	3.769***	0.000
Unambiguous feedback	4.24	0.72	3.926***	0.000
Sense of control	4.21	0.70	3.858***	0.001
Action-awareness merging	4.19	0.66	3.939***	0.001
Flow experience	4.15	0.64	3.924***	0.000
Concentration	4.36	0.62	4.043***	0.000
Time distortion	3.95	0.89	3.359***	0.000
Autotelic experience	4.15	0.82	3.713***	0.000
Loss of self-consciousness	3.93	0.94	3.225***	0.001

*** $p < 0.001$

Learners' game motivation, game anxiety, Operation fidelity, Character fidelity, Story fidelity, and Scene fidelity single-sample Wilcoxon Signed-Rank analyses are shown in Table 2. Overall motivation ($M = 4.31$, $SD = 0.61$) was higher than the median of the scale (i.e., 3), overall anxiety ($M = 2.43$, $SD = 1.09$) was lower than the median of the scale (i.e., 3), operation fidelity ($M = 3.71$, $SD = 1.06$), character fidelity ($M = 3.86$, $SD = 1.01$), story fidelity ($M = 4.05$, $SD = 0.92$), scene fidelity ($M = 4.29$, $SD = 0.85$) were also significantly higher than the median of the scale (i.e., 3). ($M = 4.29$, $SD = 0.85$) were also significantly higher than the median of the scale (i.e., 3). The study results indicated that the learners had high motivation to learn, low anxiety, and good effects on perceiving the realism of the situation.

Table 2: The Mean and Standard Deviation of Game Motivation, Anxiety, Operation Fidelity, Character Fidelity, Story Fidelity, Scene Fidelity ($N = 21$)

	<i>M</i>	<i>SD</i>	<i>Z</i>	<i>Sig.</i>
Overall Motivation	4.31	0.61	4.016***	0.000
Attention	4.41	0.53	4.027***	0.000
Relevance	4.32	0.65	3.992***	0.000
Confidence	4.28	0.67	3.930***	0.000
Satisfaction	4.21	0.69	3.934***	0.000
Game Anxiety	2.43	1.09	-2.123*	0.034
Operation fidelity	3.71	1.06	2.535*	0.011
Character fidelity	3.86	1.01	2.982**	0.003
Story fidelity	4.05	0.92	3.380***	0.000
Scene fidelity	4.29	0.85	3.731***	0.000

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The qualitative feedback results showed that 61% of learners found the GAI NPC conversations realistic; 57% of learners felt that the dialogue process with the GAI NPC provided an understanding of the traveler's needs. The following are representative comments from learners:

Learner A:

Through the game's dialogues with grandmothers and granddaughters, we can simulate the reality of travelers' conversations and understand the needs of travelers.

Learner B:

The dialogue explored the needs and thoughts of grandmothers and granddaughters and enhances the immersive experience.

Learner C:

The game responded to my questions with relevant answers, which motivated me to uncover more clues through the Q&A process.

Learner D:

The pictures of grandmothers and granddaughters add to the overall experience and make the interaction more realistic.

Conclusions

This study uses generative AI technology to design a situational travel planning training game with highly realistic and personalized NPC characters and Google Forms to assist travel design decisions, overcoming the challenges of insufficient contextual realism, limited interaction time, and venue constraints in traditional teaching. The study showed that learners in this game had a high level of flow experience and learning motions and felt a high level of dialog simulation with significant results and a low level of learning anxiety.

The qualitative feedback further confirmed the learners' recognition of the high level of immersion and contextual realism during the GAI NPC interactions, especially the personalization of the NPC characters, and their ability to give feedback enhanced the overall interaction effect. The game effectively enhances the learners' understanding of diversified customer needs and, at the same time, strengthens their self-confidence and competence in practical application. Through simulation of real traveler service situations, the learners are able to realize the knowledge transfer in dynamic interactions, which will provide concrete and effective support for future practical operations in the tourism workplace.

This study demonstrates the feasibility and potential of generative AI applied to educational games, enhancing the realism and immersion of the context and providing a new way to cultivate practical skills in tourism education. In the future, it is recommended that the interaction function be further optimized, expanded to more diversified tourism contexts, and verified for its applicability to different learners and long-term learning effectiveness.

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The Intersection of Sufism and Lifelong Learning: *Tazkiyah* (Self-Purification) as a Framework for Sustainable Development

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Abstract

This paper examines the integration of *Tazkiyah*, a Sufi practice of self-purification, into lifelong learning as a transformative framework for fostering personal and social sustainability. Centred on self-reflection, ethical conduct, and accountability, it offers a holistic model for resilience, empathy, and responsible citizenship. The study employs a multi-method approach, incorporating a literature review of classical works and a comparative analysis with modern psychological theories, such as Emotional Intelligence (EI), mindfulness, and self-actualisation. Qualitative and quantitative methods are applied to assess *Tazkiyah*'s impact on emotional resilience and personal development. While the findings highlight its profound potential in shaping ethically conscious and spiritually enriched learners, challenges persist in its broader application across diverse educational landscapes. By bridging cognitive, moral, and spiritual dimensions, this approach addresses key gaps in contemporary education, fostering a more sustainable and harmonious learning paradigm.

Keywords: self-purification, sustainability, ethical education, emotional intelligence, resilience

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Introduction

Education is often perceived as a pathway to acquiring knowledge and achieving professional success. However, its true purpose extends far beyond material accomplishments. A holistic educational model not only cultivates critical thinking and ethical values but also nurtures spiritual awareness and social responsibility (Carm, 2013). By instilling self-awareness, education empowers individuals to align their actions with personal values and the collective good, enkindling moral integrity and public-mindedness (Miller, 2007).

In today's rapidly evolving world, lifelong learning has become a cornerstone of human development, extending well beyond formal schooling (Jarvis, 2004). It is defined as an ongoing process of acquiring knowledge and skills to enhance personal growth, professional expertise, and social contribution, categorised into formal, non-formal, and informal learning (UNESCO, 2015). It fosters intellectual flexibility and adaptability, traits that are crucial for navigating modern complexities. Yet, contemporary educational models often place disproportionate emphasis on cognitive and technical skills, prioritising measurable outcomes such as academic achievement and job readiness. This narrow focus often overlooks the ethical, spiritual, and moral dimensions of education, leaving students to struggle with questions of identity, values, and ethical decision-making. Consequently, this imbalance has led to increasing stress, anxiety, and ethical erosion in professional and social spheres. The absence of a strong moral foundation in mainstream education contributes to emotional distress, declining ethical standards in workplaces, and deteriorating social values, often resulting in rising societal conflicts.

This gap highlights the urgent need for an integrative and balanced educational approach, one that mingles intellectual development with ethical, spiritual, and moral growth. The fast pace of technological advancements and the challenges posed by digitalisation, such as the erosion of interpersonal skills and increasing mental health concerns, underscore the need to rethink education in ways that address identity and value formation (Sahin, 2014). Global events, such as societal unrest and the decline in public trust in institutions, further emphasise the importance of fostering moral and ethical responsibility in education. Traditional religious and philosophical systems, such as **Islamic spirituality**, offer structured pathways for inner development (Al-Attas, 1999). In this regard, *Tazkiyah* provides a comprehensive framework for character refinement and moral elevation (Nasr, 2013). Recent trends in global education, such as the growing emphasis on social-emotional learning (SEL) and values-based education, further underscore the relevance of *Tazkiyah* in modern pedagogy (Elias et al., 1997). By fostering empathy, resilience, and ethical judgment, *Tazkiyah* complements the principles of SEL, offering a holistic model for personal and social sustainability (Sahin, 2014; UNESCO, 2015). According to Hazrat Ali (RA), true success lies in purifying the heart from worldly attachments and arrogance, an essential principle of *Tazkiyah* (Ali, 1984). Under the guidance of Sufi masters (*Shaikh*), practitioners engage in specific spiritual practices, known as *Tariqah*,¹ designed to purify the soul and foster a closer connection to God. This practice, intertwined with the pursuit of *ma'rifah*² (true knowledge), underscores the necessity of self-purification in attaining wisdom and ethical maturity (Geoffroy, 2010;

¹*Tariqah* means ("road," "path," or "way"), the spiritual path of individual Sufis (mystics) toward direct knowledge (*ma'rifah*) of God or Reality (*haqq*).

²*Ma'rifah* is spiritual or mystical knowledge in Islam, signifying direct, experiential awareness of God gained through inner realization, divine grace.

Nasr, 2007; Schimmel, 1975). Such an approach can help address the moral void in contemporary education, fostering well-rounded individuals capable of navigating both personal and societal challenges with wisdom and integrity.

Methodology

This research adopts a multi-method approach to explore *Tazkiyah* within Islamic thought, emphasising its spiritual, ethical, and psychological dimensions. A literature review and textual analysis of classical works, such as Al-Ghazali's *Ihya' Ulum al-Din*, Ibn Qayyim's *Madarij al-Salikin*, Shah Waliullah's *Hujjatullah al-Baligha*, and Iqbal's philosophical writings, have helped establish a theoretical framework. The study includes a comparative analysis between *Tazkiyah* and modern psychological theories, such as Emotional Intelligence (EI), self-reflection, mindfulness, and self-actualisation (Maslow, Rogers and Iqbal's *Khudi*). To assess its impact on contemporary practitioners, a survey will explore the influence of *Tazkiyah* on emotional resilience, with both qualitative and quantitative data analysed to identify the relationship between *Tazkiyah* and psychological outcomes.

Understanding *Tazkiyah*

Tazkiyah means purifying the soul from sins and growing spiritually to attain closeness to God (*Allah*). The notion of *Tazkiyah* (self-purification) in Islam is intricately connected to both spiritual and ethical refinement. Rooted in the Qur'an and Sunnah, it is a multifaceted process of continuous self-improvement aimed at purifying both the inner self (*Tazkiyah al-Batin*) and outward behaviour (*Tazkiyah al-Zahir*) (Al-Ghazali, 2011). Its ultimate aim is to align thoughts, actions, and intentions with divine guidance, fostering positive traits such as sincerity (*Ikhlas*), humility (*Tawadhu*), and compassion (*Rahmah*) while eradicating negative traits like arrogance, envy, and hypocrisy (Al-Ghazali, 2010). Islam does not demand unattainable perfection, but instead calls for *Ihsan*³ (Spiritual excellence), a continuous journey of self-improvement that deepens one's relationship with God (Nasr, 2007).

Linguistically, *Tazkiyah* is derived from the Arabic verb "*Zaka*"⁴ with its root word "*Z-K-W*" (ز ك و),⁵ which means "to purify", "to cleanse", or "to grow" or "to increase" (Al-Gurgani, 2000). This dual connotation of purification and growth encapsulates its essence: eliminating ego and spiritual ailments while cultivating moral and spiritual elevation (Rumi, 2004). The Qur'an (2:129; 33:2; 59:9; 87:14) frequently emphasises its significance, urging believers to cleanse their hearts and minds and detach from worldly distractions (Al-Ghazali, 2011).

Tazkiyah is a cathartic journey that refines both the inner self and external actions. Internally, it involves deep introspection and spiritual struggle (*Mujahadah*) to uproot destructive tendencies. Externally, it manifests through truthfulness (*Sidq*) and justice (*Adl*), fostering integrity in every aspect of life (Ibn Qayyim al-Jawziyya, 2022). In its verbal form, *Tazkiyah*

³ Excellence at the highest level; striving to do one's best in every aspect of life with sincerity and consciousness of God (*Taqwa*).

⁴ foundational words for "*Tazkiyah*," meaning purification of the soul, and "*Zakat*," referring to the charity given to purify wealth.

⁵ "زكى" (z-k-a); ز ك و pronounced as *zay, kaf, waw*.

transcends mere purification; it elevates the *Nafs* (self), requiring deliberate effort and ongoing self-assessment (Nasr, 2007). By striving for *Ihsan*, individuals cultivate *Ikhlas* (sincerity) and draw closer to God (Nasr, 1981, 2002). In this sense, *Tazkiyah* aligns with modern andragogy, where ethical and spiritual growth is essential as intellectual development (Iqbal, 2021). Through this process, individuals aspire to refine their character and unite their soul with divine wisdom (Hermansen, 1995).

Several key concepts are foundational to *Tazkiyah*. Central is the *Nafs* (self or ego), which can either incline toward virtue or be corrupted by base desires. *Tazkiyah* seeks to discipline the *Nafs*, purifying it through self-regulation and aligning with divine principles (Al-Ghazali, 2011). Another important concept is the cultivation of *Taqwa* (God-consciousness), a deep awareness of *Allah* (God), which serves as a moral compass, guiding individuals toward ethical conduct and righteousness (Nasr, 2002). *Taqwa* is central to maintaining mindfulness, gratitude and submission to God's will (Qur'an 91:9-10). This is achieved through devotional practices like prayer (*Salah*), fasting (*Sawm*), remembrance of God (*Dhikr*), and charity (*Zakat*), allowing individuals to manifest their *Birr* (to cultivate righteousness, innate goodness, and virtue) in their daily lives (Al-Ghazali, 2011).

Methods of *Tazkiyah*

A fundamental step in this journey is *Tawbah* (Repentance), a sincere return to Allah by seeking forgiveness, which cleanses the soul and restores one's spiritual relationship with the Divine. Al-Ghazali (2011) outlines three essential conditions for genuine repentance: heartfelt remorse for past transgressions, immediate abandonment of sinful actions, and a steadfast commitment to righteousness. Another essential practice is *Dhikr* (Remembrance of Allah), which strengthens faith and purifies the heart through the constant invocation of Allah's name. Sufis particularly emphasise the repetition of *La ilaha illa Allah* as a means of spiritual elevation and increased awareness of the Divine (Schimmel, 1975). Al-Qushayri (2007) highlights that *Dhikr*, when performed with sincerity, purifies the soul and leads to *ma'rifah*, ultimately bringing the seeker closer to divine presence. Similarly, *Salah* (Prayer) is a cornerstone of purification, acting as a safeguard against immorality and reinforcing mindfulness in daily life (Rumi, 2004). Complementing prayer, *Sadaqah* (Charity) and Helping Others contribute to purification by cleansing wealth and removing greed. Ibn Ata'illah al-Iskandari (2014) states that giving in charity cultivates detachment from materialism, allowing one to transcend worldly desires and develop true reliance on Allah (*Tawakkul*). Self-discipline is another cornerstone of *Tazkiyah*, requiring mastery over desires and temptations. The Qur'an (79:40-41) emphasises that those who restrain their lower self (*Nafs al-Ammaara*) will attain spiritual success. Ibn al-Arabi (2020) asserts that conquering the lower self through self-discipline and spiritual exercises leads to a purified soul capable of receiving divine light (Chittick, 1989).

Beyond these practices, the pursuit of knowledge is central to self-purification. Islamic learning refines moral consciousness and deepens spiritual insight, while *Suhbah* (companionship of the righteous) plays a crucial role in fostering ethical and spiritual elevation (Nasr, 2002). Hujwiri (2014) emphasises that surrounding oneself with virtuous company accelerates personal transformation and strengthens faith. In addition to external practices, inner contemplation is integral to *Tazkiyah*. *Muraqabah* (Sufi meditation) cultivates deep awareness of Allah through introspection and spiritual vigilance (Schimmel, 1975). Closely related practice is *Khalwah*, where individuals withdraw into solitude for focused worship, seeking a heightened connection with the Divine (Al-Ghazali, 2011). Many

ascetic Sufis throughout history have engaged in *Khalwah* to attain greater spiritual depth. Finally, *Adab* (spiritual etiquette) forms the foundation of this path (The Qur'an 91:9-10). Rumi (2004) eloquently articulates that true proximity to the divine is achieved not through mere ritual, but through sincerity, humility, and refined character, which open the doors to divine wisdom. Through these interconnected practices, *Tazkiyah* becomes a holistic journey of self-purification, fostering both inner refinement and ethical conduct in daily life (Hujwiri, 2014; Nasr, 2002).

The Ultimate Aspiration: Ihsan and Divine Nearness

The pinnacle of *Tazkiyah* is *Ihsan*, a concept that urges individuals to live as if they are in the very presence of the Divine, fostering a deep sense of accountability and devotion (Chittick, 1989). Patience (*Sabr*) is not merely passive endurance but an active, steadfast commitment to self-discipline, humility, and spiritual refinement (Qur'an 2:153). Analogously, *Tawakkul* (Absolute Reliance or trust on God) is not about passive resignation but a balanced trust—combining complete faith with persistent effort (Qur'an 65:3). Together, *Ihsan*, *Taqwa*, *Sabr*, and *Tawakkul* form the cornerstones of *Tazkiyah*, fusing inner transformation with outward ethical conduct (Nasr, 2007, 2013).

The Ripple Effect of Ihsan: Ethical Stewardship and Holistic Education

Ihsan's influence transcends personal spirituality, shaping ethical consciousness and sustainability, both social and environmental (Kamali, 2002). Rooted in sincerity, justice, mindfulness and responsibility, it carries a sense of stewardship over resources, aligning with the Qur'anic principle of *Mizan*⁶ (cosmic balance) (Kamali, 2010; The Qur'an 55:7-9). The Prophet Muhammad (PBUH) underscored the importance of moderation, conservation, and environmental care (Al-Ghazali, 2010). This ethos extends beyond ecology to social sustainability, promoting equity, fairness and compassionate governance, ensuring a lasting harmony between human actions and the world (Foltz, 2006). Integrating *Ihsan* into academic curricula is essential for cultivating ethical leadership, critical reasoning, and moral depth (Iqbal, 1920, 2021). By seamlessly merging intellectual rigor with spiritual and ethical wisdom, educational institutions can nurture professionals who excel not only in their fields but also as conscientious changemakers (Nasr, 2002, 2013).

The Four Dimensions of Tazkiyah: A Holistic Framework

Tazkiyah can be comprehensively understood through four interconnected dimensions that purify the self, heart, actions, and soul:

Tazkiyah al-Nafs (Purification of the Self), This first dimension focuses on cleansing the *Nafs* (**ego or lower self**) from negative traits like arrogance, greed, envy, and pride (heedlessness) (Al-Ghazali, 2011). It necessitates self-awareness, emotional regulation, and discipline that align with modern notions of emotional intelligence (Ernst, 1997; Nasr, 2013). Practices such as *Muhasabah* (self-reflection) guide individuals in this ongoing journey of self-mastery and transformation, allowing them to navigate challenges with patience rather than impulsivity (Chittick, 1989).

⁶ *Mizan* represent the concept of justice (*adl*), not just about fairness in legal matters but also about ensuring a balanced and equitable social order.

Tazkiyah al-Qalb (Purification of the Heart), Moving beyond the self, the **Qalb** (heart) is central to human emotional and spiritual well-being. A heart burdened with jealousy, hatred, and pride obstructs spiritual growth, whereas one infused with sincerity, love, and compassion fosters inner tranquillity and divine closeness (Nasr, 1991, 2007). This process parallels **social intelligence**, where individuals develop empathy and strengthen their emotional awareness in relationships, leading to greater humility, sincerity, and harmonious interactions with others (Al-Ghazali, 1873; Nasr, 2002).

Tazkiyah al-A ‘mal (Purification of Actions), The third dimension focuses on aligning outward actions with inner purity, ensuring that good intentions translate into ethical behaviour (Nasr, 2002, 2013). True righteousness is not just about intentions but also about consistently acting with integrity and sincerity (Nasr, 1981). This aligns with modern discussions on **moral intelligence**, where ethical behaviour stems from internalized values rather than external validation. In the Islamic tradition, actions are meaningful only when performed with sincerity (*Ikhlas*), seeking divine acceptance rather than societal approval (Nasr, 2013).

Tazkiyah al-Ruh (Purification of the Soul), At last, the *Ruh* (soul) represents the deepest aspect of human existence. Its purification requires transcending material distractions and attuning oneself to divine guidance through prayer, *Dhikr* (remembrance), and **contemplation of the universe’s divine signs** (Ibn Qayyim al-Jawziyya, 2022). This process cultivates spiritual intelligence, fostering a life of deep purpose, inner serenity, and unwavering reliance on God. These four dimensions are not isolated; rather, they interweave into a holistic process of transformation. Refining one aspect strengthens the others, ensuring harmony between thought, action, and emotion (Chittick, 2018).

Transformation of the Nafs via “Tazkiyah”

The *Nafs* (self/ego) plays a central role in *Tazkiyah* (spiritual purification), as it represents the inner battleground between base desires and spiritual elevation (Ibn al-Arabi, 2020). In Islamic thought, the *Nafs* progresses through three transformative stages. The first is *Nafs al-Ammarah* (the Commanding Self), an ego-driven state dominated by desires and impulsivity, often leading individuals toward heedlessness and wrongdoing unless consciously restrained (Al-Ghazali, 2011). With spiritual awareness and self-discipline, one enters the stage of *Nafs al-Lawwama* (the Self-Reproaching Self), marked by inner moral conflict, self-awareness, and a sincere struggle between virtue and vice, where individuals begin to recognize their flaws and engage in meaningful self-reflection (Chittick, 1989, 2018). The final and most elevated state is *Nafs al-Mutma’innah* (the Tranquil Self), wherein the soul, now purified, finds peace in divine will, embodying moral excellence, spiritual serenity, and deep contentment, as referenced in the Quran (89:27–30) and echoed by classical scholars (Hujwiri, 2014).

Contemporary psychology echoes with these concepts, particularly regarding self-regulation and emotional discipline, both of which are essential to personal development. The internal struggle against *Nafs al-Ammarah* mirrors psychological theories on impulse control and delayed gratification (Baumeister & Vohs, 2007). Studies affirm that self-regulation enhances emotional stability, improves decision-making, and fosters healthier interpersonal relationships. Similarly, the self-reflective nature of *Nafs al-Lawwama* aligns closely with psychological models of personal growth that emphasize self-awareness and moral development (Gross, 2002).

Meanwhile, the *Nafs al-Mutma'innah* aligns with modern concepts of **eudaimonic well-being**, which emphasizes living in alignment with intrinsic values and higher purpose. Individuals who cultivate internal motivation and uphold moral integrity often report greater life satisfaction and psychological harmony (Ryan & Deci, 2000, 2001). This state of inner peace reflects the spiritual serenity that arises from submission to divine will rather than external affirmation. This harmony reflects *Tazkiyah*'s essence, elevating the self from desire to divine closeness, shaping both soul and society (Nasr, 2013).

Theological Dimensions of *Tazkiyah*

Tazkiyah is not merely a theoretical construct but a deeply experiential journey, shaped by the wisdom of scholars and spiritual luminaries throughout Islamic history. Pioneering thinkers like Al-Ghazali and Ibn Qayyim al-Jawziyya (2022) have articulated soul purification as a multi-dimensional process comprising three key stages: **Takhliyah**, the removal of negative traits; **Tahliyah**, the adornment of the soul with noble virtues; and **Tajliyah**, the ultimate goal of achieving divine closeness. However, *Tazkiyah* extends beyond these stages. It is a continuous, dynamic process that involves *Mujahadah*, the spiritual struggle against ego and desire; *Muraqabah*, a practice of deep self-reflection and mindfulness; and *Tahdhib al-Akhlaq*, the ongoing discipline of moral refinement (Al-Ghazali, 2011).

The 14th-century Sufi scholar **Ibn Ata'illah al-Iskandari** focuses on the centrality of self-awareness and consciousness of God in the purification process. He argued that true purification of the soul begins with the realization of one's shortcomings and an awareness of God's presence in every aspect of life. In this regard, he highlighted that the removal of pride and ego is integral to achieving closeness to the Divine (Hermansen, 1995). This notion aligns with the broader Islamic understanding that purification is not only a means of personal growth but also a way to live in harmony with the moral and spiritual guidance prescribed by **Allah** (Chittick, 1989). Ibn Ata'illah's perspective expands the concept of *Tazkiyah*, positioning it as a dynamic process of individual transformation that is inherently linked to societal reform, reflecting the interconnectedness of personal and collective righteousness. This transformative discipline fosters a **Qalb Saleem** (a sound heart), a state of spiritual clarity that cultivates a deeper, intimate connection with the Divine (Ibn Ata'illah al-Iskandari, 2014).

Philosophical Parallels: *Tazkiyah* and Self-Actualization

In Islamic tradition, the *Nafs* (self) is inherently pure but susceptible to corruption through desires and distractions. The purification process of *Tazkiyah* aims to evolve the *Nafs* toward goodness and spiritual fulfillment. This concept resonates with Maslow's theory of self-actualization, which defines self-fulfillment as the realization of one's highest potential (Maslow, 1943). While Maslow emphasizes personal enlightenment and autonomy, *Tazkiyah* ensures that this growth remains ethically and spiritually grounded, integrating moral consciousness with self-improvement. Similarly, Carl Rogers' concept of the *fully functioning person* aligns with *Tazkiyah*, as both emphasize continuous self-growth, self-awareness, and authenticity (Rogers, 1961). While Rogers highlights personal congruence and psychological well-being, *Tazkiyah* extends this framework by rooting self-actualization in moral responsibility and divine guidance. Unlike purely individualistic models, *Tazkiyah* does not merely seek personal success but aligns it with higher ethical commitments and spiritual refinement.

Beyond humanistic psychology, interestingly, this idea also aligns with existentialist thought, especially Friedrich Nietzsche's notion of the *Übermensch* (Superman), which advocates for transcending conventional moralities to create new values and overcome societal limitations (Nietzsche, 2024). Muhammad Iqbal, the philosopher-poet, merges Nietzsche's ideas with Islamic spirituality, developing his concept of **Khudi** (selfhood), which reinterprets Nietzsche's idea of personal transformation within an Islamic framework (Iqbal, 1920, 2021). For Iqbal, the *Nafs* is not merely a passive element to be purged of ego, but a dynamic force capable of achieving greatness, provided it undergoes continuous self-discipline and refinement. While Nietzsche's *Übermensch* seeks to overcome traditional values to attain individual greatness, Iqbal's **Khudi** underscores moral and spiritual refinement through divine guidance, positioning the individual within a broader cosmic order (Siddiqui, 2013). This convergence of Nietzsche's existentialism and Iqbal's Islamic thought highlights a shared emphasis on personal growth, the creation of new values, and the continuous transformation of the self (Siddiqui, 2013).

Contemporary Relevance of *Tazkiyah*

In today's fast-paced and often fragmented world, the principles of *Tazkiyah* guide ethical decisions, resilience, and social harmony. Beyond spirituality, it shapes emotional intelligence, moral clarity, and responsibility, helping individuals navigate dilemmas with wisdom and integrity.

“Tazkiyah” as a Foundation for Ethical Decision-Making and Psychological Resilience

At its core, *Tazkiyah* fosters **self-reflection**, an essential component of ethical decision-making. In an age of **moral relativism and ethical ambiguity**, the ability to introspect and align actions with a higher moral standard is indispensable. Research links self-reflection to stronger moral reasoning and principled decisions in complex situations by promoting **emotional intelligence (EI)** (Rest et al., 1999). Studies indicate that individuals with high EI demonstrate greater self-awareness, emotional regulation (Mayer et al., 2008), and interpersonal sensitivity, key to ethical conduct and resilience, all of which contribute to enhanced moral judgment and psychological well-being (Schutte et al., 2002). *Tazkiyah* promotes virtue ethics by cultivating qualities like humility, patience and sincerity, all of which contribute to psychological well-being. Humility reduces anxiety and depression while fostering meaningful relationships (Krause, 2009; Worthington et al., 2017). According to Schnitker and Emmons (2007), Patience enhances stress tolerance and emotional resilience, helping individuals navigate adversity with composure. Research further affirms that gratitude, sincerity, and self-restraint strengthen emotional stability and life satisfaction (Emmons & McCullough, 2003; Ryan & Deci, 2001).

“Tazkiyah” and the Science of Mindfulness: A Convergence of Spiritual and Psychological Insights

Modern psychology recognizes mindfulness and emotional regulation as key to mental well-being. Islamic practices like **Muraqabah** (self-vigilance) and **Dhikr** enhance cognitive flexibility, emotional stability, and anxiety reduction (Kabat-Zinn, 1990; Nasr, 2013). Empirical research confirms that mindfulness-based interventions significantly reduce stress, depression, and emotional dysregulation, fostering resilience (Brown et al., 2007; Hoge, et al., 2013). *Tazkiyah* also parallels Cognitive Behavioural Therapy (CBT), which emphasizes

self-awareness and emotional regulation in mental health management (Beck, 2011; Hoge, et al., 2013), highlighting its relevance in modern mental health.

“Tazkiyah’s” Role in Social Cohesion and Ethical Leadership

Beyond personal transformation, *Tazkiyah* fosters **social harmony and ethical leadership**, ensuring that moral refinement benefits society. Ethical self-purification strengthens social bonds, trust, and cooperative behaviour (Dovidio et al., 1991) while fostering empathy, altruism,⁷ and civic responsibility—key to a just and ethical society (Batson et al., 2002; Karniol et al., 2003). Furthermore, it shares striking similarities with Goleman’s (1995) proposed Emotional Intelligence (EI) model, which highlights five key components essential for effective leadership: self-awareness, self-regulation, motivation, empathy, and social skills.

“Tazkiyah” in Education and Professional Life: Practical Strategies

In educational settings, integrating *Tazkiyah*-based principles into learning environments cultivates greater focus, emotional balance (emotional intelligence), ethical consciousness, and cognitive resilience. (Hicks, 2009). Studies on Islamic pedagogy reveal that structured self-purification not only improves academic performance but also strengthens moral reasoning and decision-making abilities (Karamali, 2019). Institutions can reinforce these values by promoting communal engagement, conflict resolution, and intercultural dialogue. By integrating *Muraqabah* (self-reflection) into daily routines, they also enhance emotional intelligence and stress management (Rahman, 1980).

A practical strategy involves embedding *Tazkiyah* principles into character-building programs, where students are taught self-discipline, ethical reasoning, and mindfulness through structured lessons and real-life applications (Al-Ghazali, 2011). This enhances **academic and moral** growth. Service-learning projects focused on *Sadaqah* (charity) and civic responsibility strengthen empathy and social consciousness (Esposito, 2016). Additionally, teacher training initiatives should equip educators with Islamic ethical frameworks and mentorship methodologies to sustain these values across all levels of education (Rahman, 1980). Mentorship programs and peer-support groups encourage *Suhbah* (companionship with the righteous), goal-setting, and self-improvement, reinforcing *Tazkiyah* as a lifelong journey. Ethical self-purification refines character while strengthening community values, workplace ethics, and civic responsibility (Esposito, 2016). A values-driven curriculum that integrates integrity, self-discipline, and social responsibility enhances both academic excellence and ethical leadership (Karamali, 2019). Embedding Islamic ethics and spirituality into psychology, sociology, and leadership studies nurtures holistic moral development (Nasr, 2007, 2013).

“Tazkiyah” and Contemporary Educational Models. Comparing *Tazkiyah* with other educational models, such as Social-Emotional Learning (SEL) and Transformative Learning, highlights its unique contributions. SEL is widely recognised for enhancing emotional intelligence, self-regulation, and interpersonal skills, which are crucial for academic and professional success (CASEL, 2020). Research indicates that SEL programs improve

⁷ Prosocial attitude; Altruism refers to selfless concern for the well-being of others, often leading to acts of kindness and social responsibility without expectation of personal gain (Batson, 2011).

academic performance by 11 percentile points, reduce stress levels, enhance social relationships, and minimize behavioural issues (Durlak et al., 2011). Neuroscientific studies further affirm that SEL-based mindfulness practices bolster cognitive flexibility and emotional resilience (Siegel, 2007). While SEL fosters self-awareness and empathy, and transformative learning encourages critical reflection, *Tazkiyah* integrates these principles within a deeply spiritual and ethical framework. Unlike secular models, which primarily emphasize psychological and cognitive growth (CASEL, 2020), *Tazkiyah* aligns self-development with divine wisdom, cultivating individuals who are not only intellectually capable but also socially responsible and spiritually attuned (Al-Attas, 1999). By embedding *Tazkiyah* in modern education, institutions bridge the gap between intellectual development and moral consciousness, producing ethical leaders who contribute to both personal excellence and societal well-being (Hermansen, 1995).

“Tazkiyah” and Time Management: A Key to Sustainable Growth

One of the most practical aspects of *Tazkiyah* is its emphasis on time management and productivity, which are essential for both personal and societal development. Islam regards time as a divine trust (*Amanah*), making its efficient use not just a practical necessity but a spiritual duty. Structured spiritual practices instil a sense of discipline, enabling individuals to prioritize tasks, reduce procrastination, and maintain focus. Islamic scholars have long emphasized the importance of **managing time wisely**. Al-Ghazali (2011) highlights that a balanced routine enhances cognitive clarity. Similarly, Ibn Qayyim al-Jawziyya (2022) warns that neglecting time leads to heedlessness (*Ghaflah*), resulting in unproductivity and a loss of purpose. Modern psychology echoes these insights, showing that individuals who set clear goals and practice structured reflection achieve greater success in both personal and professional spheres (Baumeister & Tierney, 2011).

Tazkiyah-based time management also nurtures a **growth mindset**, where individuals view challenges as opportunities for learning and self-improvement (Baumeister & Tierney, 2011). This mindset is essential in today’s fast-paced world, where distractions and inefficiencies often lead to **stress, burnout, and reduced productivity** (McLeod, 2023). Studies on SEL support this, demonstrating improvements in emotional intelligence and concentration (Durlak et al., 2011). Beyond efficiency, time management rooted in spiritual consciousness aligns actions with higher ethical and moral standards, ensuring sustainable personal growth and meaningful societal contributions (Durlak et al., 2011). Furthermore, Rahman (1980) highlights how Islamic intellectual traditions, such as the *Tazkiyah*, have transformed in response to modern challenges. While the fundamental principles remain intact, these practices have been reinterpreted to remain relevant in contemporary society, focusing on both individual transformation and societal well-being.

Case Studies on the Impact of *Tazkiyah* in Modern Life

Studies by Achour et al. (2021) found that while work stress reduces life satisfaction, prayer significantly enhances it, affirming the role of spiritual practices in well-being. In one case, a Muslim student battling anxiety, depression, and anger benefited from Salah and self-reflection (Sarah, personal communication, October 7, 2024). These practices improved emotional balance and academic focus, aligning with research on mindfulness and resilience (Brown et al., 2007). An HR professional in a multinational firm adopted *Tazkiyah* principles—silence, self-discipline, and emotional control to handle workplace stress, resulting in better relationships and job performance (Arnav, personal communication,

October 27, 2024), consistent with emotional intelligence frameworks (Mayer et al., 2008). According to Sinar Daily (2024), inmates who embrace the Quran find repentance and spiritual growth behind bars. A prisoner undergoing rehabilitation found healing through prayer, Qur'anic recitation, and repentance (Tawbah), enabling transformation from past behaviors, mirroring findings on spirituality in rehabilitation (Worthington et al., 2017). Even a 7-year-old non-Muslim girl saw improvement in focus and emotional regulation through gratitude and mindfulness, showcasing *Tazkiyah*'s universal appeal (Avni, personal communication, November 9, 2024).⁸

In a compelling example of spiritual transformation, Mahmood Farooqui, a former Tihar Jail inmate, initiated rehabilitative programs such as theatre workshops, English lessons, and Tihar Akhbar to foster emotional healing and growth among fellow prisoners. His efforts, including the proposed Media Hub, aligned with *Tazkiyah*, promoting self-purification, resilience, and spiritual development (Quraishi, 2018).

Challenges and Limitations of Implementing *Tazkiyah* in the Modern Context

Integrating *Tazkiyah* into modern life presents several challenges. The fast-paced, achievement-driven society often prioritizes material success over spiritual and moral development. With digital distractions and professional pressures, cultivating the introspection needed for self-purification becomes difficult. Research suggests modern lifestyles reduce opportunities for self-reflection and moral reasoning.

Another challenge is the lack of structured frameworks for incorporating *Tazkiyah* into education and professional settings. Without values-based learning, individuals struggle with emotional intelligence, ethical decision-making, and interpersonal relationships. Additionally, *Tazkiyah* is often misunderstood or oversimplified, reduced to rituals or wrongly associated solely with Sufism, leading to resistance or extreme practices (Al-Ghazali, 2011; Chittick, 1989). Psychologically, the journey of self-examination and moral refinement requires persistence. Cognitive dissonance—when personal behaviour clashes with moral ideals, can cause resistance to change (McLeod, 2023). Furthermore, without mentorship or community support, self-purification can feel isolating, and progress may stall. Socio-cultural influences, like corruption and moral decline, also make it challenging to uphold ethical values in environments that prioritize competition and self-interest (Goleman, 1995).

Despite these hurdles, interventions in education, mentorship, and societal reform can bridge the gap between spirituality and contemporary life. Research on values-based leadership demonstrates that institutions prioritizing moral education and spiritual intelligence cultivate stronger ethical cultures, enhance well-being, and promote long-term social stability (McLeod, 2023).

***Tazkiyah* and Its Alignment With the SDGs**

Tazkiyah contributes to achieving several Sustainable Development Goals (SDGs) by promoting mental well-being (SDG 3) through mindfulness (Batson et al., 2002) practices

⁸ These case studies are drawn from personal interviews conducted by the author in 2024, as part of an independent research initiative on *Tazkiyah* and emotional well-being. For confidentiality, names and identifying details have been changed.

like *Muraqabah* and *Dhikr*, enhancing emotional intelligence and psychological resilience (Qurtuby, 2013). It supports quality education (SDG 4) by integrating ethical decision-making and character development into curricula, fostering self-awareness and moral reasoning. By nurturing respect, empathy, and equity, *Tazkiyah* promotes gender equality (SDG 5) and fosters social harmony, reducing inequality (SDG 10). Its emphasis on moral integrity and accountability enhances peace, justice, and strong institutions (SDG 16) through ethical leadership. Furthermore, *Tazkiyah* encourages community collaboration and mutual support, strengthening partnerships for the SDGs (SDG 17), ultimately creating a more sustainable, just, and compassionate society.

Findings of the Study

The findings of the paper highlight the multidimensional nature of *Tazkiyah*, emphasizing its stages of purification, *Takhliyah* (removal of bad traits), *Tahliyah* (adornment with virtues), and *Tajliyah* (divine closeness). It underscores the importance of practices like *Mujahadah* (spiritual struggle) for achieving a sound heart (*Qalb Saleem*) and moral clarity. The paper draws parallels between *Tazkiyah* and self-actualization theories, showing how Islamic spirituality aligns with psychological models like Maslow's and Rogers' frameworks, focusing on personal growth, ethical responsibility, and spiritual refinement.

Furthermore, *Tazkiyah* enhances **emotional intelligence**, fostering resilience, ethical decision-making, and social cohesion. Its principles contribute to **mindfulness** practices, aligning with modern psychological theories like **CBT**. The paper also discusses the relevance of *Tazkiyah* in educational and professional contexts, highlighting its role in cultivating ethical leadership, moral reasoning, and academic success. Overall, *Tazkiyah* offers a holistic approach to personal and societal development, blending spiritual and psychological growth to promote ethical and meaningful contributions to society.

Conclusion

Beyond individual transformation, *Tazkiyah* can transform modern education and leadership by fostering ethical, values-driven societies. However, challenges like rigid structures and cultural skepticism hinder its practical application. To harness its potential, strategies must include integrating ethical cultivation into education, mentorship, and institutional policies. By embedding *Tazkiyah*, societies can produce leaders who excel professionally while upholding integrity and justice. Future research should focus on policy interventions and cross-cultural case studies for global implementation.

AI-Generation/Assistive Technology Declaration

Grammarly and OpenAI were used to assist with proofreading, grammar checking, and improving the clarity and flow of the manuscript. These tools were used to enhance readability, while the research and analysis were independently conducted by the author.

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Merits and Pitfalls of Using ChatGPT in Programming Courses: A Case Study

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Abstract

ChatGPT has gained popularity due to its ability to generate programming code and detect and fix errors. There is a high possibility that students will use ChatGPT to complete assignments or projects. The potential use of ChatGPT necessitates a thorough risk assessment to understand how to incorporate ChatGPT into programming courses. The use of ChatGPT elicits both concern and optimism. The paper discusses how ChatGPT has assisted students in enhancing their programming knowledge and how students perceive its role in improving learning. The participants in this study are Foundation Science and Engineering students enrolled in computer programming modules in the 2023-2024 academic year. In the first five weeks of teaching, instructors do not compel students to use ChatGPT in tutorials. A programming quiz was assigned at the end of week five to evaluate students' programming knowledge and skills. Subsequently, the instructors introduced ChatGPT and strongly encouraged students to use it during the tutorials. Another programming quiz was assigned at the end of the semester to assess students' programming knowledge and skills after using ChatGPT. An interview was administered at the end of the semester to assess foundation students' perceived views and experiences in learning programming with and without ChatGPT. The results of this study provide suggestions for using ChatGPT in programming courses at all levels to maintain academic integrity.

Keywords: ChatGPT, programming course, higher education

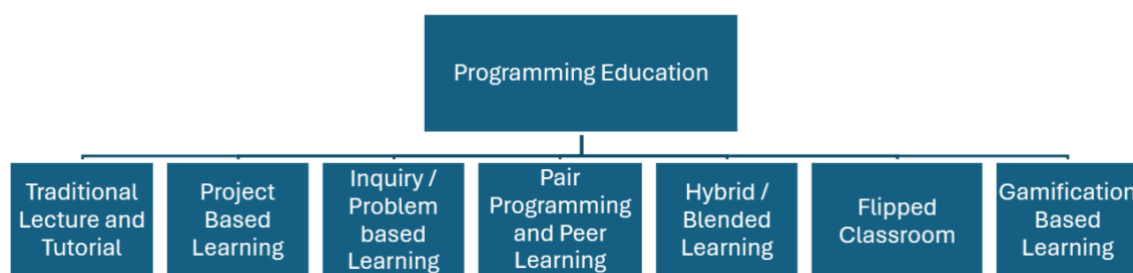
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Introduction

Integrating AI in programming education is inevitable, as it has profoundly transformed how students learn and how educators teach (Rajendran & Ramasamy, 2024). AI in programming courses has benefited learners and educators in numerous ways, especially the tutoring support that enhances student learning and success (Labadze et al., 2023). Traditional programming teaching and learning approaches, such as lectures and tutorials, are widely practiced in programming education. However, the advancement of technology has introduced innovative approaches that enhance engagement and experience, personalisation, and efficiency in learning. In recent years, studies focused on improving computer programming teaching and learning methods such as project-based and problem-based learning (Alsmadi et al., 2024), student engagement through active learning, pair/peer programming (Orr, 2024), gamification using leaderboards (Cigdem et al., 2024), Kahoot (Zayas, 2023), and other digital tools (Moraes et al., 2023), online learning via interactive coding platforms (Alasmari et al., 2024), debugging instruction and techniques (Yang et al., 2024) and flipped classroom (Chen & Hsu, 2021) adaptation to remote and hybrid learning settings (see Figure 1). These studies have noted both the benefits and limitations.

Figure 1: Programming Teaching and Learning Approaches



Freeman et al. (2014) noted that active learning strategies significantly improve student outcomes compared to traditional lecture-based instruction, and limited personalisation makes individualised learning difficult. Segmenting lectures to incorporate active learning strategies using technology helps to mitigate the limitations. Recent studies have incorporated game elements into lectures using Kahoot (Chernov et al., 2021), Leaderboard (Fotaris et al., 2016), and other digital tools (Gamage et al., 2022) in programming learning, reporting increased engagement and motivation through competitive elements. The overall limitations of using gamification highlighted that the focus on pace and competition may not effectively promote deep learning or the development of critical thinking skills (Hanus & Fox, 2015). A similar outcome is noticeable when AI chatbots are integrated into information technology courses. Xu et al. (2024) developed a digital game-based AI chatbot to enhance students' learning experiences. The study reported no significant difference in creativity levels between the groups using game-based and traditional AI chatbots. In programming education, critical thinking involves the ability to analyse, evaluate, and systematically solve programming problems through logical reasoning. Engaging in practical coding tasks and actively participating in programming activities are crucial for learning programming effectively.

Several studies have integrated ChatGPT into programming tutorials, highlighting that it enhances students' understanding and problem-solving abilities (Sun et al., 2024), contributing to a positive learning experience. The Technological Pedagogical Content Knowledge (TPACK) model emphasizes the importance of understanding the need for technology relating to content and pedagogical strategies. A mere integration of technology

will lead to superficial understanding rather than deep learning (Tedre et al., 2021). Limited studies found in the literature have explored how the underlying learning theories in programming education influence the integration of ChatGPT into tutorials. It is essential to recognise that the content in programming education encompasses two distinct dimensions: (a) conceptual knowledge and (b) applied knowledge. The applied knowledge is not directly related to conceptual knowledge but is used to solve programming problems. This study explores the potential benefits and challenges of integrating ChatGPT into tutorials, guided by programming pedagogical principles. The research questions are:

1. How does ChatGPT assist students in enhancing their programming knowledge?
2. How do students perceive ChatGPT's role in improving their programming learning experience?
3. What strengths and drawbacks do ChatGPT present in a programming course?

Literature Review

Programming courses are taught at various levels, from K-12 to university (Yim & Su, 2025). As AI rapidly advances in education, many institutions struggle to grasp its potential strengths and limitations. In higher education, the adoption of AI in teaching and learning is generally supported (Labadze et al., 2023); however, it is being utilised primarily for educational purposes. That said, academic integrity is essential and should not be compromised. Ethics and integrity in using ChatGPT in programming education pose a challenge (Cotton et al., 2023). Its ability to complete programming assignments has raised concerns. Despite these concerns, educators are increasingly inclined to adopt AI-powered chatbots in programming education, which encourages re-evaluating innovative pedagogical and assessment methods.

AI chatbots such as ChatGPT are actively transforming pedagogical approaches in programming education, as many studies focus on maximizing their benefits to address the limitations of traditional programming education. In a typical programming learning setting, students learn programming syntax and concepts with example code (sample program) in lectures. The primary drawback of traditional lectures is the limited knowledge transfer between the learner and the educator. Programming learning involves various stages of comprehension, application, debugging, and problem-solving. The actual application of program learning occurs in tutorials, where students engage actively through problem-solving and program debugging.

The Underlying Pedagogical Principles in Programming Learning

Lectures and tutorials in a traditional classroom setting are arranged as back-to-back sessions or scheduled on different days, and these sessions usually span from 1 to 4 hours. Hands-on coding practice is the most important learning activity, as it strengthens understanding through active participation and allows students to write and test code, applying syntax and concepts learned in lectures to solve programming problems. The other tutorial approaches include flipped-based learning, gamification, pair/peer programming, and project-based learning. Cognitive Load Theory (CLT) is one of the most common theories in computing education research (Berssanette & de Francisco, 2022). Cognitive load in programming learning is crucial as there are two stages: (a) comprehension of programming concepts and syntax, and (b) applying knowledge to practical skills to solve complex problems. CLT suggests segmenting learning materials into several smaller sections to enhance retention. Typically, instructors teach programming concepts and syntax using example programs.

Implementing sound strategies that promote active engagement, prior knowledge activation, and self-paced learning to reinforce understanding and long-term retention focuses on how students build cognitive skills to retain information (Plass et al., 2010).

In introductory programming courses, assignments are one of the formative assessments given as take-home small projects for novice learners. Programming tasks in an assignment typically involve a single program development life cycle, encompassing program design, coding, and testing to ensure the program is free from logic and runtime errors. Hands-on coding practice in tutorials helps students apply theoretical knowledge to practical skills (Gordillo, 2019) and promotes problem-solving skills to complete their assignments. Students' practical coding experience is essential for grasping fundamental programming concepts, enabling them to identify and correct coding errors and misconceptions. One of the issues is that their motivation to solve challenging programming problems decreases because they must spend time writing and testing code multiple times to complete it successfully (Eteng et al., 2022). Chang et al. (2024) reported that the complexity of programming tasks leads to anxiety and decreased motivation in students. Nevertheless, learners often rely on sample programs instead of attempting to create their programs (Walter, 2024).

ChatGPT can generate code for rudimentary programming problems. However, many studies still do not clearly explain how it can support active engagement through hands-on coding in tutorials. Students can write computer programs without errors by transferring conceptual and practical knowledge to solve problems. How is this possible when using ChatGPT to enhance program-writing abilities and improve problem-solving skills? Novice learners must master programming skills over several years by engaging in intense practical activities. Students develop logical thinking and problem-solving skills as they spend more time practicing program writing and testing. Although the literature suggests that ChatGPT enhances the programming learning experience, further investigation is needed to determine how it can be effectively integrated as a supportive tutorial tool to maximize its potential benefits.

Case Study Design

The participants in this study were Foundation Science and Engineering students enrolled in computer programming modules, including Internet Programming (HTML), Computer Methods (MATLAB), and Computer Programming (Python). Table 1 shows the semester in which the modules are offered in the academic year 2023/2024, along with the number of participants. Three programming teachers teaching the above-mentioned modules in the Faculty of Science and Engineering foundation programs used a similar tutorial activity design in their programming courses. Each participant in this single case study is treated as an individual case.

Table 1: Participants in Introductory Programming Modules

Group	Module Name	Academic year/semester	Number of Participants
Group 1 (Python)	Computer Programming	2023/24 Spring	171
Group 2 (HTML)	Internet Programming	2023/24 Spring	80
Group 3 (MATLAB)	Computer Methods	2023/24 Spring and Summer	114

Tutorial Activity Design

Hands-on tutorial questions were designed for each programming lesson over ten teaching weeks for all the modules. In the first five weeks, students followed traditional lectures and tutorials without being compelled to use ChatGPT. In the subsequent five weeks, students were introduced to using ChatGPT to solve their programming problems and were strongly encouraged to utilise it during tutorials. Two programming quizzes were administered: one at the end of week five to assess students' programming knowledge and skills, and another at week ten to evaluate their programming ability after using ChatGPT. At the end of the semester, students are invited to volunteer for an online interview (see Table 2) to share their views, perceptions, and learning experiences.

A total of forty-one students from the three groups volunteered to participate in a semi-structured interview: fifteen from Group 1 (Python), eight from Group 2 (HTML), and eighteen from Group 3 (MATLAB). Bekele and Ago (2022) suggest that interviewing 10 to 20 key participants is typically sufficient to identify and understand significant issues in studies exploring personal experiences. The interview questions are divided into two sections. The first section contained questions designed to gather background information about the participants, while the second section focused on collecting data about students' experiences in learning programming with ChatGPT, the role of ChatGPT in enhancing programming knowledge, and their perceptions of its effectiveness in improving programming learning in tutorials.

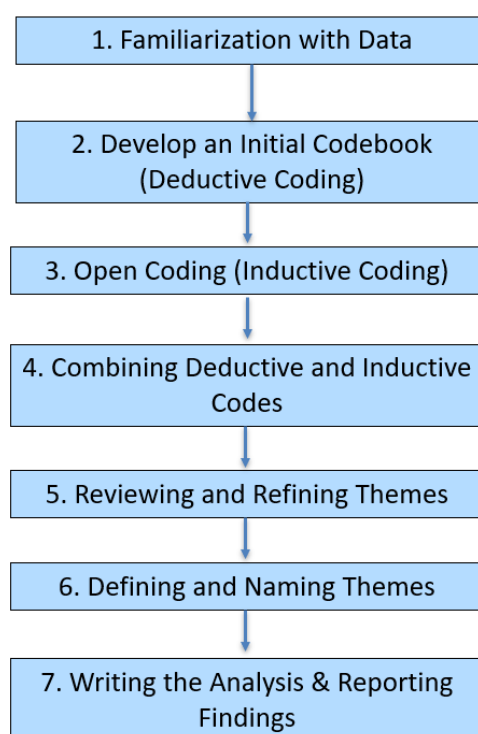
Table 2: Selected Interview Questions

RQ1: How does ChatGPT assist students in enhancing their programming knowledge?	
A1	Have you noticed any changes in your understanding or proficiency in programming since incorporating ChatGPT into your learning?
A2	How would you describe the effectiveness of ChatGPT in helping you learn language through errors? Why?
A3	Do you believe you can independently use ChatGPT to learn programming errors without much assistance from your lecturer?
RQ2: How do students perceive ChatGPT's role in improving programming learning?	
B1	Do you feel that ChatGPT has enhanced your programming skills? If yes, how?
B2	Do you think ChatGPT's assistance with programming errors has enhanced your overall understanding and proficiency in programming language? If so, how?
B3	In what scenarios would you recommend someone to use ChatGPT to learn programming language, and when might it not be as helpful?
B4	Can you describe your experience using ChatGPT to learn programming language through errors?
RQ3: What strengths and drawbacks do ChatGPT present in a programming course?	
C1	In what ways do you think ChatGPT complements other learning resources or methods that you have used for learning programming?
C2	Do you believe that incorporating ChatGPT into your learning has increased your motivation, engagement, and confidence to learn programming languages? Why or why not?
C3	Have you encountered any challenges or limitations while using ChatGPT for programming learning? If so, could you describe them?

Interview Data Analysis

Inductive and deductive approaches are the two primary methods in thematic analysis. Inductive thematic analysis explores themes and patterns that emerge from a new research topic, mainly when limited literature exists. Deductive analysis is used to apply predefined coding to expand existing research. This study employed a hybrid thematic analysis approach (Fereday & Muir-Cochrane, 2006), using an inductive thematic approach for RQ1 (How does ChatGPT assist students in enhancing their programming knowledge?) and a deductive thematic approach for RQ2 (How do students perceive ChatGPT's role in improving programming learning?), and RQ3 (What strengths and drawbacks does ChatGPT present in a programming course?). Figure 2 illustrates the steps employed to analyse interview data using a hybrid thematic approach.

Figure 2: Hybrid Thematic Analysis



Results and Discussion

Forty-one students from the three groups volunteered to participate in a semi-structured interview. Ninety-nine percent of participants have experience using AI tools ($n = 40$), and the majority have some experience at the beginner level ($n = 15$, 37%) or a moderate level ($n = 25$, 59%). One participant in the study volunteered to discuss the learning experience and attempted the tutorial questions without using ChatGPT (see Table 3). The interview questions are divided into two sections. The first section contained questions to gather information about the participants. The latter section explored data on students' experiences with learning programming using ChatGPT, the role of ChatGPT in enhancing programming knowledge, and perceptions of ChatGPT's effectiveness in improving programming learning.

Table 3: Students' Level of Experience in Using AI

Group	None	Beginner	Moderate	Advanced
Group 1	0	5	10	0
Group 2	0	3	5	0
Group 3	1	7	9	1
Total	1	15	24	1

How does ChatGPT assist students in enhancing their programming knowledge?

Through an inductive thematic analysis of the interview data, three key themes have emerged: (a) coding efficiency, (b) increased curiosity, and (c) alignment with coursework. For the first theme, students acknowledge that ChatGPT has helped them identify coding errors they could not resolve during the tutorial. They perceived ChatGPT as a tool for verifying errors encountered during the tutorial and checking alternative solutions. However, some students commented that it might benefit those with limited coding experience. They prefer to validate answers with instructors, as there is a risk of incorrect or misleading information. As beginners, they find it challenging to rely entirely on ChatGPT and suggest that it should be used as a supplementary tool, complemented by instructor explanations.

The second theme is increased curiosity. Students commented that ChatGPT has increased their curiosity in learning programming as it helps them explore more coding solutions and, interestingly, experiment with code to understand how the program works. In the third theme, students noted that relying on ChatGPT could reduce the effort required for problem-solving. However, they suggested that hands-on coding experience remains essential, as ChatGPT's responses are generic and may not align with the specific learning syllabus (content). For example, students from a Python course commented that ChatGPT provided solutions using functions they could not comprehend.

The results from the key themes suggest that using ChatGPT in tutorials may help detect and correct coding errors; however, it may not be sufficient to enhance programming skills. Park and Kim (2025) reported that interviews with twenty-four students revealed a sense of enjoyment and a companion-like feeling when using ChatGPT. They observed that ChatGPT offers a distinctly different experience from traditional methods of obtaining information or using web search engines. Participants in this study expressed a similar positive feeling; however, they may not be fully aware of how to use it effectively. Relying on AI might not promote meaningful learning, especially in tutorials, or significantly enhance programming skills.

How do students perceive ChatGPT's role in improving programming learning?

The thematic analysis for RQ2 identifies key themes regarding ChatGPT's strengths as (a) efficiency and accessibility, (b) enhancing understanding and problem-solving, and (c) encouraging confidence and learning engagement. Its limitations include (a) not being ideal for all learners and (b) negative experiences correcting code that ChatGPT generates incorrectly. Students commented that ChatGPT's strength in acquiring programming knowledge lies in its ability to provide quick responses, immediate feedback, and error correction. This result aligns with the positive perceptions reported in the literature. However, using ChatGPT in tutorials without a proper instructional framework based on the

programming content may not benefit students aiming to enhance their programming skills. Training the AI chatbot to produce the desired output is important and warrants further exploration into prompt engineering to help students use ChatGPT effectively in tutorials.

What strengths and drawbacks does ChatGPT present in a programming course?

The thematic analysis for RQ3 identifies key themes regarding ChatGPT's strengths as an error-handling tool and its ability to understand code. At the same time, its limitations include the inability to support hands-on coding experience. Students find that ChatGPT enables them to fix errors in code, as it can also suggest approaches to prevent errors. This support helps them learn programming concepts and syntax more easily. However, a key limitation is that this approach does not effectively develop problem-solving skills. Additionally, ChatGPT does not directly support hands-on programming practice.

Introductory programming students have limited experience using AI chatbots to support their programming writing ability. One way to use ChatGPT in tutorials is to detect and fix errors to solve programming problems. Therefore, guidance from instructors on how students should use ChatGPT would help enhance their programming problem-solving skills. If students use ChatGPT to generate code and modify it to solve problems, it might help promote writing skills.

Conclusion and Recommendation

Overall, this study contributes to the ongoing debate on the merits and limitations of AI in programming education. The outcome, combined with instructors' experiences, proposes instructional principles for utilising ChatGPT in tutorials and offers suggestions for maintaining academic integrity.

Instructional Principles for Using ChatGPT in Tutorials

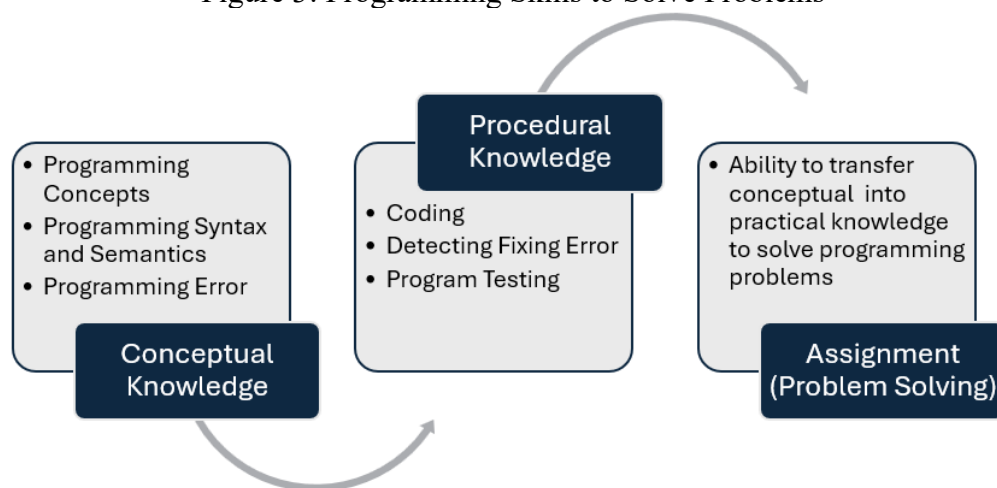
ChatGPT has some potential benefits in supporting programming learning. However, it might not directly help to promote program writing skills to support problem-solving ability. Hands-on coding practice is one approach used in tutorials to help students learn to apply programming conceptual knowledge to practical skills and solve problems. ChatGPT can generate code, detect and fix errors, and provide explanations based on the prompts. These features can further be explored to measure students' ability to solve programming problems. There is a possibility that students use ChatGPT in tutorials to generate code to solve problems, modify it, and use it further to detect and fix errors. Two key learning approaches using ChatGPT in tutorials were identified: (a) using ChatGPT only to detect and fix errors, and (b) generating code from ChatGPT and modifying it to practice coding. Writing the correct prompts is essential for students to understand how to utilise ChatGPT to produce the desired output, and instructors must consider how to foster this skill when incorporating ChatGPT into tutorials.

Suggestions for Academic Integrity

Developing an instructional framework that guides the ethical use of ChatGPT and its practical application in assignments is essential to minimize academic misconduct. ChatGPT can support programming learning and assessment. Practicing coding in tutorials is important for learning how to solve problems. Assignments are one of the primary formative

assessments used to evaluate students' coding ability to solve problems. However, a significant concern is plagiarism. Redesigning coursework in programming education can help effectively incorporate ChatGPT. Figure 3 illustrates the programming skills students need to acquire in lectures and tutorials before attempting assignments independently. A proper instructional guideline on using ChatGPT for coding and testing would be beneficial for enhancing learning outcomes and the ethical use of AI tools. Suitable features from ChatGPT can be incorporated into assignment tasks. The future direction of this study is to investigate program learning through errors; to redesign assignments to integrate ChatGPT.

Figure 3: Programming Skills to Solve Problems



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Transforming Formative Assessment Method in Introductory Programming Course With ChatGPT

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Abstract

ChatGPT is one of the AI chatbots that can generate programming code and explain the flow of a computer program clearly to its users. Its ability to write computer programs and detect and fix errors has been a profound debate in recent years. The typical programming assignment requires students to design and write code and test it to ensure the program works without errors. Learning both declarative knowledge (understanding programming concepts, syntax, and semantics) and procedural knowledge (applying declarative knowledge to write a program to solve a problem) is a typical pedagogical method used in a programming course. Learning programming through errors is a novel learning approach to teaching and learning programming languages. Utilising ChatGPT as an AI teaching assistant is a promising approach to adapting to this method. This study investigates how effective ChatGPT can be for learning an introductory programming language through errors. The participants in this study were Foundation Engineering students enrolled in a Python Programming course in the 2023/2024 academic year. Learning programming through errors was the primary approach introduced in lectures. The lessons were divided into two parts to assess students' abilities to learn programming through errors, both with and without the use of ChatGPT. Data was collected from assignments, final exam scores, and student portfolios. The results of this study provide insight into re-designing formative assessment methods for programming courses.

Keywords: formative assessment, programming error, ChatGPT, instructional design

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Introduction

Programming learning primarily involves two stages: (a) foundational knowledge and (b) practical understanding. The foundational knowledge includes learning programming concepts, syntax, and semantics, whilst practical understanding is the application of programming concepts and syntax to solve a programming problem. A notable amount of research has been conducted to examine fundamental programming learning issues (Srivatanakul, 2023; Wang et al., 2021), scaffolding programming learning (Shin et al., 2023; Sun et al., 2024; Zhang et al., 2023; Zheng et al., 2022), assessment methods (Riese & Bater, 2022; Thangaraj et al., 2023; Vittorini et al., 2021; Xu et al., 2023;), learners' perceptions and experiences (Kuo & Kuo, 2023; Napalit et al., 2023; Qian & Lehman, 2017), as well as the suitability of programming languages (Brown et al., 2022; Chen et al., 2018; Medeiros et al., 2019). However, no well-defined pedagogy has been found in the literature on teaching programming (Barros, 2022). The choice of programming language, programming paradigm, and organisational approaches are significant unresolved issues in programming education (Luxton-Reilly et al., 2018).

An assignment in programming courses is a standard formative assessment that requires students to design, write, and test code to ensure the program functions without errors. Students' ability to transfer declarative knowledge (understanding programming concepts, syntax, and semantics) and procedural knowledge (applying declarative knowledge to write a program) is assessed using a rubric. In lectures, a worked example, often referred to as a sample program, is commonly used to illustrate programming concepts, syntax, and semantics. In tutorials, students solve programming problems to transfer declarative knowledge into procedural knowledge with hands-on coding practice. The learning experience of writing and testing programs often improves when students can understand and fix programming errors that are not strongly highlighted in the lecture.

Learning programming through errors is a novel approach to teaching and learning programming languages (Tulis et al., 2016; Zhou et al., 2021). Beege et al. (2021) investigated the impact of various errors in worked examples on the learning process. They found that this approach can enhance learning compared to problem-solving tasks, enabling them to emphasize and reflect on the erroneous example to reinforce self-explanation. ChatGPT in programming courses promotes student-centric learning. Though ChatGPT has been heavily criticized for producing irrelevant or incorrect output, it has the potential to solve intermediate-level programming problems (Dunder et al., 2024). Utilising ChatGPT as an AI teaching assistant is a promising approach to adopting this method. Emphasizing learning computer programming through error helps bridge gaps in research on effective programming education, especially in formative assessment.

This research aims to evaluate the effectiveness of ChatGPT to scaffold formative assessment for an introductory programming course.

1. Would ChatGPT be effective in learning an introductory programming language through errors?
2. Would ChatGPT be a useful AI tool for completing a programming assignment?

Literature Review

Programming knowledge and skills are evaluated through formative and summative assessment methods. Formative assessment offers timely feedback to evaluate ongoing learning, while summative assessment evaluates learning outcomes at the end of the course. In-class tests, exams, quizzes, assignments, projects, and portfolios (Renzella & Cain, 2017) are standard assessment methods in programming courses. Developing a framework to assess complex problem-solving skills in computer and engineering education is challenging for educators and researchers (Xu et al., 2023). Nonetheless, technological advancements have enhanced formative evaluation models to meet the needs and motivate modern digital learners.

In general, there is no single definitive solution to a programming problem. The example program serves as a guide for learners to observe while writing their programs. The customary programming teaching model introduces concepts, syntax, semantics, and worked examples in lectures and tutorials. Focusing on programming language errors to enhance conceptual and procedural knowledge is not a standard pedagogical approach. Learners are expected to recognise and rectify mistakes as they practice. However, novice learners often struggle to understand programming errors when they write their programs without examples. Students who struggle or are confused in their learning become frustrated and disengage without proper support (Lodge et al., 2018).

Providing timely feedback supports effective learning (Mojtahedzadeh et al., 2024). In programming courses, feedback models include common mistakes and errors related to concepts and program logic (Haldeman et al., 2018). Programming instructors face challenges in providing effective and timely feedback to students to improve their program design, writing, and testing skills. Once instructors have evaluated the assignments and provided feedback, learners are responsible for reviewing and enhancing their understanding. The instructor cannot accept a modified or corrected program after grades have been released. This approach is practiced widely, encouraging learners to develop their logical thinking and problem-solving skills. Another challenge is that learners may struggle to redesign and rewrite a program if they do not fully comprehend the feedback, especially when there is a lack of ongoing support for learning.

Learning From Error Using ChatGPT

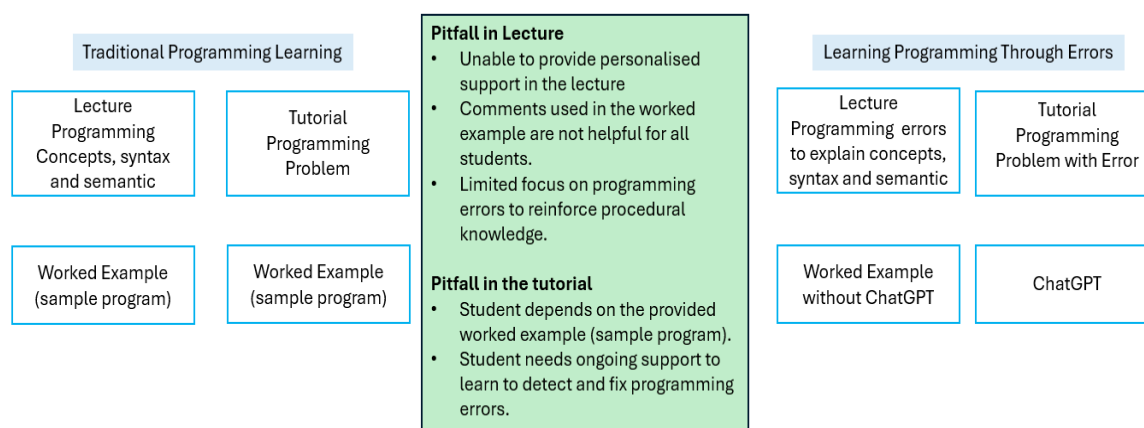
Xia et al. (2023) investigated ChatGPT's ability to generate code for an introductory programming assignment and found that learners struggled with more complex logical reasoning, which could mislead novice programmers. Logical thinking is one of the essential outcomes achieved with hands-on coding activities. A study on the large-scale analysis of ChatGPT's code generation abilities, utilising over 2,000 programming tasks in Java and Python, highlighted its limitations in handling logic errors (Nguyen et al., 2023). The effectiveness of ChatGPT in fixing bugs in code without proper prompting can produce correct output for simple bugs; however, superficial output is found for more complex programs (Li et al., 2023). In programming, different types of errors are related to programming syntax, concepts, and problem-solving logic. Though ChatGPT can explain erroneous code, it must be carefully analysed before it can be used as feedback (Lee & Ko, 2024). A shift in the pedagogical approach in programming courses is crucial when ChatGPT is incorporated into teaching, learning, and assessment.

Pedagogical approaches related to programming errors to promote computer program learning are scarce in the literature (Jerinic, 2014). Program testing and debugging are the most vital stages of programming, and they can be challenging for both beginners and instructors (Kafai et al., 2020). Testing helps to recognize programming errors that are present in the program. Debugging involves finding and fixing programming errors, which requires multiple tests to ensure a program runs without errors (Sun et al., 2024). In tutorial and practical sessions, students practice designing, writing code, and testing programs. However, students encountering programming errors may only debug outside the classroom, as instructors may not closely observe them (Fitzgerald et al., 2008). A learner's ability to acquire programming skills depends on understanding the concepts and syntax and identifying programming errors. Errors can arise from poorly designed programs, coding (concepts, syntax, and semantics), or misconceptions.

Fitzgerald et al. (2008) noted that “good programmers are not necessarily good debuggers, but good debuggers are usually good programmers.” They investigated the debugging skills and behaviors of novice programmers at various institutions, suggesting that instructors may need to focus on design, writing, and debugging as one skill rather than regarding each as a distinct skill. The ability to debug a program is essential for developing stronger programming skills, which include writing, testing, and debugging.

In lectures, students gain an understanding of programming concepts, syntax, and semantics. They also work on programming problems in tutorials using worked examples provided by instructors. However, this approach has some problems. Instructors often rely on adding comments to programs to explain concepts, which makes it difficult to provide personalised support to each student. On the other hand, students tend to rely too heavily on worked examples rather than solving problems independently. The alternative approach, learning through errors using ChatGPT, encourages students to identify and correct errors independently. Instead of relying on ready-made explanations, students actively engage with debugging and problem-solving, which helps them understand programming better. This approach makes learning more interactive and independent. The Recursive Reminding Theory supports this approach by demonstrating that learning from errors enhances understanding. By utilising ChatGPT as an AI-assisted tool, students can enhance their skills through trial and error, making programming education more effective and engaging (see Figure 1).

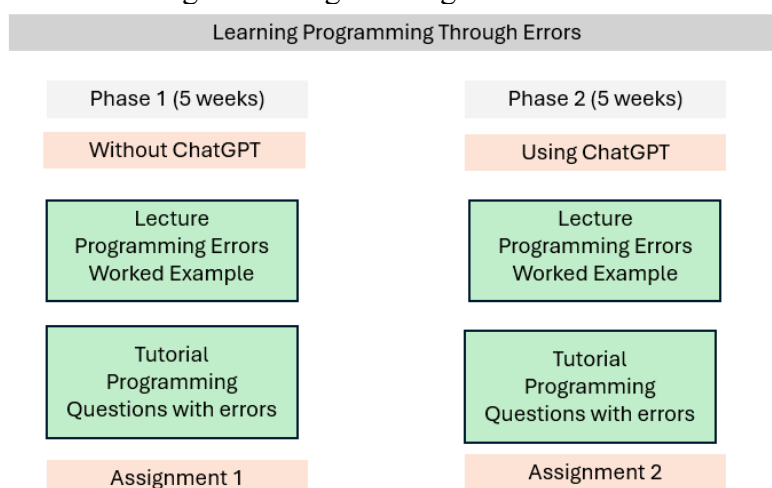
Figure 1: Learning Programming Through Errors



Method

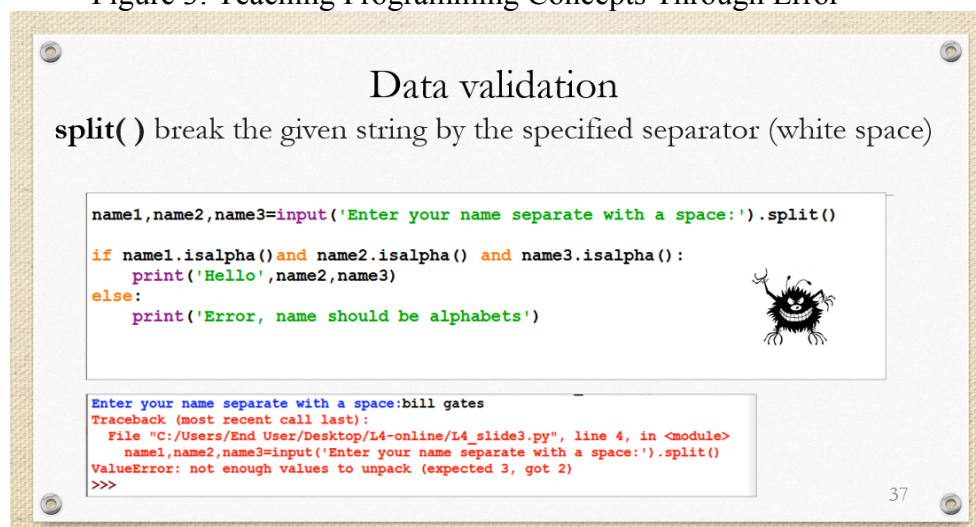
The participants in this study were one hundred and seventy Foundation in Engineering students enrolled in the computer programming module (Python) offered in the academic year 2023/2024. Learning programming through errors was the primary approach introduced in lectures and tutorials. The lesson plans and activities were developed using the TPACK (Technological Pedagogical Content Knowledge) framework (see Figure 2).

Figure 2: Programming Lesson Plan



This study employs a qualitative comparative study approach, where a programming course is conducted over 10 weeks and divided into two phases of 5 weeks each. The objective was to analyze the effectiveness of ChatGPT-assisted learning on students' programming skills by comparing their performance before and after using ChatGPT. In the first 5 weeks (Phase 1), students learn about programming errors through lectures and worked examples (see Figure 3).

Figure 3: Teaching Programming Concepts Through Error



They also participate in tutorials that involve debugging programs with errors (see Figure 4). At the end of this phase, students complete Assignment 1, which assesses their ability to

identify and fix errors without using ChatGPT. This phase represents a traditional approach to learning.

Figure 4: Example of Programming Error Question

The aim of the following Python program is to validate age within the range of 18 to 120. If the input falls outside this range, the program should display 'Age should be in the range of 18 to 120.' If the input is valid, the program should display, 'You may proceed with the program.' Examine the test runs. Test runs 1 and 2 show correct output, but test runs 3 to 5 show incorrect output.

```
age=int(input('Enter your age: '))
if age>=18 or age<=120:
    print('Age should be in the range of 18 to 120.')
else:
    print('You may proceed with the program')
```

a) Explain why the logic error has occurred?

a) Write the correct code to fix the error in the condition (use logical OR operator).

Test Run 1

Enter your age: 0
Age should be in the range of 18 to 120.

Test Run 2

Enter your age: 130
Age should be in the range of 18 to 120.

Test Run 3

Enter your age: 18
Age should be in the range of 18 to 120.

Test Run 4

Enter your age: 120
Age should be in the range of 18 to 120.

Test Run 5

Enter your age: 25
Age should be in the range of 18 to 120.

In the next 5 weeks (Phase 2), the same pedagogical design was employed, with students attending lectures and working on programs with errors in tutorials. However, in this phase, students are encouraged to use ChatGPT as an AI-assisted tool to detect and correct errors. During tutorial sessions, students must identify errors in the program and explain why the error occurred (see Figure 5).

Figure 5: Example of Programming Error Question Using ChatGPT

Tutorial Programming Question using ChatGPT

```
def getAlpha():
    AlphaList=['A','B','C','D']
    alpha=input('enter an alphabetic character A-Z: ')

    if alpha.isalpha():
        alphaList.append(alpha).upper()
    else:
        errorMsg()

    print('The alphabetic character in the list',AlphaList)

def errorMsg():
    print('Invalid input, enter A-Z only')

getAlpha()
```

Examine the following Python program, there are **TWO (2)** errors in the code.

```
def getAlpha():
    AlphaList=['A','B','C','D']
    alpha=input('enter an alphabetic character A-Z: ')

    if alpha.isalpha():
        alphaList.append(alpha).upper()
    else:
        errorMsg()

    print('The alphabetic character in the list',AlphaList)

def errorMsg():
    print('Invalid input, enter A-Z only')

getAlpha()
```

a) Name the programming errors.

b) Explain the Python statements that are causing the errors.

This learning approach helps students understand the underlying concepts and syntax they were missing or clarifies any misconceptions. At the end of this phase, students complete Assignment 2, which evaluates their performance with ChatGPT-assisted learning.

Inductive Thematic Analysis

A reflective journal is used to gather data, where students document their experiences, challenges, and insights while working on Assignment 2 with ChatGPT, compared to Assignment 1 without ChatGPT. Twenty reflective journals were randomly selected for detailed analysis to address the research questions. Two themes were identified: (a) whether ChatGPT was found helpful for program debugging, and (b) whether it supported acquiring programming skills to analyze the effectiveness of ChatGPT in supporting programming learning through error (RQ1). Another two themes were identified for RQ2: (c) how well ChatGPT assisted in completing assignments, and (d) whether it introduced a challenge.

Results and Discussion

The analysis of the twenty reflective journals was categorized into main themes with supporting sub-themes. Five out of twenty students indicated they did not use ChatGPT to complete assignment 2. Many students found ChatGPT helpful in explaining programming concepts, code structure, and debugging in an easy-to-understand way.

ChatGPT's Effectiveness for Learning Programming Through Errors

Novice programming learners require ongoing support for their programming learning, which is a well-known limitation in typical practical classes or tutorials. Students must master programming writing skills within 10 to 12 weeks of instruction. Often, instructors struggle to support students' learning, making it a significant challenge. ChatGPT can explain the coding in smaller steps when students face difficulties. Several recurring themes identified in this study are also evident in the literature, including enhancing student engagement, making learning more enjoyable, and providing practical learning support.

“Also, its ability to provide instant feedback and suggestions is very nice; it also breaks the code down for you in simple terms, making it easier to understand what's going on if you're confused.”

“It provides a detailed explanation of how code works, making learning more interactive and engaging.”

The sub-themes that emerged from the main theme are as follows.

Breakdown of Coding. Worked examples used in lectures and tutorials are not compelling because students tend to write code similarly. This approach appears feasible with ChatGPT, which can generate multiple worked examples for a single problem-solving question. Students found ChatGPT helpful in explaining program fragments. Using multiple worked examples can promote program comprehension tasks. However, hands-on activity is essential to support this task. A faded-worked example strategy to promote programming knowledge and skills (Matthews et al., 2019), promising to maximize the benefits of ChatGPT.

Encouraging Exploration.

“ChatGPT doesn’t just provide me with the code; it also explains why things are done in a certain way.”

“Besides, if you are not satisfied with the code generated by ChatGPT, you can request it to regenerate a new code until you are satisfied with the result.”

Students noted that ChatGPT introduced them to new coding techniques they would not have explored otherwise. This learning approach is an important first step for them to learn, but they must also think and write code based on their own logical thinking. This approach can help develop essential logical thinking. A proper guideline on how students should use ChatGPT for learning programming is crucial. Instructors must provide a guide for students to understand the required knowledge and skills, as well as how to utilise ChatGPT to achieve them. A declaration on using AI for programming assignments would pose a challenge and may not effectively support academic integrity.

Trial and Error Approach. Students used ChatGPT iteratively, testing code, modifying it, and refining their understanding. The Recursive Reminding Theory supports this approach, which involves identifying a shift in programming pedagogy to incorporate AI chatbots, such as ChatGPT. A trial-and-error approach is a subtle learning process that enables novice learners to develop a strong cognitive understanding. This approach paves the way for redesigning the assignment into a learning portfolio, allowing students to utilise ChatGPT; however, grading and scoring students' understanding and skills warrant further investigation.

“ChatGPT helped me understand programming better by explaining errors in simple terms.”

“ChatGPT gave me a code snippet, I modified it and learned from the changes.”

“It helped me fix errors quickly, allowing me to focus on improving my programming logic.”

I experimented with different approaches by modifying ChatGPT’s suggestions, which helped me learn more about the topic.

The Usefulness of ChatGPT in Completing Programming Assignments

This theme analysed students’ reflections on whether ChatGPT was useful for completing the assignment task and whether it supported or hindered their learning. The sub-themes that emerged from the main theme are as follows.

Learner’s Awareness of Using ChatGPT. Students' excitement and engagement with ChatGPT reflected a highly positive response. However, they are also aware of its proper use for learning programming. This awareness was observed when students chose not to use ChatGPT to complete the programming assignment. Incorporating ChatGPT into teaching and learning contexts with proper guidelines and learning activities enables them to learn how to use it effectively.

“I believe students could exploit this tool to easily complete assignments without learning anything in the process. In conclusion, ChatGPT is an excellent tool for learning; however, I

believe students should use it appropriately in an educational manner to maximize its benefits.”

“Due to this reason, it may become difficult in the future to add new code, and we will rely more on ChatGPT.”

Combining ChatGPT With Manual Debugging. Students emphasised that ChatGPT should be used alongside lecture notes and textbooks, not as a replacement. They found ChatGPT helpful as an initial guide, but they still preferred to manually debug programs. This reflection highlights the importance of guidelines for utilising ChatGPT in a classroom setting and for assessment purposes. The initial discussion in the literature on ChatGPT was that it could pose a challenge in assessing students. This claim is acceptable if educators implement the typical programming assignment, accompanied by a declaration of how students utilised ChatGPT to complete their assignments.

“Overall, I think ChatGPT is a good learning tool, but it will not be as helpful as a teacher or even the notes, because it doesn’t know you are a new learner and will just give out everything it knows, and sometimes some beginners will end up messing up everything with those codes.”

Conclusion and Recommendation

The analysis of twenty reflective journals revealed that ChatGPT facilitates programming learning by providing guidance, simplifying complex concepts, and enhancing confidence. Students used it as a "coding buddy" for real-time support, enhancing their learning through trial and Error, exploration, and time-saving debugging. It also helped explain code concepts and introduce alternative approaches, encouraging experimentation with coding. However, students regard ChatGPT as a supplementary tool alongside traditional learning methods for optimal results.

The following suggestions are for assignment programming tasks using ChatGPT in an introductory course.

- Trial and Error – promotes programming skills by detecting and fixing code errors.
- Faded Worked Example – promotes programming skills through a learning cycle that includes code writing and testing.
- Modifying Program – promotes programming skills through logical thinking approaches.

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Declaration

During the preparation of this paper, the author utilised Grammarly and ChatGPT to verify grammar and enhance clarity and language.

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The Design of Field Geology Guide Training Combines Spherical Video-Based Virtual Reality (SVVR) and Contextual Clues in Game-Based Learning

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Abstract

Attending field geology class can help learners develop the skills to observe rock layer sequences and infer geological history and tectonics. This training is typically supported by class guides who possess geological expertise and can effectively lead students enhancing learning effect and safety. However, there are variables in the wild field influenced by factors such as unexpected situations faced by students, physical fitness levels, weather conditions, and geological structures that have been affected by weather. These reasons make class guide training crucial. To create a simulation-based online training environment, this study integrates spherical video-based virtual reality (SVVR) to design a field geology situation that showcases the geology of a sea coast in Taiwan. With contextual clues as scaffolding in game-based learning design, learners can thoroughly explore the local geological environment within a safe and controlled immersive setting. Additionally, they can practice responding to unexpected situations that arise for students in various scenarios. It not only enhances their geological knowledge, but also ability of student sudden occurrence and conditions. The study involved 16 participants, and the results indicated that learners demonstrated significant improvements in their learning effectiveness. They exhibited a high level of flow, accompanied by low level of anxiety. In terms of cognitive load, the internal cognitive load assessment was not significantly higher, suggesting that the learning content was moderate. The external cognitive load was not significantly higher, suggesting that the technology was not significantly difficult to operate. This study may provides innovative teaching strategies for geology education but also serves as a reference for research in the geology field of virtual reality educational games.

Keywords: SVVR, game-based learning, geology education, flow

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Introduction

With the development of information technology and the improvement of digital literacy, virtual reality (VR) provides an immersive 360 environment, which can effectively enhance learners' conceptual cognition, skill training, and attitude (Chen et al., 2022). In this environment, learners can have a diversified learning experience through the escape room designed with contextual clues (Issock Issock et al., 2024).

To make excellent geohistorical inferences, field geology is one of the most important fields of study in geology (Chris Johnson, 2017). It aims to classify and interpret rock minerals and geological structures in the field, and integrate and analyze the stacked layer upon layer of rock strata about to make logical geohistorical inferences. In addition to the instructor, teaching assistants usually join the group to support the course. However, the actual learning site is outdoors, which is susceptible to weather, space capacity, rock weathering, physical fitness, or unexpected conditions of the students not only affecting the learning effectiveness, but also challenging the on-site response of the teaching assistants leading the group, which tends to affect the learning effectiveness and reduce the quality of the learning experience (Balliet et al., 2015).

The purpose of this study is to design a geological teaching game combining Spherical Video-Based Virtual Reality (SVVR) and contextual clues, focusing on the geological features of the Mysterious Coast of Jinshan, Taiwan, for the first time as a geological field assistant for geological class. The VR game is built as real field geological environment, and applies the contextual learning theory (Lave & Wenger, 1991) to the situation in which the assistant support the team. With the Problem-Based Learning (PBL) method, learners are guided to explore and interact with each other in the VR world to complete the geological learning tasks, and to apply their knowledge to complete geohistorical inference to enhance their logical thinking and reasoning skills.

Literature Review

Field Geology and Assistant

Field geology includes mineralogy, petrology, earth structure, earth history, earth tectonics, etc. Among them, field geology is a discipline that integrates the above mentioned studies and applies them to actual field, and it is also an important learning points for geologists (Chris Johnson, 2017). However, the field environment changes continuously with time passing and external forces, it makes students encounter difficulties in inquiry and practice (Grissom et al., 2015), such as: the geological environment will be affected by exogenic phenomena or vegetation cover affecting the observation effect. Also, the weather, physical fitness, students' sudden situations or the size of the space in the lecture environment affect the effectiveness of the learning process, which lead to the inability to focus on the geologic learning itself. These make learner troublesome to focus on the geological learning itself (Balliet et al., 2015). Therefore, the field geology practicum environment requires excellent teaching models and teaching assistants to improve it.

SVVR Integration Into Learning

One of the theoretical foundations of VR learning is situated learning (Lave & Wenger, 1991), which aims that with contextual designing, learners can effectively invest and migrate the

experience to enhance decision-making abilities in actual situations (Kimhi et al., 2016) such as natural sciences (Chan et al., 2023), however, it is constrained by the cost of immersive VR, the technological barrier, technical design content and substantial finance (Jong, 2023), which has led to the widespread use of low-cost and easy-to-develop SVVR technology in education. For example, geography and spatial thinking (Jong, 2023) and language learning (Jong, 2023). In summary, this study aims to enhance the ability of geological field teaching assistants to conduct courses through SVVR.

Game-Based Learning

Game-based learning (GBL) is an educational approach referring to a type of learning that deeply integrates computer games with educational content (Prensky, 2001), which can stimulate intrinsic motivation, enhance interest, aid memory, provide training and feedback, and promote higher-order thinking (Hogle, 1996). By helping learners to reduce cognitive load and improve learning outcomes through their work in multimedia education (Mautone & Mayer, 2001), games have been shown to have a positive impact on pedagogical applications (Latorre-Coscolluela et al., 2025).

Research Questions

The research questions for this study are as follows:

- (1) Were learners making significant progress in their learning effectiveness?
- (2) What were the anxiety, flow and cognitive load of the learners?

Research Method

Participants and Procedure

This study was conducted in a high school in Taiwan with a total of 16 participants, with an average age of 16 years old, who had not participated in any camps or trainings for field geology investigation. In this study, four questionnaires were collected, including one-group pretest-posttest design for learning effectiveness and anxiety levels, and the one-sample test for flow and cognitive load. Since the sample size was less than 30, Wilcoxon signed-rank was used for statistical purposes.

Before the game begins, a pretest on learning effectiveness and anxiety levels was conducted. Participants then entered the game platform, which started with a story introduction and an interface tutorial. Following this, they proceeded to the geological SVVR tour of Mysterious Coastline in Jinshan. The detailed design will be explained in Section 3.3. After completing the game, the posttest of learning effectiveness, anxiety levels, flow, and cognitive load was conducted to statistical analysis.

Table 1: Research Procedure

Procedure	Session time	Description
Pretest	20 minutes	Measuring learning effectiveness and anxiety.
Game introduction and setup	10 minutes	Entering the SVVR game.
Game start	60 minutes	Explore the Mysterious Coast of Jinshan.

Instruments

Learning Effectiveness. The pretest and posttest in this study used the same set of questions, with the items randomly arranged to ensure a different order between the two tests. The test consisted of 14 multiple-choice questions and 1 inference question, covering topics such as identifying types of rocks, geological and sedimentary structures, historical geological inference, and analysis of local geological photos. All questions were developed by professional geology teachers and verified by the researchers to ensure alignment with the content of the VR model.

Anxiety Levels. It was based on the "Affective Filter Hypothesis" scale developed by Krashen (1982). Specifically, the study utilized the activity anxiety dimension and adapted the content to design a game-related anxiety questionnaire tailored to the research context. The questionnaire comprised 8 questions and was based on five-point Likert scale.

Flow. To analyze learners' engagement in the activity, this study utilized the flow questionnaire translated by Hou & Chou (2012), originally developed by Kiili (2006). The questionnaire consists of 23 questions, divided into two main dimensions: Flow Antecedents and Flow Experience. A five-point Likert scale was used for the evaluation.

Game-Based Learning. The Cognitive Load Scale (Klepsch et al., 2017) was adapted from Leppink's scale (2013). The scale has three dimensions with a total of 8 questions, two on internal cognitive load, three on external cognitive load, and three on related cognitive load on a 5-point Likert scale.

Game Design

This game is set in Taiwan's Jinshan Mysterious Coast, with an actual path of approximately 500 meters. On-site guided tours typically take 3 to 6 hours. 360-degree panoramic photos were captured using a RICOH THETA camera and uploaded to the ThingLink platform to construct scenes and provide knowledge descriptions, as shown in Figure 1. Students can click on icons to view and read the content. During the game, different paths and explorations can be generated based on their willingness to explore.

The storyline revolves around a novice geology teaching assistant leading a group to explore and learn. Students engage with contextual clues to study and collect geological data while completing tasks on Google Docs, such as capturing screenshots of photos, classifying structures, and conducting geological history analysis and inference as Figure 2.

During the game, students encounter scenarios such as straying from the group or shopping, requiring them to make situational choices. Correct answers earn points, while incorrect answers prompt feedback and comments, providing immediate responses, as shown in Figure 3. The images used in the scenarios were generated using Bing AI.

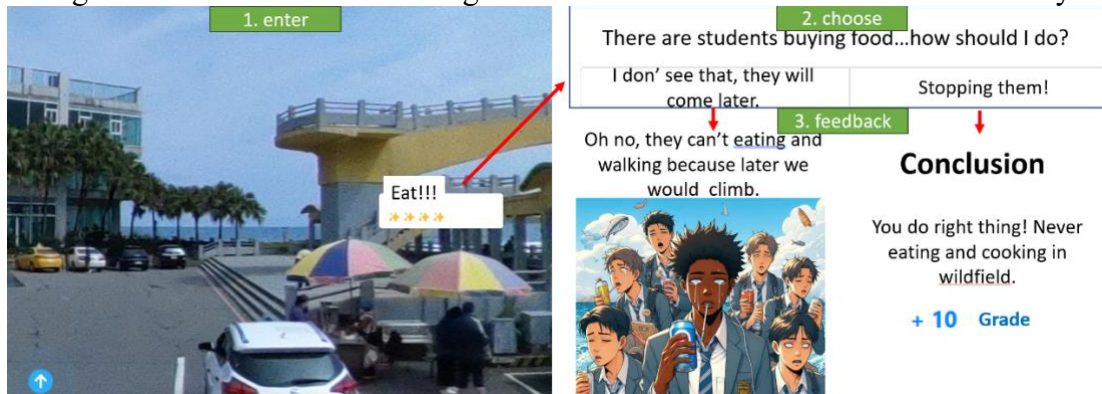
Figure 1: Actual Situation of the Scene



Figure 2: After Clicking the Icon, It Can Display Instructions and Correspond to Learning Tasks



Figure 3: Learners Act as a Navigator on How to Handle the Situation Correctly



Results and Discussion

Learning Effectiveness

The scores of learning effectiveness showed a significant improvement ($t = -2.84, p = .002 < .01$), indicating the effectiveness of learning field geology in identifying rock types and interpreting geological structures. Furthermore, learners were able to describe the history of rock strata based on their observations.

Table 2: Summary Table of Learning Effectiveness (n = 16)

	Pretest		Posttest		Z	p
	M	SD	M	SD		
Learning Effectiveness	34.25	12.12	44.25	11.69	-2.84	.002**

** $p < .01$, *** $p < .001$

Anxiety Levels

Statistics revealed a significant decrease after the game in anxiety ($t = -2.84$, $p = .002 < .01$), inferred to be a result of game-based learning, as well as the controllability of the environment and the possibility of repetition to learn or understand knowledge or thinking related to field geology.

Table 3: Summary Table of Anxiety Levels (n = 16)

	Pretest		Posttest		Z	p
	M	SD	M	SD		
Anxiety Levels	3.73	1.40	2.76	1.07	-2.84	.002**

** $p < .01$, *** $p < .001$

Flow

Overall flow reached significance ($p < .001$), indicating that participants were quite engaged. While the loss of self-consciousness did not reach significance ($p = .067 > .05$), possibly due to the need for sustained focus on logical reasoning, which may have influenced this aspect of the experience.

Table 4: Summary Table of Flow (n = 16)

	M	SD	p	V
Overall flow	3.699	0.768	< .001***	91.000
Flow antecedents	3.650	0.776	0.001**	89.000
Challenge	3.625	0.806	0.007**	36.000
Goal	3.656	0.831	0.006**	52.500
Feedback	3.594	0.841	0.010*	42.500
Control	3.750	0.856	0.003**	63.500
Playability	3.625	0.885	0.009**	42.500
Flow experience	3.740	0.784	< .001***	102.500
Concentration	3.766	0.834	0.002**	76.000
Time distortion	3.688	0.814	0.004**	63.000
Autotelic experience	3.859	0.811	0.002**	66.000
Loss of self-consciousness	3.500	1.211	0.067	50.000

* $p < .05$, ** $p < .01$, *** $p < .001$

Cognitive Load Scale

The analysis results showed no significant differences across the three dimensions. The intrinsic cognitive load ($p = 1.0 > .05$) suggests that the difficulty level of learning field geology was moderate and appropriate. The extraneous cognitive load ($p = .09 > .05$) indicates that the game interface and operations were reasonably balanced, presenting some challenges but remaining within an acceptable range. As for the germane cognitive load ($p = .887 > .05$), the learning aids and support interfaces did not show a statistically significant effect.

Table 5: Summary Table of Cognitive Load Scale (n = 16)

	<i>M</i>	<i>SD</i>	<i>p</i>	<i>V</i>
intrinsic cognitive load	2.938	1.124	1.000	27.000
extraneous cognitive load	2.917	1.092	0.090	16.500
germane cognitive load	2.604	0.809	0.887	5.500

* $p < .05$, test value = 3

Conclusions

The study results confirmed the feasibility of SVVR and game-based learning in field geology education, demonstrating improvements in learning effectiveness. Student feedback, such as "an enjoyable way of learning" and "hoping for more similar activities in the future," reflect low levels of anxiety during the experience and high flow states. As for cognitive load, the findings indicate a moderate level, suggesting an appropriate balance for effective learning.

Based on the above discussion, the limitations and future development of this study are as follows:

(1) Factor Interaction

The factors influencing learning effectiveness are diverse and complex. While this study demonstrates the effectiveness of SVVR in enhancing learning effectiveness, it does not clarify the relationships between factors or identify potential underlying variables. For instance, the study did not measure learners' attitudes toward learning or distinguish the specific contributions of SVVR and gamification to learning effectiveness. Additionally, the possibility of other mediating factors influencing the outcomes remains unexplored, warranting further investigation.

(2) System Development

System Development: Immersive design has promoted geological thinking and decision-making skills, offering opportunities for experiential transfer to real-world fieldwork. However, research by Sureephong et al. (2024) indicates that while gamified VR can enhance student engagement and motivation, it does not guarantee ideal learning transfer. Given that the goal of the game is to facilitate experiential transfer during actual fieldwork, this study should further analyze differences in higher-order learning achievements and conduct field-based studies to evaluate the transfer effects. This would help clarify the effectiveness of such experiential transfer.

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Multicultural Education in Korean Higher Education: A Case Study for Advancing Global Citizenship in Southeast Asia

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The Southeast Asian Conference on Education 2025
Official Conference Proceedings

Abstract

In 2023, South Korea launched the “300K Project,” an initiative aiming to attract 300,000 international students to Korean universities by 2027. While this project has boosted the number of students remarkably, the long-term impacts on students choosing to study in South Korea still remained. Without a strong emphasis on multicultural education, stakeholders risk undermining international students’ ability to effectively integrate, succeed academically, and develop essential competencies. This gap may not only hinder their educational experience but also impede their capacity to cultivate global citizenship skills and thrive in an increasingly interconnected world. By employing James A. Banks’ framework on multicultural education theory, this research aims to assess how knowledge about multicultural education has been integrated and disseminated in Korean higher institutions through the lenses of international students and explore how this can support them in Korean universities. Using a mixed-methods approach, the research incorporates surveys of 150 international students from different universities who have already had at least 6 months living and learning in South Korea. After that, the research employed in-depth interviews with a number of students to delve deeper into their lived experiences, noticing some challenges including language barriers, cultural adaptation struggles, and the inconsistent provision of multicultural support. This case study provides valuable insights for other developing nations, such as Vietnam, the Philippines, and Indonesia, as they navigate similar efforts to balance expanding international enrollment with the cultivation of inclusive, globally connected academic environments for students from all over the world.

Keywords: multicultural education, global citizenship, higher education, Korean education policy, international students

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Introduction

Over the past two decades, South Korea has emerged as a leading destination for international students, especially from Asia, due to strategic government initiatives and a strong emphasis on higher education internationalization. The “Study Korea 300K” project epitomizes Korea’s ambition to host 300,000 international students by 2027. As of 2023, Korea has already attracted 181,842 students, representing 60.6% of its target, with 89.27% of them coming from Asian countries. Among these, students from Vietnam, Uzbekistan, Mongolia, and China make up a significant share (Kim, 2023). However, while access has expanded, concerns persist around the qualitative dimensions of this multicultural education. Language barriers, cultural adjustment, and unilateral policy approaches have led to dropout rates and feelings of isolation.

Figure 1: Number of International Students in South Korea by Year¹

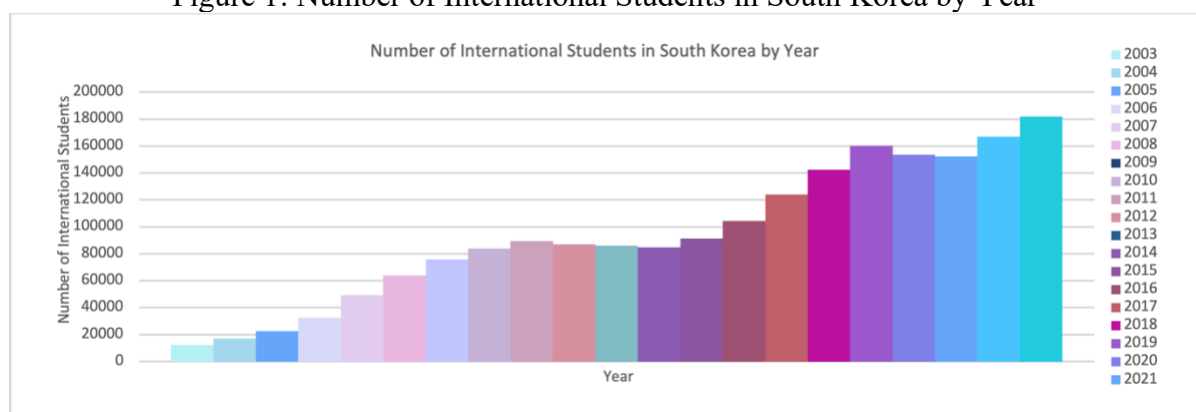
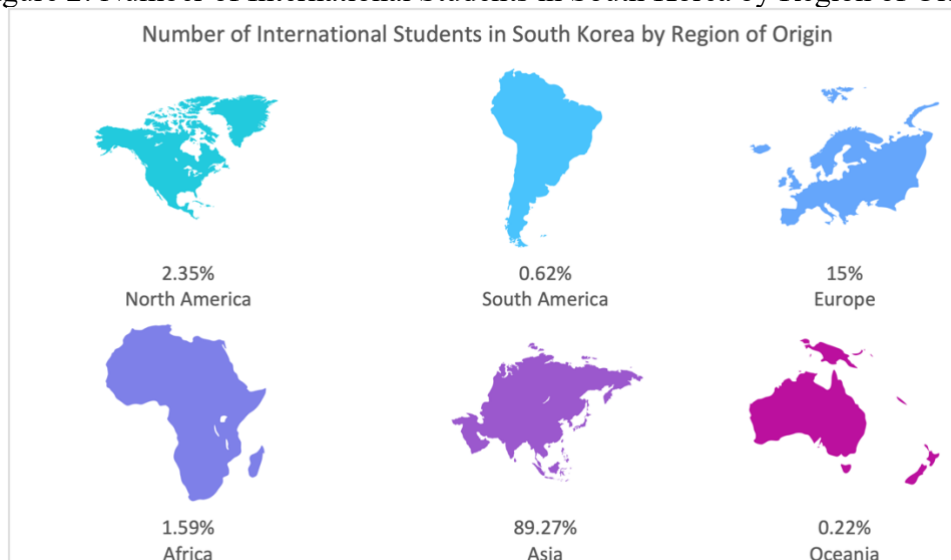
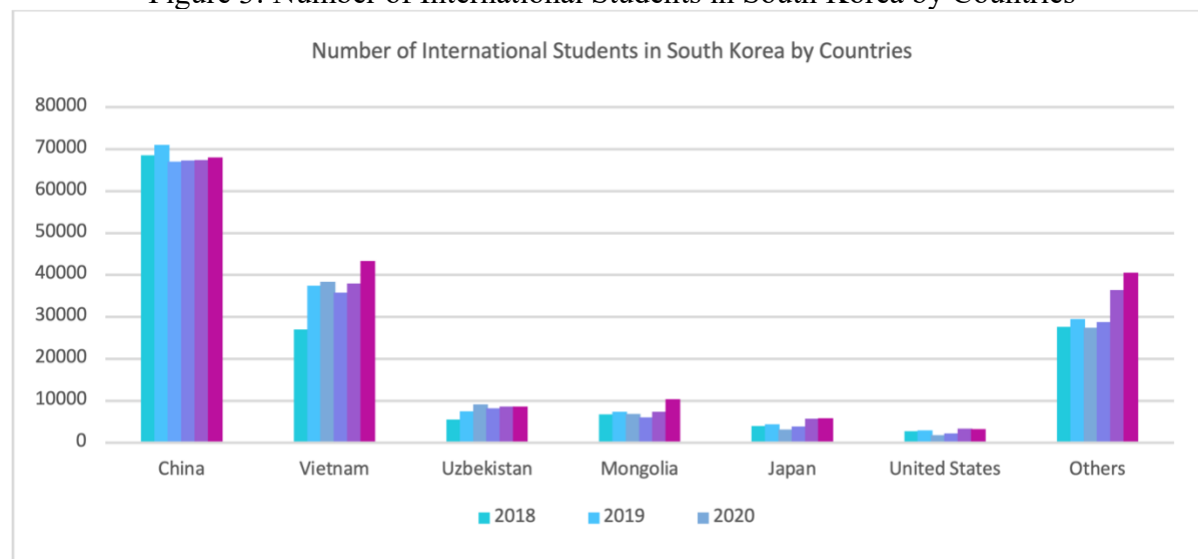


Figure 2: Number of International Students in South Korea by Region of Origin



¹ Up until 2003, the survey on foreign students only included those enrolled in junior colleges, four-year universities, and graduate schools. Starting from 2004, the scope was expanded to include all foreign students enrolled in junior colleges, four-year universities, graduate schools, online universities, and various schools.

Figure 3: Number of International Students in South Korea by Countries



The prevailing concept of multicultural education in Korea tends to focus on understanding other cultures (Chang, 2012). Also, multicultural education is basically targeted on a small group of minorities (Chang, 2012). Therefore, multicultural education targeted at the Korean public should be as equally important as the newly arrived migrants (Shen, 2019). The curriculum should address race, ethnicity, culture, language, religion, gender, and class.

Foundational works outline multicultural education not merely as an additive process of including diverse cultural elements, but as a transformative pedagogical framework that reorients curricula, teaching practices, and institutional policies to foster empathy, critical awareness, and social justice (Banks, 1993; Sleeter, 2014). Global citizenship education further extends this framework by emphasizing the development of engaged, critically informed citizens who understand the complex interdependencies among economic, social, environmental, and political systems (Cantón & Garcia, 2018; Goren & Yemini, 2017). These perspectives offer a rich theoretical base from which to consider the practices implemented in higher education systems, including those in Korea and throughout Southeast Asia.

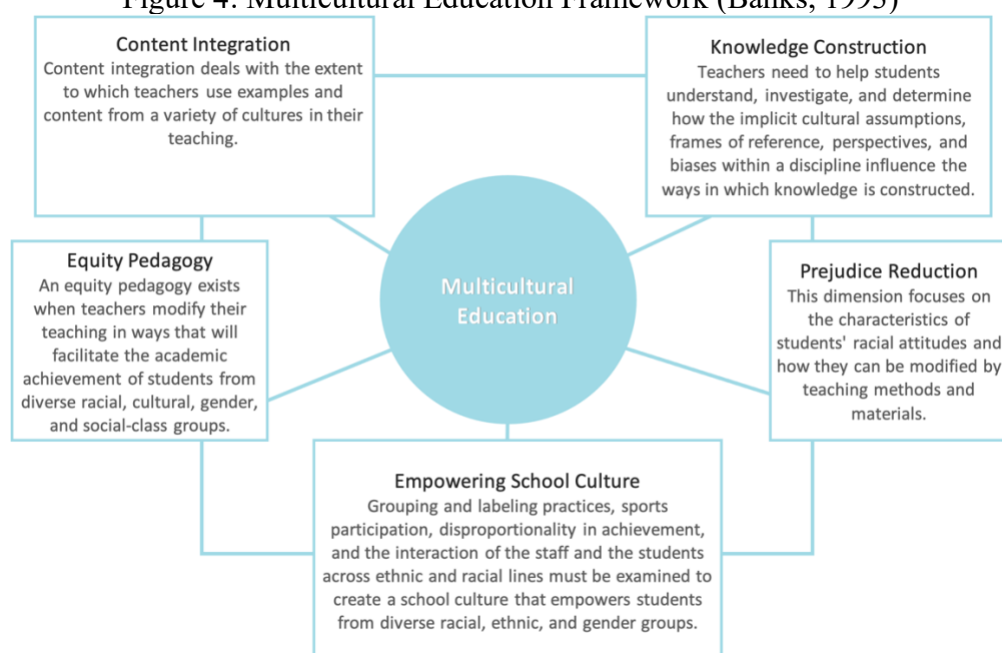
Multicultural education in South Korea has evolved to address the needs of marginalized students, including immigrants. Some approaches include instruction about different cultures, ethnic studies, intergroup relations, and culturally relevant teaching. Also, the existing multicultural education in Korea has been implemented with an assimilation approach, helping minorities adjust to the mainstream society, rather than aiming at integration where every member maintains their identity while respecting each other. The increase in international marriages and foreign workers has driven the need for inclusive education that reflects Korea's diversity. However, most participants had limited prior interactions with diverse racial and ethnic groups before the multicultural program, which underscores the importance of providing such experiences in teacher education (Kim & Choi, 2020).

Furthermore, the lack of specific multicultural content in Korean teacher education programs can lead to teachers feeling unprepared to implement multicultural education effectively in their classrooms (Kyun et al., 2015). Moral education and multicultural education are commonly concerned with cultural diversity. Multicultural education systematically aims to institutionalize cultural diversity in education settings (Chu, 2008).

Using Banks' (2013) framework on multicultural education, this study seeks to understand how Korean universities are addressing the needs of their diverse student body and fostering an inclusive academic environment. Through surveys and in-depth interviews, the study would like to explore the challenges and opportunities encountered by international students, providing valuable insights for South Korea and other nations, such as Vietnam, the Philippines, and Indonesia, as they strive to create globally connected academic environments. By doing this, the study aims to identify best practices and policy recommendations for promoting equity and inclusion in higher education.

Multicultural education in Korea has been shaped by institutional strategies including intensive Korean language programs, mentoring, and cultural exchange. Yet, questions remain about how effectively these initiatives promote an inclusive learning culture and foster global citizenship among students, particularly those from Southeast Asia. In response to these unresolved questions, this study takes a closer look at how multicultural education is experienced on the ground. Anchored in Banks' (1993) five-dimensional framework—Content Integration, Knowledge Construction, Prejudice Reduction, Equity Pedagogy, and Empowering School Culture—this study investigates the experiences and perceptions of international students in Korean universities, and the extent to which multicultural education supports global citizenship development.

Figure 4: Multicultural Education Framework (Banks, 1993)



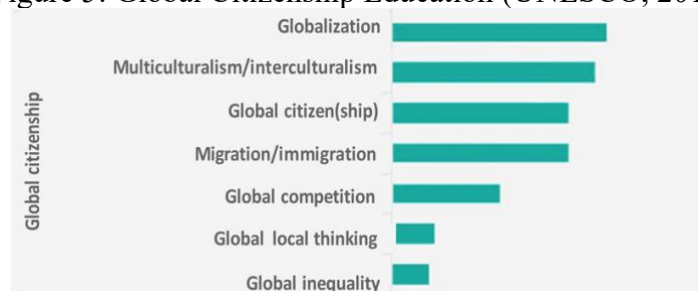
The concept of global citizenship serves as an essential complementary framework for understanding the broader aims of multicultural education in an interconnected world (UNESCO, 2015). According to Oxfam UK a global citizen is someone who is aware of the wider world and their role within it, respects diversity, understands how the world works economically, socially, politically, culturally, technologically and environmentally, and takes action to make the world more equitable and sustainable. However, as UNESCO's 2015 Global Education Monitoring Report highlights, global citizenship education (GCED) remains underdeveloped in many national education systems (UNESCO, 2015). Only 10% of textbooks explicitly address topics such as peace and conflict resolution, and a mere 7% of countries offer standalone GCED courses. While 91% of nations report initiatives toward

curriculum reform, just 66% actually emphasize global citizenship in practice (UNESCO, 2015).

Against this backdrop, this study examines how multicultural education in Korean higher education institutions may address this global deficit, particularly for international students from Southeast Asia. The research investigates whether Korea's educational approaches facilitate not only academic adaptation but also the development of empowered, globally engaged citizens who can navigate and contribute to an increasingly interconnected world (Guo & Jamal, 2007).

The findings from this research offer valuable insights for educational policymakers, university administrators, and faculty members involved in international education initiatives across Asia. Furthermore, by identifying both successful practices and areas for improvement in Korea's approach to multicultural education, this study contributes to the broader discourse on creating inclusive, globally oriented higher education environments that prepare students for meaningful participation in an interconnected world.

Figure 5: Global Citizenship Education (UNESCO, 2015)



Methodology

This research employed a sequential explanatory mixed-methods design to investigate multicultural education in Korean higher education institutions and its impact on international students' global citizenship development. The study was conducted in two distinct phases to address three primary research questions:

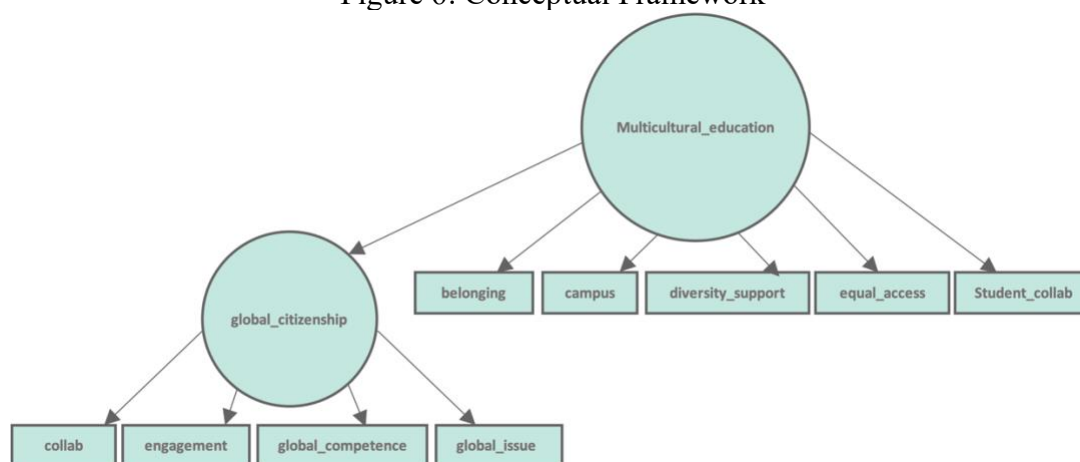
1. How do international students perceive multicultural education in Korea?
2. Does multicultural education foster global citizenship?
3. How is an empowering and inclusive learning culture experienced by international students?

The first phase employed a survey to collect quantitative data on students' experiences with multicultural education and global citizenship development. The survey instrument was developed based on (Banks, 1993) multicultural education framework and included nine construct categories measuring both multicultural education dimensions (campus environment, sense of belonging, student collaboration, diversity support, equal access) and global citizenship dimensions (global issue awareness, cultural collaboration, global competence, cultural engagement).

A purposive sampling approach targeted international students at Korean universities. Survey participation required at least six months of residence in Korea to ensure sufficient exposure to the educational environment. The questionnaire was distributed to 150 international

students at 17 Korean universities between September and November 2023, with 137 valid responses collected (91.3% response rate).

Figure 6: Conceptual Framework



Data Analysis & Findings

The sample included students from 12 countries, with Vietnamese students comprising the largest group (45.2%), followed by French (10.4%), Chinese (8.1%), and Myanmar (8.1%) students. Participants were enrolled across diverse academic disciplines: engineering ($n = 26$), business and economics ($n = 24$), social sciences ($n = 23$), and humanities ($n = 18$). The gender distribution was 54.6% female, 44.1% male, and 1.3% non-binary.

Figure 7: Universities

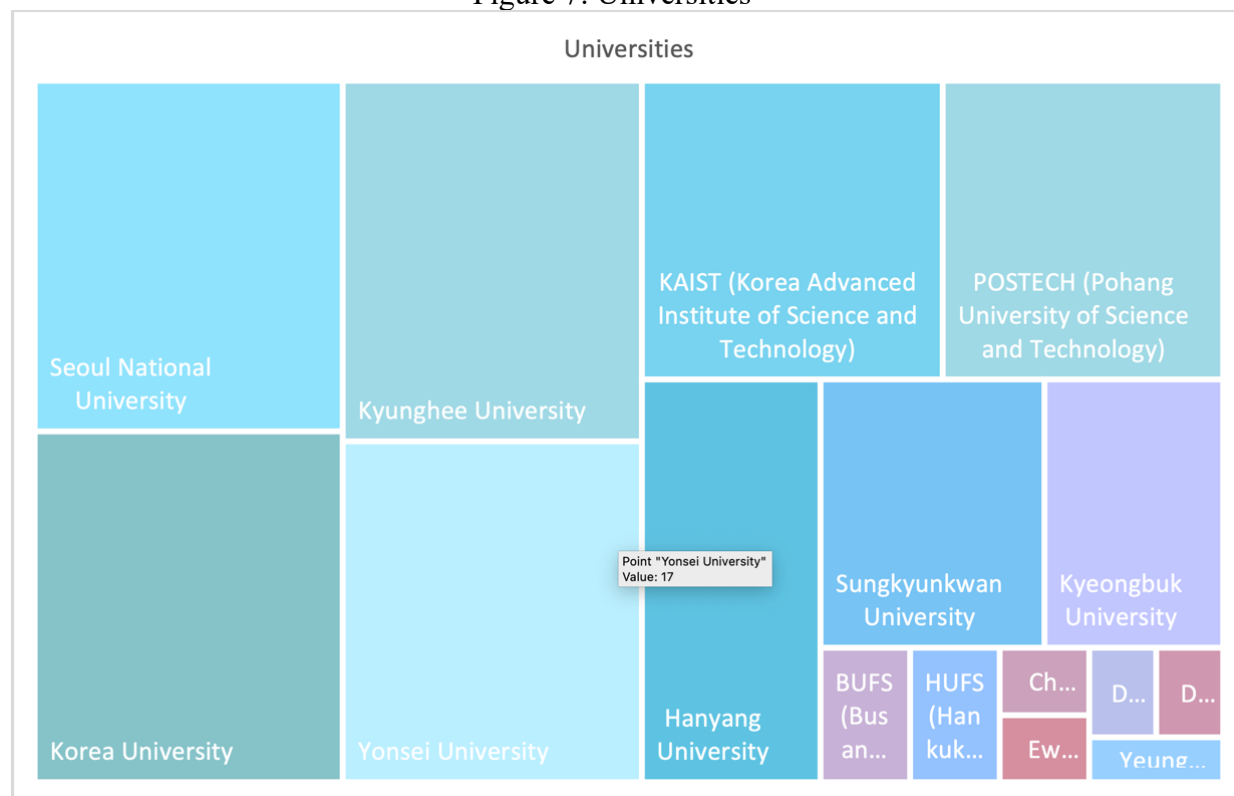
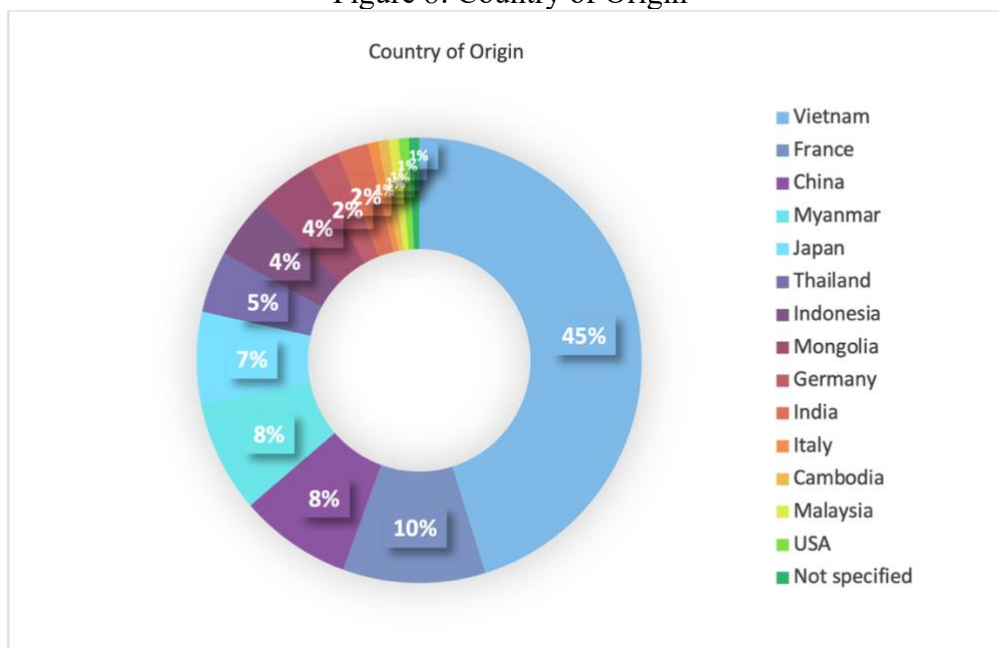
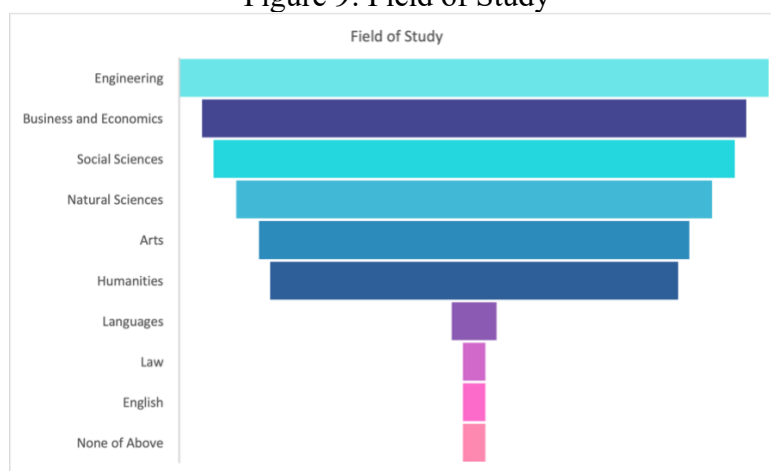


Figure 8: Country of Origin



Academic representation was balanced, spanning engineering (26 students), business and economics (24), social sciences (23), and humanities (18), among others. This range enhanced the study's capacity to explore disciplinary variations in students' experiences with multicultural education. Notably, 54.6% of respondents identified as female, suggesting gender-based perceptions may also play a role in shaping how multicultural experiences are internalized.

Figure 9: Field of Study



In this study, the constructs were operationalized as follows. For multicultural education, five key indicators were used: campus environment, sense of belonging, student collaboration, diversity support, and equal access. For global citizenship, four core dimensions were identified: awareness of global issues, cultural collaboration, global competence, and cultural engagement. These variables served as the basis for both the Likert-scale survey design and the structural equation modeling (SEM) analysis conducted in the later stages of the study.

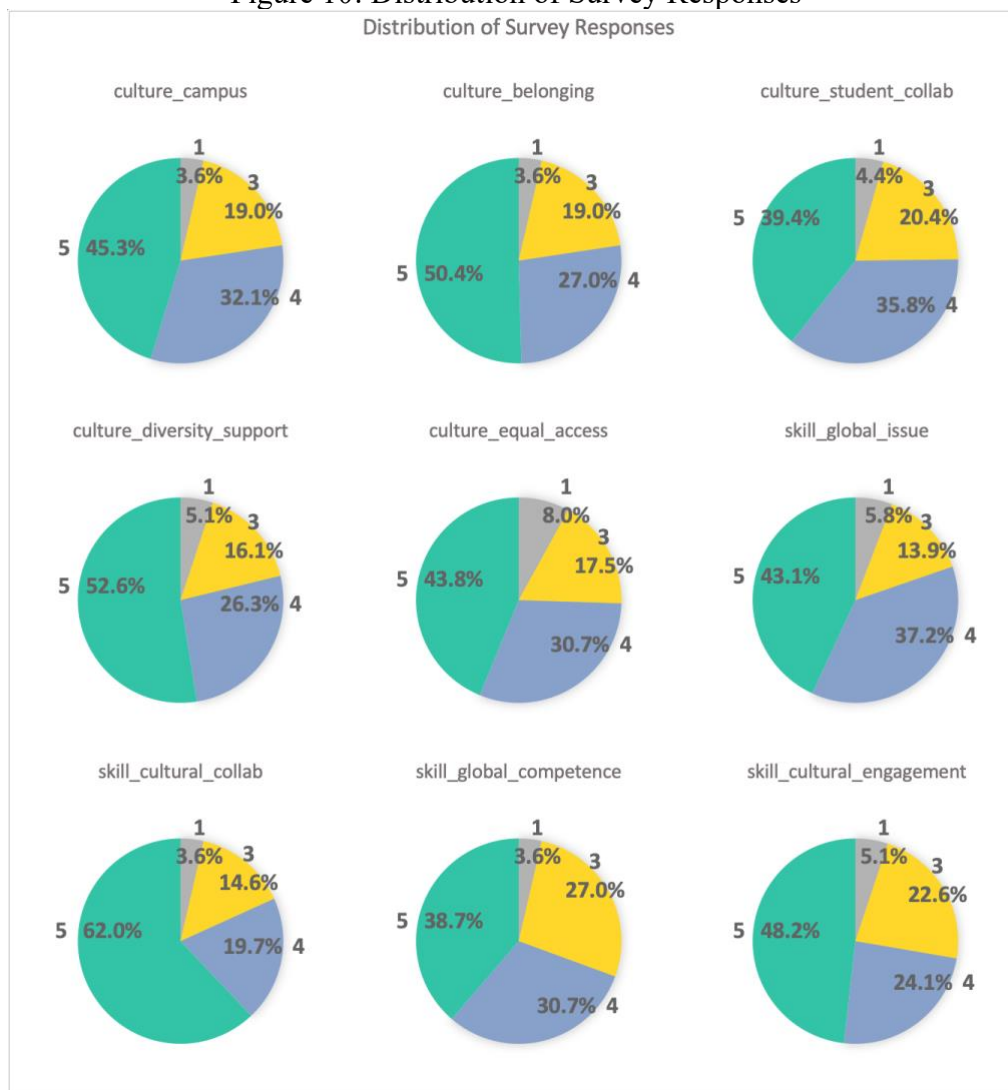
The data revealed a generally positive perception of multicultural education's role in promoting global citizenship. Notably, 66% of respondents agreed or strongly agreed that

their universities fostered an inclusive campus culture supporting diversity. Similarly, 61.2% reported a strong sense of belonging due to the multicultural environment, while 56.3% noted structured opportunities for collaboration with local students.

A detailed analysis of the Likert-scale responses across nine key constructs revealed meaningful trends in how international students perceive multicultural education and its impact on their learning experience and global citizenship development. Each construct was evaluated on a five-point scale, ranging from “Strongly Agree” to “Strongly Disagree.” The results indicated overall positive perceptions, with certain domains showing higher consensus among students.

In the institutional and cultural dimensions, *culture_diversity_support* recorded the highest rate of strong agreement (52.6%), followed by *culture_belonging* (50.4%) and *culture_campus* (45.3%). These results suggest that students generally feel that their universities promote diversity and foster a sense of inclusion. However, *culture_equal_access* showed a relatively higher level of disagreement (8.0%) compared to other categories, pointing to potential inequities in access to campus resources or opportunities.

Figure 10: Distribution of Survey Responses

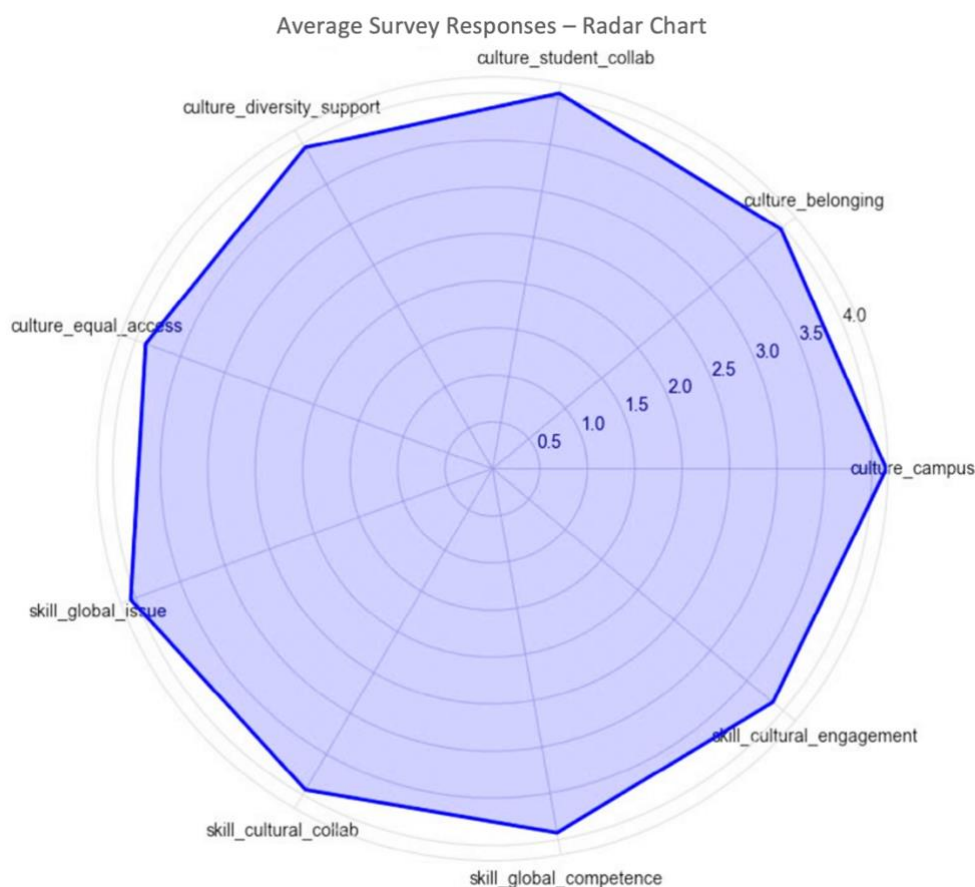


In terms of collaborative and structural engagement, *culture_student_collab* showed a strong combined agreement (39.4% strongly agree and 35.8% agree), indicating that many students experienced structured opportunities for cross-cultural interaction. However, a notable 20.4% remained neutral, and 4.4% disagreed, suggesting that these opportunities may not be uniformly implemented across institutions.

The skills-related dimensions also yielded encouraging outcomes. *skill_cultural_collab* was particularly high, with 62.0% strongly agreeing that their experiences enhanced their ability to collaborate across cultures—the highest agreement score across all constructs. *skill_global_issue* and *skill_cultural_engagement* followed with strong agreement rates of 43.1% and 48.2% respectively. Meanwhile, *skill_global_competence* showed a slightly lower rate of strong agreement (38.7%) but had the highest rate of neutral responses (27.0%), suggesting students may feel less confident or uncertain about their readiness to act as global citizens despite institutional efforts.

These findings highlight that while the multicultural learning environment in Korean universities is generally perceived positively, variability remains in how students experience inclusiveness, access, and skill development. Notably, dimensions related to cultural collaboration and diversity support scored consistently higher than those tied to systemic equality and personal global competence, reflecting both the strengths and gaps in current multicultural education practices.

Figure 11: Average Survey Responses – Radar Chart



The radar chart in Figure 12 displays average survey responses across nine key constructs measuring multicultural education and global citizenship skills. The chart utilizes a blue polygon that extends outward from the center along multiple axes, with each axis representing a different survey construct. Values range from 0 at the center to approximately 4.0 at the outer edge of the grid.

All constructs show relatively high average scores, with most reaching beyond the 3.5 mark on the scale. The data reveals a fairly balanced distribution across all dimensions, creating a somewhat symmetrical polygon shape. Culture_diversity_support and skill_cultural_collab appear to have the highest average scores, extending furthest from the center. Culture_equal_access shows a slightly lower average compared to other constructs, though still remains well above the midpoint of the scale. The strong overall scores across all dimensions indicate generally positive perceptions of multicultural education and its impact on global citizenship development among international students in Korean higher education institutions. The consistent pattern across both institutional factors (culture variables) and individual competencies (skill variables) suggests a coherent relationship between multicultural education provisions and students' perceived global citizenship outcomes. The findings also highlight the importance of integrating multicultural education with practical global engagement activities.

Multicultural education serves as a foundational element in preparing students to effectively navigate an increasingly interconnected global landscape by cultivating nuanced cultural understanding, promoting empathetic tolerance, and enhancing cross-cultural communication proficiencies.

Figure 12: Structural Model

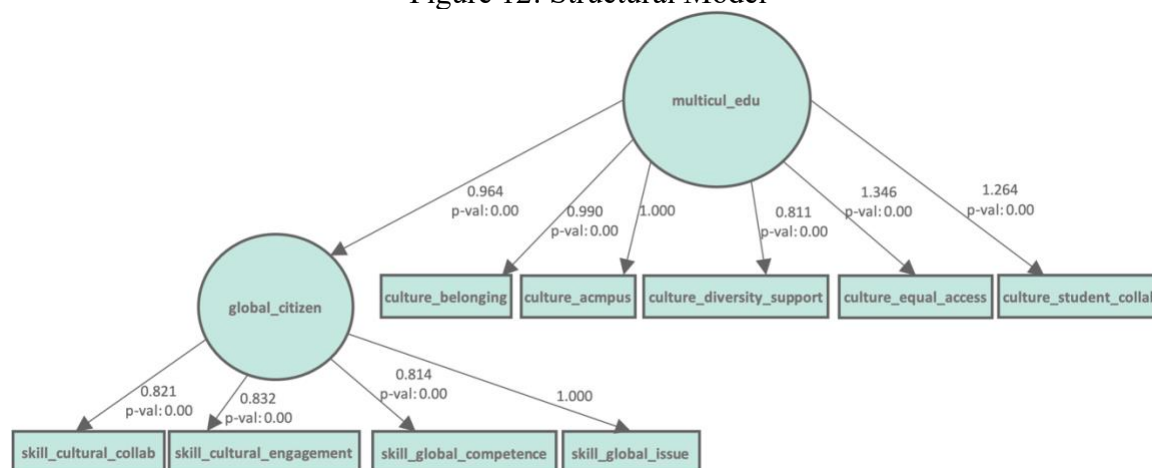


Figure 12 shows the structural equation model that explores the relationships between multicultural education and global citizenship, along with the specific factors measured for each. The model presents the strength of the connections, as indicated by the path coefficients and statistical significance levels.

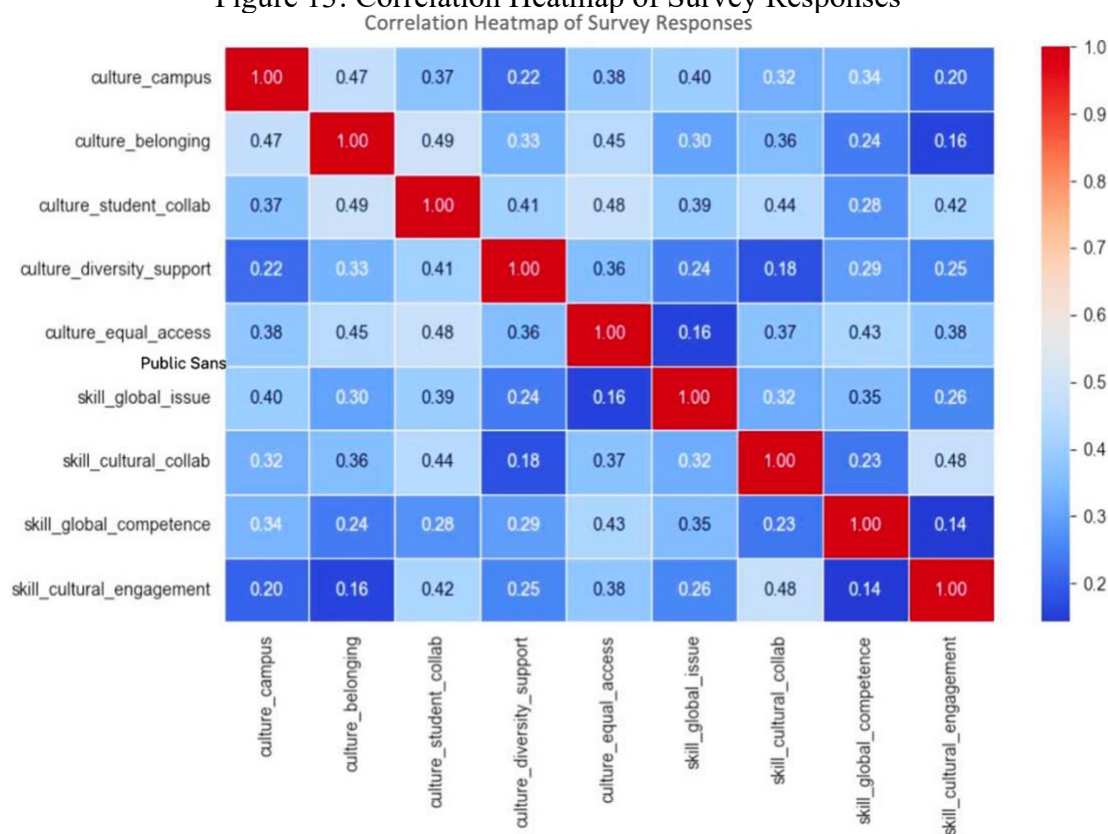
Multicultural education demonstrates a strong positive effect on global citizenship ($\beta = 0.964$, $p < 0.001$), showing the core hypothesis that multicultural educational environments in Korean universities significantly contribute to global citizenship development among international students. As can be seen from the pathways between multicultural education and its five indicators, there is a particularly strong effects on culture_student_collab ($\beta = 1.264$,

$p < 0.001$) and `culture_equal_access` ($\beta = 1.346$, $p < 0.001$), means that structured opportunities for cross-cultural interaction and equitable access to institutional resources are critical components of effective multicultural education.

The global citizenship construct displays robust connections with its four indicators. Moreover, the relationship with `skill_global_issue` shows a perfect standardized coefficient ($\beta = 1.000$, $p < 0.001$), suggesting this pathway may represent a theoretical saturation point. The relationship with `skill_cultural_collab` is also strong ($\beta = 0.821$, $p < 0.001$), reinforcing the critical role of intercultural collaboration skills in global citizenship formation. The weaker loading for `skill_cultural_engagement` ($\beta = 0.614$, $p < 0.001$), while still significant, indicates that cultural engagement activities may be necessary but not sufficient components of comprehensive global citizenship development within Korean higher education institutions.

The strongest latent variables were student collaboration (standardized loading: 0.724) and equal access to resources (0.703). These factors were crucial in shaping students' personal experiences of inclusive education. Interestingly, while cultural engagement was important, it alone was not enough to truly foster a strong sense of belonging and community among the students. Instead, it necessitated the backing of robust institutional support and collaborative structures to make a meaningful difference. By developing and implementing policies that thoughtfully address underlying issues like race and class, multicultural education can tackle hidden problems and effectively promote equality for all (Lee et al., 2019). The statistical analysis reveals that multicultural education has a significant impact on global citizenship, with specific factors like encouraging student collaboration, providing equal access, and promoting cultural engagement playing key roles (Khaedir & Wahab, 2020; Watson et al., 2011).

Figure 13: Correlation Heatmap of Survey Responses



The correlation heatmap in Figure 13 reveals the complex human experiences behind numbers, showing how different aspects of multicultural education connect with global citizenship development. When students find meaningful opportunities to collaborate across cultures (culture_student_collab), they're much more likely to feel they truly belong (culture_belonging), with one of the strongest correlations ($r = 0.49$) in the study. Similarly, students who actively engage with different cultures (skill_cultural_engagement) develop stronger abilities to work collaboratively across cultural boundaries (skill_cultural_collab, $r = 0.48$).

The moderate correlations between campus environment and belonging ($r = 0.47$) reflect how the overall atmosphere affects students' sense of inclusion. However, the data tells a more nuanced story when we examine weaker correlations. The minimal relationship between diversity support programs and actual global competence ($r = 0.29$) suggests that simply promoting diversity without meaningful integration doesn't necessarily translate to real-world skills. Even more telling is the weak link between cultural engagement activities and feeling like one belongs ($r = 0.16$).

Perhaps most revealing is how little connection exists between students' awareness of global issues and their perception of equal access to resources ($r = 0.16$). This can be referred that international students in Korean universities are not just passive recipients of multicultural education—they actively engage in and therefore benefit from cross-cultural learning opportunities. The numbers show that genuine human connections and meaningful structural support matter far more than symbolic gestures of inclusion.

$$R_{adj}^2 = 1 - \left(\frac{(1-R^2)(n-1)}{n-k-1} \right) \quad (1)$$

where:

- $R^2 = 0.156$,
- $n = 137$,
- $k = 1$ (only multicul_edu as a predictor),

$$R_{adj}^2 = 1 - \left(\frac{(1 - 0.156)(137 - 1)}{137 - 1 - 1} \right)$$

$$R_{adj}^2 = 1 - \left(\frac{(0.844)(136)}{135} \right)$$

$$R_{adj}^2 = 1 - 0.851 = 0.149$$

Adjusted $R^2 = 0.149$ (very close to R^2).

The final adjusted R^2 value of 0.149 tells a humbling story about the complexity of human development. Despite rigorous statistical modeling, multicultural education explains only about 15% of what shapes global citizenship in these students. This modest figure reminds us that becoming a global citizen isn't simply the result of institutional policies or classroom experiences.

Conclusion

This study contributes to a growing body of literature evaluating the implementation of multicultural education policies within non-Western higher education systems. The Korean case offers compelling lessons for neighboring Southeast Asian countries seeking to internationalize their higher education landscapes. The story behind Korea's multicultural education efforts is one of grassroots and a commitment to social justice for marginalized communities. Educators and advocates worked hard to create policies and programs that would support these underserved students. Korea's remarkable success in dramatically increasing its international student population, nearly 15-fold over two decades, demonstrates the power of a centralized, data-driven policy initiative. The "Study Korea 300K" project illustrates how national strategies, when aligned with institutional efforts, can attract large numbers of foreign students. For countries like Vietnam or Thailand, adopting similarly ambitious yet localized frameworks could support their own demographic and educational development goals, tailored to their unique contexts.

Korea's experience also highlights the critical importance of addressing not just access, but also inclusion. While Korea has made strides in creating institutional structures to support international students, the findings of this study suggest that a purely quantitative expansion of multicultural education is insufficient. Qualitative aspects such as students' sense of belonging, peer relationships, and cultural adaptation must be brought to the forefront. These human elements are essential in transforming universities from multicultural environments into truly intercultural learning communities where all students feel valued and empowered. As seen in the structural equation model, institutional factors like equal access and student collaboration are stronger predictors of global citizenship than symbolic diversity programs alone, highlighting the importance of centering the human experiences of students. Also, the research implied for educators around the world are recognizing the potential of multicultural education to address the needs of their own marginalized student populations. By aligning more closely with the UN Sustainable Development Goals and the UN Pact for the Future, which emphasize the need for mutual understanding and seeing one's own culture as part of a bigger global picture, as well as UNESCO's Global Citizenship Education agenda, Korea can solidify its role as an educational leader in Asia. This approach is what makes the Korean experience so valuable for others to learn from.

Lastly, this study recommends that future research explore longitudinal outcomes of multicultural education on international students' career trajectories, identity formation, and transnational engagement. Phase two of this research will adopt a qualitative lens to deepen understanding of students' lived experiences, especially regarding the role of diversity support in cultivating global leadership.

This study provides empirical evidence that multicultural education in Korean higher education has a significant and positive effect on fostering global citizenship among Southeast Asian students. Through quantitative modeling, it reveals that empowering learning cultures are built not merely through exposure to diversity, but through structured collaboration, equitable access, and meaningful institutional support. On the second phase of the research, we might dig deeply into the qualitative approach, to explore further about this phenomenon, also students perspectives. Also, in order to truly understand the full impact of multicultural education, future research might explore the experiences of underrepresented student groups. It is crucial that we explore how these policies influence their career development, identity formation, and transnational engagement over the long term.

Acknowledgements

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Financial Literacy of Young Adults in Higher Education: Do They Master the Key Concepts?

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Abstract

Financial literacy is one of the main skills that adults must acquire in order to make a right financial-decisions throughout their lives. Most of the adults learn and face with financial literacy concepts in their university years. This study analyses the financial literacy level of students in North American University and examines the learning sources of the students. To analyse the level of financial concepts that students are aware of, survey was conducted among different departments of the university, number of total participants are 181. The findings reveal that students know in moderate level basic financial concepts like inflation, interest rates. However, students have almost no awareness about long-term financial planning, investment risks and mortgage structure. Study also found that there are no significant learning sources for students to learn Financial literacy. Study suggests that universities should beside classical lecturing use “Blended Learning” teaching method and cooperate with financial institutions to deeply teach Financial Literacy to the students.

Keywords: financial literacy, financial concepts, financial education, teaching methods

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Introduction

In today's era, where Artificial Intelligence (AI) and Smart Finance are revolutionizing the financial landscape, providing financial services has become more accessible and convenient than ever. With a single click on a smartphone, individuals can apply for loans, send money, pay bills, manage their budget, and even trade international assets, including cryptocurrencies (Malani, 2024). However, along with these advancements, users face significant risks, such as financial scams, fraud, and potential monetary losses (Yu et al., 2022). Additionally, the easy availability of credit, attractive payment conditions, and frequent sales promotions often encourage impulsive spending and unintended shopping, leading to excessive debt and severe financial distress (Lusardi & Streeter, 2023).

To reap the full benefits of these accessible financial services and reduce the associated risks, improving financial literacy is crucial. Financial literacy empowers individuals to make informed financial decisions, understand complex financial products, and recognize potential threats. Studies show that individuals with higher financial literacy are less likely to fall victim to financial scams (Kasim et al., 2023; Umar & Dalimunthe, 2024; Yu et al., 2022) and are better equipped to avoid impulsive spending, manage finances effectively, and create long-term sustainable financial plans (Lusardi & Streeter, 2023). Furthermore, Lusardi and Streeter (2023) found that financial literacy enhances overall well-being.

The significance of financial literacy has led to increasing interest, particularly among young adults, including university students. Financial literacy is typically defined as the ability to understand and effectively use various financial skills, such as personal financial management, budgeting, and investing (Lusardi & Mitchell, 2014). Studies have highlighted alarmingly low financial literacy levels among young adults, both in the U.S. and globally (Lusardi & Tufano, 2015).

The concept of financial literacy has evolved over time. Remund (2010) redefined it as the ability to understand and apply financial skills such as budgeting, investing, and financial planning. More recent definitions emphasize not just knowledge, but practical competence in making sound financial decisions (U.S. Financial Literacy and Education Commission, 2020). Financial literacy covers a wide range of competencies, including understanding inflation, risk diversification, investment strategies, stock markets, and emerging fields like cryptocurrency. In a rapidly evolving digital financial landscape, it is imperative that students acquire these competencies for long-term financial well-being.

Financial literacy also aligns with several global goals, including the United Nations Sustainable Development Goals (SDGs). It supports poverty reduction (SDG 1) by enabling individuals to manage personal finances effectively (Delgadillo et al., 2024). It fosters gender equality (SDG 5) by ensuring equal access to financial education (Mittal, 2024) and contributes to inclusive economic growth (SDG 8) through better financial decision-making (Chandel & Arora, 2024). These broader social benefits underscore the importance of promoting financial literacy both at the individual and institutional levels.

This study examines the financial literacy of students from various departments at North American University (NAU) in Houston, Texas. It assesses their understanding of core financial concepts such as inflation, risk diversification, investment, the stock market, cryptocurrency, and basic numerical skills relevant to finance. Furthermore, it investigates

how financial literacy influences students' future financial behaviors, considering factors like attitudes, intentions, and subjective norms.

Financial Literacy Among Adults and College Students in the United States

In the U.S., the financial literacy of adults leaves much to be desired. According to a World Economic Forum report, the financial literacy level among U.S. adults has remained around 50% for the past eight years, with a 2% decline in the past two years (World Economic Forum, 2024). Additionally, 65% of Americans live paycheck to paycheck, only 44% can cover a \$1000 emergency expense from savings, 28% have no savings, and 39% lack a retirement plan (ExcelinEd, 2025). Alarmingly, financial literacy among college students is even more worrying. Studies show that only 38% of Gen Z and 45% of Gen Y exhibit sufficient financial literacy (Moneyzine, 2025). This lack of financial knowledge contributes to the growing issue of student loan debt, which totals \$1.7 trillion in the U.S. (USA Today, 2024). The average borrower graduates with over \$45,000 in debt (National Center for Education Statistics, 2021), and many students are unaware of alternative repayment options, struggling to meet financial obligations (Consumer Financial Protection Bureau [CFPB], 2024).

While these statistics highlight the need to enhance financial literacy among adults and college students, they also prompt the question: Why do college students end up with such significant debt? Many studies attribute this to financial illiteracy, as students lack the skills and knowledge to manage their finances effectively (Dewi et al., 2019; Lusardi & Tufano, 2015; Ninan & Kurian, 2021). As a policy recommendation, experts suggest incorporating financial literacy education early on, such as including it in high school and college curricula (Bastedo, 2019; Mandell, 2008; Ranjan, 2024). However, without deeper analysis of students' financial behavior, such recommendations risk oversimplifying the issue. It is essential to identify the specific factors influencing students' financial decisions to develop effective educational policies.

Bridging Financial Literacy Gaps in Higher Education

Financial literacy has become a critical issue in higher education. College students face unique challenges, including managing student debt and planning for future financial stability. Many students are required to make complex financial decisions but lack the necessary knowledge or skills to do so. This gap between financial responsibility and capability underscores the importance of studying financial literacy among young adults.

To address this gap, several studies suggest integrating comprehensive financial education into higher education curricula. Research shows that structured financial education improves students' financial knowledge and confidence (Lusardi & Mitchell, 2014; Mandell & Klein, 2009). Effective financial education programs often combine theoretical instruction with practical exercises, such as budget simulations, investment games, and real-life case studies (Fernandes et al., 2014). Research also emphasizes the importance of tailoring financial education to students' life stages and career goals. For example, first-year students may benefit from content on budgeting and debt management, while graduating seniors need more advanced investment and retirement planning strategies (Cude et al., 2006).

Despite these efforts, many students still struggle with basic financial concepts such as inflation, interest rates, and risk diversification (Chen & Volpe, 1998). Research has also

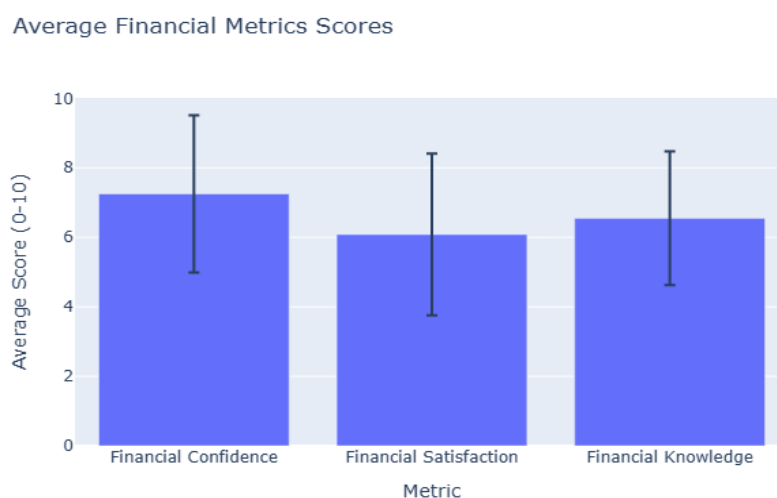
shown that students with higher financial literacy tend to display more responsible financial behaviors, including lower credit card debt, higher savings rates, and better investment diversification (Lusardi, 2019). However, the financial literacy rates among young adults remain alarmingly low. According to the U.S. National Financial Capability Study, only 24% of young adults demonstrate basic financial literacy (U.S. Financial Literacy and Education Commission, 2020). Among 15-year-olds, only 16% achieve a proficient level of financial literacy, indicating that the issue often begins well before students enter college.

This knowledge gap contributes to widespread financial stress, with 70% of students reporting significant financial anxiety (Financial Literacy and Education Commission, 2024).

One of the major concerns is student loan debt. In the U.S., 42.2 million individuals hold federal student loan debt, totaling \$1.75 trillion (Forbes Advisor, 2024). Unfortunately, many students do not fully understand the terms and repayment obligations of their loans (Financial Literacy and Education Commission, 2024), leading to widespread regret, with 61% of borrowers expressing remorse about the amount of debt they took on (Citizens Bank, 2019). These findings highlight the real-world consequences of financial illiteracy and its impact on students' future economic well-being.

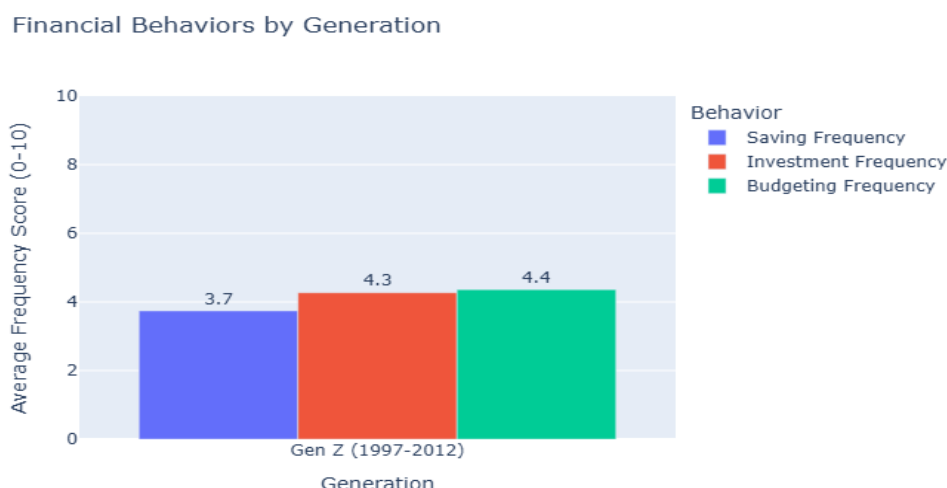
Results and Discussion

Figure 1: Financial Metrics: Confidence, Satisfaction and Knowledge



According to the results of our survey in NAU, Financial confidence has the highest average score, having slightly above 7 points out of 10. This shows that students have confidence about their financial abilities. However, Financial Satisfaction of the students are at the lowest average score, around 6, which indicates that they are less satisfied with their financial situation compared to their confidence and knowledge. Having the lowest financial satisfaction can be interpreted as even students feel confident and informed about financial literacy, they are still not satisfied with their financial situation. This can be because of external financial pressures as debts or uncontrolled expenses etc. Knowledge lays between satisfaction and confidence. Showing that students feel overconfident within having low knowledge about financial literacy.

Figure 2: Financial Literacy by Generation



If we look to the generations, scores as 3.7, 4.3 and 4.4 out of 10 seems to to moderate but inconsistent behavior. It is not strong, but not as extremely weak either. This shows that students have moderate level of knowledge about budgeting and investment with lower frequency in savings. This suggests that financial habits are not firmly established in Gen. Z students. In addition, we can conclude that there is a significant gap for improvement saving, investment and budgeting habits among students.

Figure 3: Understanding Financial Concepts

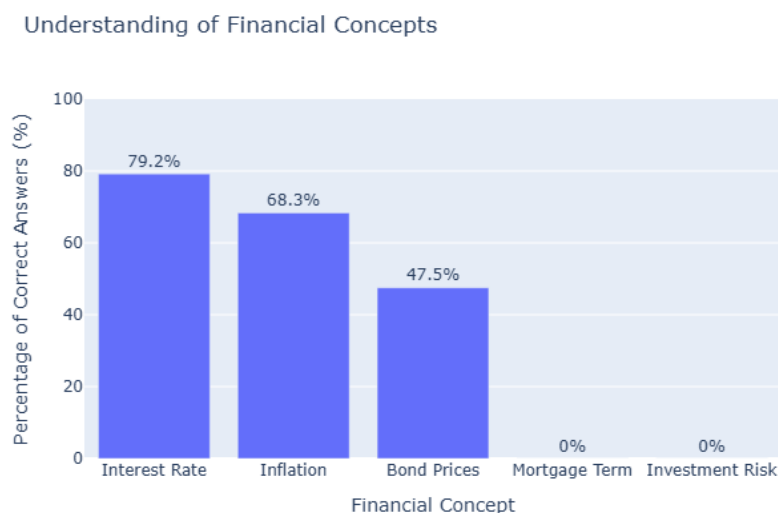
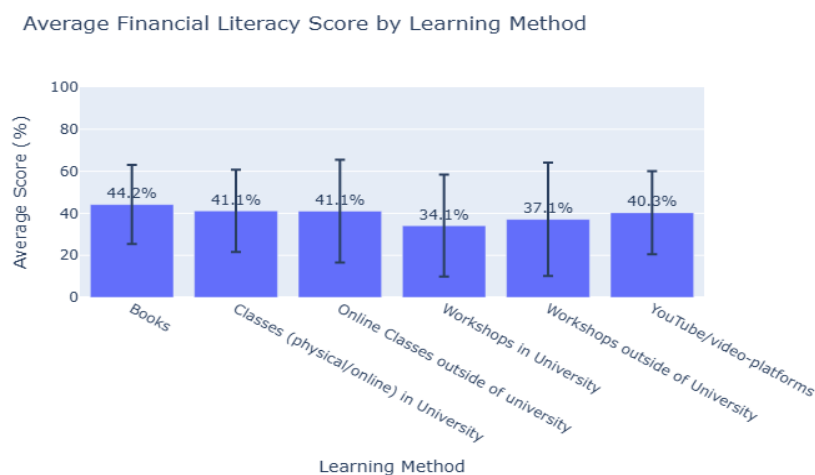


Figure 3 shows that students know in moderate level the basic financial concepts as interest rates and inflation. However, more complex and less used terms as bond prices, mortgage terms, and investment risk are poorly understood or completely unfamiliar. Students are not familiar with mortgage and investment risk concepts which is really concerning, because these concepts are crucial for long-term budgeting and financial decision making. These findings suggest that we must focus more on complex concepts as investment strategies, risk management and mortgaging in our educational process, particularly in the course of Personal Finance.

Figure 4: Learning Methods of Students



We also wanted to know from where students learn financial literacy. Results show that there is no significant learning method that helps students to improve their financial literacy. All the leaning sources have the moderate impact on students' learning of Financial Literacy. These findings suggest that just traditional methods as courses in class is not enough for students to deeply learn financial literacy. Universities can use combined teaching methods as "Blended learning" where students also learn more from different sources (books, YouTube, podcasts, discussion, workshops, trainings and application of the concepts in real cases etc).

Conclusion

In conclusion, we can say that while students know basic concepts of Financial Literacy in moderate level, they are struggling in practical financial decision-making and long-run financial planning concepts like mortgage structure, investment risks and financial markets. From these results we suggest universities to integrate into the curricula of their educational program regardless of the faculty or department Financial literacy courses. This course should be one of the required courses especially for freshmen students. Moreover, Financial Literacy courses should be taught in a practical way with the partnership of financial institutions as banks or stock markets etc. By combining traditional lectures with real cases from financial institutions and other digital tools, self-paced online modules, "Blended learning" teaching method can be used to deeply learn, apply and analyse financial concepts of the students.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

For analysing the data quadratic.ai was used and for the proofreading the mainscript and organizing the references Chat GPT was used.

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Development and Implementation of a Humanities-Play Integrated Education Program for Elementary School Students

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Abstract

This study aims to develop and evaluate the educational significance of a humanities-play integrated education program designed for elementary school students residing in the border regions of South Korea. Cheorwon, Gangwon-do, the program's site, is a border area experiencing urban decline in terms of physical, social, and economic functions, with lingering security concerns among residents. Therefore, a practical approach considering socio-cultural aspects is needed to improve the quality of life for these residents. The humanities-play integrated program introduced in this study combines humanities texts with various play activities designed to stimulate physical and cognitive engagement, supporting healthy self-identity formation among elementary students in border areas. During the development phase, the program was structured to connect humanities values and play activities through elements of creativity, spontaneity, simplicity, repetition, and real-life relevance. Since 2022, a total of seven program sessions have been conducted, with survey satisfaction rates ranging from 87% to 99%. The findings indicate that integrating humanities and play promotes positive self-recognition and confidence among students, receiving high engagement and positive feedback. In conclusion, the humanities-play integrated program demonstrates an educational effect in fostering healthy self-identity in elementary students from border areas.

Keywords: humanities-play integrated education, elementary education, socio-cultural approach, local revitalization program

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Introduction

Since the early 1960s, the Republic of Korea has experienced rapid urbanization alongside remarkable economic growth, causing large numbers of people to migrate to urban areas. As cities expanded physically to accommodate the influx of new residents, many provincial city centers, apart from a few major metropolitan areas, began to show signs of deterioration in physical infrastructure, social structures, and economic viability.

This issue is also closely related to Korea's unique historical context. After signing the Armistice Agreement in 1953, the country grappled with the underdevelopment of border regions due to various regulations, as well as lingering security concerns among local residents. In an effort to revitalize these declining urban areas—including those in border regions—the government has implemented a range of policies. These initiatives involve improving the physical environment, bolstering local commercial districts, fostering new industries and job opportunities, enhancing cultural and welfare services, and promoting greater community participation. However, earlier urban regeneration projects focused primarily on upgrading physical infrastructure, which has not led to truly sustainable or equitable development. In fact, existing studies on the key areas and factors of urban regeneration have shown that social and cultural considerations can be more significant than the physical environment alone. Accordingly, there is growing demand for practical strategies that go beyond merely updating outdated physical spaces and instead comprehensively address the social and cultural factors required to improve residents' quality of life.

This study focuses on Cheorwon-gun in Gangwon State, a border region on the Korean Peninsula that has been experiencing a steady outflow of residents. Although population decline stems from multiple factors, previous data indicates that educational support is a particularly pressing concern.

In a survey targeting young adults between the ages of 19 and 29 from 800 households in Cheorwon, respondents identified “Employment Support” (37.8%), “Business Attraction” (16.2%), and “Improving the Education System and Cultivating Future Talents” (15.9%) as critical measures for encouraging population inflow. This finding underlines the importance that local residents place on education.

A separate satisfaction survey targeting households with preschool- and K–12-age children revealed that 55.5% of respondents felt there were “insufficient” educational opportunities outside of formal schooling. This finding highlights the lack of diverse learning experiences as a significant concern.

Taken together, these results suggest that, in order to improve the overall quality of life for local residents, there is a pressing need not only to enhance the educational environment but also to provide a broader range of learning experiences that nurture future generations.

In response, this study designed and implemented a humanities–play integrated education program for elementary school students in Yangji Village, Cheorwon-gun. The program was made possible through a multi-party MOU aimed at revitalizing Yangji Village, involving the Yangji Village Residents' Council, Geunnam Elementary School, the Gangwon National University Education-Research Group for Local Regeneration and Humanities Care Experts, and the Yangji Village Urban Regeneration Field Support Center. By reading humanities texts and engaging students in a variety of physical and cognitive play activities, the program

sought to offer diverse learning experiences for elementary school children in a border region and to support healthy identity formation.

The purpose of this study is to introduce the development and implementation of the program, describe the outcomes achieved, discuss its educational significance, and identify areas in need of further improvement.

Program Details

Location: The program was conducted at Geunnam Elementary School in Yangji Village, Cheorwon-gun, Gangwon Special Self-Governing Province, Republic of Korea.

Implementation Period: The program ran once per semester from June 2022 to October 2024, with each session lasting five weeks for a total of six sessions.

Target Participants: Each session was offered to two classes from grades 2 to 6 at Geunnam Elementary School, with class sizes ranging from 7 to 15 students.

Operation Details: The teaching staff generally included a lead instructor, responsible for overall planning and class delivery, and an assistant instructor.

On a single day, separate two-hour sessions were offered during the regular curriculum—one program tailored for lower grades and another for upper grades. The content of these two programs were different.

Program Planning

Importance of Reading Humanities Texts

1. Reading humanities texts helps children develop integrated thinking skills about themselves and the world, while fostering positive social behavior.
2. It opens a path to emotional healing by allowing children to resolve underlying, unresolved feelings.
3. Lessons gained from reading act like a “vaccination,” helping children understand and tackle the problems they will encounter in life.

Linking Humanities Education With Play

Play is far more than just fun; it is crucial for well-rounded development, contributing to children’s physical, cognitive, and social growth. When combined with play, humanities education can provide more dynamic and effective learning experiences. The impact of humanities is amplified when receptive and expressive activities are combined. Values found in humanities texts are more deeply internalized—and can deliver new meaning—when paired with a variety of physical and artistic play activities. Moreover, play-based expressions are especially helpful for children whose language skills are not yet fully developed, as they offer additional ways to communicate and explore ideas.

Key Elements of Program Design

1. Creativity: Activities should be designed to spark creativity by connecting humanities readings with playful engagement.
2. Voluntary Participation: Students should participate by choice. While instructors may encourage engagement, they do not force it. Notably, students who were initially reluctant often showed increased enthusiasm as the sessions progressed.
3. Simplicity and Repetition: The humanities concepts introduced should be easily understandable for the students' age level and reinforced through repeated exposure to maximize learning.
4. Real-World Relevance: The values and insights gained from humanities education should relate directly to students' everyday lives and offer possible solutions to real-life challenges.

Additional Details

Texts and play activities were adapted according to the students' grade levels. Lower-grade students primarily read picture books, while upper-grade students focused on folktales and myths. To support hands-on play activities, the instructor prepared sample materials so all students could participate without difficulty within the allotted time.

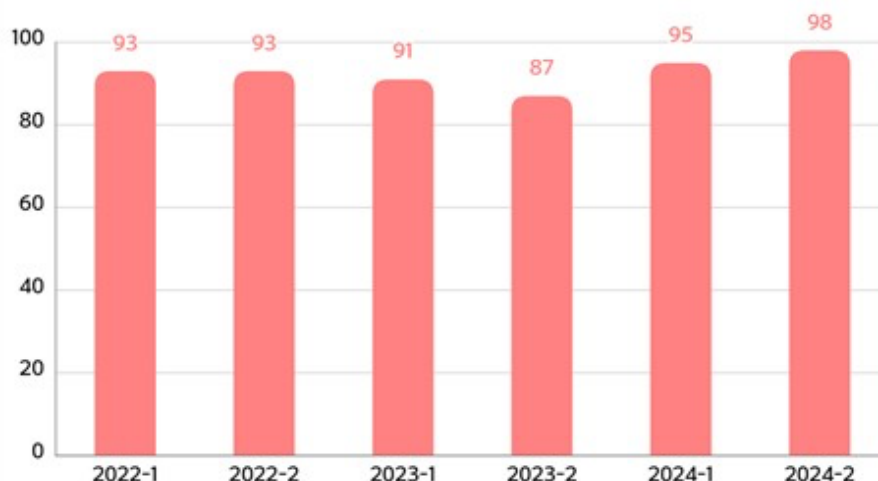
The program also prioritized cooperative activities with minimal competitive elements. One key emphasis during class was that there are no "correct" answers. Students were encouraged to freely express their ideas, while being guided to communicate their opinions appropriately.

Quantitative Results

A survey was administered to program participants, focusing on the following nine items:

1. Overall Satisfaction
2. Appropriateness of Group Size
3. Suitability of Teaching Methods
4. Quality of Facilities
5. Level of Participant Engagement
6. Knowledge Acquisition Before vs. After Program
7. Relevance to Real-World Applications
8. Course Satisfaction
9. Instructor Satisfaction

Figure 1: Overall Satisfaction of Elementary Students With the Program (%)



Qualitative Results

Student Feedback Summary

- I liked how the teacher explained the stories in a fun way.
- The teacher was kind and caring, which made it enjoyable.
- It was so much fun; I want to take this class again.
- I hope other friends get a chance to join this class, too.
- At first, I felt shy because it was my first time doing a humanities program, but it became really fun later on.
- I thought reading books would be boring, but the sessions got more interesting as time went on.
- I feel my friendship with my classmates grew stronger through these lessons.

School Teacher Feedback

- This program offered a valuable opportunity for students to engage with literary texts and traditional stories they rarely encounter.
- During the humanities lessons, the children appeared enthusiastic and genuinely happy.
- The students have become better at expressing their own ideas.

Educational Significance of the Program

1. Emotional Development: The program nurtured students' imaginative thinking and deepened their self-understanding, contributing to healthier self-concepts. Through in-depth study of humanities texts and cooperative play activities, students strengthened their social skills and improved peer relationships.
2. Cognitive Development: By reading stories, students learned to engage with texts more deeply, boosting both concentration and vocabulary. Additionally, they showed strong interest in using their imaginations to create original stories during play activities.

Conclusion

This study designed and implemented a humanities–play integrated education program for elementary school students in a border region. Its goal was to broaden students’ learning experiences and help them develop a healthy sense of self. Across six sessions, participants’ satisfaction ranged from 87% to 98%. The program also successfully sparked interest in humanities among students who were not previously familiar with such content, having a positive impact on both their emotional and cognitive development.

Moreover, because this program was planned with social and cultural considerations in mind, it represents a practical strategy for improving the quality of life for residents of Cheorwon-gun.

However, since the program was short-term and focused on non-physical interventions, further in-depth research is needed to quantitatively assess its positive effects and explore its sustainability over the long term.

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Transformational, Transactional, and Lasallian Identity Leadership Behaviors: Effects on Employee Performance

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Abstract

Leadership plays a crucial role in educational institutions, influencing both organizational success and the attainment of institutional goals. This study examines the leadership behaviors of school administrators at La Salle Green Hills. It focuses on the dimensions of transformational leadership, including vision articulation, role modeling, goal alignment, high-performance expectations, individualized support, and intellectual stimulation. Additionally, it addresses transactional leadership characterized by contingent rewards. The study explores how these behaviors influence employee performance, particularly regarding timeliness, diligence, collaboration, and proactiveness. As a Catholic institution, the study also investigates the Lasallian identity, emphasizing core values such as faith, service, and communion, to understand their impact on employee commitment and goal achievement. Using a quantitative research design, the study utilized an adapted and modified 37-item leadership behavior assessment ($N_1 = 282$) and a 25-item self-rating questionnaire ($N_2 = 164$), both administered online to employees. Correlation and regression analyses were conducted to evaluate the relationships and influences of leadership behaviors on employee performance. Results indicate that the administrators are perceived to have high expectations for employees' performance, however, providing individualized support and empathy are less frequently observed. Also, transformational leadership behaviors significantly enhance employees' proactiveness while transactional behavior has a positive relationship with the employee's core value of communion. Overall, there is a strong positive relationship among transformational, transactional, and Lasallian identity leadership behaviors, all of which are key motivators for employees, fostering collaboration and proactive engagement in the workplace. By strengthening these leadership practices, the school can significantly improve employee performance and achieve its goals.

Keywords: leadership behavior, employee performance, Lasallian identity, transactional, transformational

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Introduction

Leadership is a vital part of every organization. It plays a crucial role in achieving the goals and in shaping the success of educational institutions. Bryant Kolle, a specialist in Strategic Partnership of LinkedIn, describes leaders as someone who inspires their followers with their charm, appealing ways, and engaging personality. They are individuals who can inspire people to do their best and become better versions of themselves along the way. Leaders are seen as models and persons who take responsibility for their actions and with the people they work with. Given this, leadership behaviors or styles play a significant role in employees' ability to perform above and beyond what is expected, primarily when motivated by good leadership. Thus, leadership has a positive and significant effect on employee satisfaction and performance (Paais & Pattiruhu, 2020). In the study of Ibad and Hadi (2022), transformational leadership is defined as the ability to inspire and motivate followers to enhance their achievements, and transformational leaders use their emotional and social intelligence to change the behavior of their team members (Bass & Avolio, 1990). Several studies have shown how transformational leadership affects employee performance. In the study of Chang and Ferozi (2021), the effects of the different dimensions of transformational leadership are associated with employee performance. Ningsih et al. (2023) has shown that transformational leadership has a significant impact on employee engagement, performance, and satisfaction. Moreover, transformational leadership emphasizes that administrators have the potential to act as change agents, transforming the people, culture, and climate by addressing the changing and complex demands within schools (Mendez-Keegan, 2019). Meanwhile, according to Nguni et al. (2006), transactional leadership motivates followers by appealing to their self-interest and is based on an exchange relationship. Follower compliance is exchanged for expected rewards. Additionally, this form of leadership may result in an efficient and productive workplace, but it is limited compared to transformational leadership. Moreover, the study of Nguni et al. (2006) also found that the contingent rewards dimension of transactional leadership had shown a moderate positive influence on job satisfaction, but with a strong negative influence on the commitment to stay. Transformational and transactional leadership styles may be different from one another, but Waldman et al. (1990) says that they build on one another. Transformational leadership strengthens transactional leadership by focusing on the development of followers as well as addressing the goals of the different stakeholders of an organization (Bass & Avolio, 1990).

Considering that transformational leadership has been studied in different contexts and many countries and these studies have been found to affect or impact employee performance, motivation, satisfaction, trust in leaders, and managing changes, (Chang & Ferozi, 2021; Podsakoff et al., 1990; Vinger & Cilliers, 2006), this study works with the assumption that if administrators exhibit transformational leadership behaviors, then they could influence excellent employee performance and implement institutional changes successfully. In addition, the study will assess whether contingent reward behaviors also have any influence on the performance of employees.

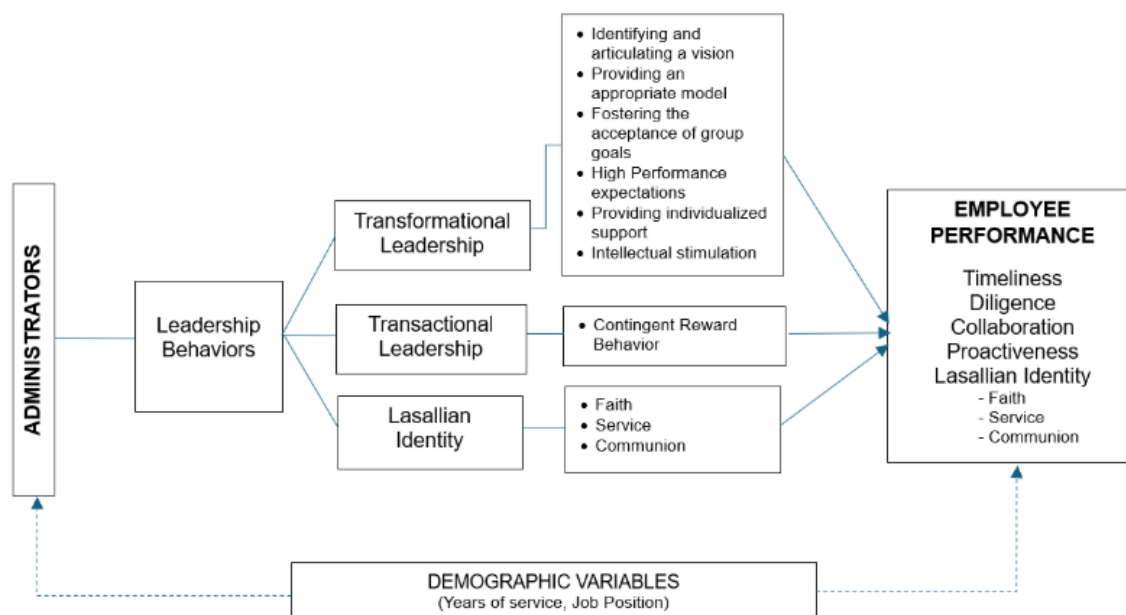
Objectives of the Study and Research Questions

Given this context, the study aims to determine the current leadership behaviors of the La Salle Green Hills (LSGH) administrators and whether these behaviors affect the performance of the employees. In addition, the study targets to identify which of the leadership behaviors predict the performance of the employees. In support of the study objectives, the following are the research questions that the study aims to answer:

1. What are leadership behaviors frequently exhibited by the administrators?
2. What are the participants' perceptions of employee performance?
3. How do these behaviors influence or affect the performance of the employees?
4. Which leadership behavior or dimension is associated with the performance of the employees?
5. Which leadership behavior or dimension predicts the performance of the employees?

Conceptual Framework

Figure 1: Conceptual Framework



Given the assumption of the study that the leadership behaviors of the administrators who exhibit transformational leadership behaviors significantly affect the performance of employees, a conceptual framework is developed as seen in Figure 1. The dependent variable is employee performance while the independent variables are the leadership behaviors and Lasallian Identity. The correlation of each of the dimensions of transformational and transactional leadership with employee performance in terms of timeliness, diligence, collaboration, and proactiveness is determined. In addition, the Lasallian Identity of faith, service, and communion is evaluated to determine if these traits also correlate with the performance of employees. Among these behaviors, the study will also assess whether a specific behavior serves as a predictor of employee performance.

Methodology

Research Design

A correlational quantitative research design is used in the study to investigate and analyze the relationship between and among the study variables. The study aims to determine the significant differences between leadership behaviors and how these behaviors affect and predict or influence employee performance.

Participants

Participants of the study include all regular employees from administrators, faculty, and support staff personnel of La Salle Green Hills. The participants or respondents were grouped according to their assigned job position and years of experience in the institution. A total of $N_1 = 282$ participants accomplished the Leadership Behavior evaluation, while $N_2 = 164$ accomplished the self-rating questionnaire on employee performance.

Measures or Instruments of the Study

The administrators' evaluation tool is composed of transformational, transactional, and Lasallian Identity leadership behaviors. The self-evaluation tool that measures employee performance is composed of four categories namely, timeliness, diligence, collaboration, and proactiveness. For the Lasallian Identity, items on faith, service, and communion are included in both measures. Table 1 below shows the rating scale in interpreting the results of both measures.

Tool 1: Online Administrators' Evaluation: a tool that measures the leadership behaviors of the administrators. It consists of 28 questions involving transformational and transactional leadership behaviors (Chang & Ferozi, 2021; Podsakoff et al. 1990). The questions are divided into 7 dimensions which are identifying and articulating a vision, providing an appropriate model, fostering the acceptance of group goals, high-performance expectations, providing individualized support, intellectual stimulation, and transactional behaviors. As an added variable, the tool also includes 9 questions on Lasallian core values of faith, service, and communion. It uses a 5-point Likert scale wherein the behaviors are measured based on their frequency.

Tool 2: Self-evaluation: a tool that measures the fulfillment of the job functions and responsibilities of an employee. It consists of 16 questions that represent employee performance which was adapted from the study of Chang and Ferozi (2021). The researchers divided and grouped the questions into four categories: timeliness, diligence, collaboration, and proactiveness. Similar to Tool 1, the self-evaluation also includes 9 questions on Lasallian core values of faith, service, and communion. The instrument uses a 5-point frequency Likert scale.

Table 1: Rating Scale used for Online Administrators' Evaluation and Employee Performance Self-Evaluation

Rating Scale		Mean Ratings	
Options	Description	Range	Interpretation
5	Frequently (Palagi)	4.21 - 5.00	The behavior is observed almost always
4	Fairly often (Madalas)	3.41 - 4.20	The behavior is observed more than half of the time
3	Sometimes (Paminsan-minsan)	2.61 - 3.40	The behavior is observed half of the time or less
2	Once in awhile (Bihira)	1.81 - 2.60	The behavior is observed a few times or less
1	Not at all (Hindi kailanman)	1.00 - 1.80	The behavior is never observed

Data Gathering Procedure and Analysis

The study employs the use of online evaluation instruments for administrators and self-rating forms for all employees. The instruments are distributed to all participants using Google Form.

The respondents or participants are given 2 weeks to complete the evaluation and self-rating forms (Leadership Behavior Survey and Self-rating Form) based on the directions set for the instruments. Upon completion of the data gathering process, the data are processed using Excel and SPSS Software. The quantitative data is analyzed using descriptive statistics, t-test, correlation, and regression analyses.

Results and Discussion

Demographics

Online Administrators' Evaluation. The Online Administrator's Evaluation was a survey given to employees to rate the leadership styles of their supervisors, unit heads/leads. Table 2 and table 3 showcase the detailed breakdown of participants based on their years of service and job positions.

Table 2: Frequency and Percentage of Participants Based on Years of Service

Years of Service	Frequency	Percentage
0 to 3 Years	70	24.82
4 to 6 Years	25	8.87
7 years and above	187	66.31
Total	282	100.00

Table 2 shows the distribution and percentage of respondents based on their years of service at LSGH. The participants were categorized into three groups: those with 0 to 3 years of service, those with 4 to 6 years, and those who have been with LSGH for 7 years or more. The first group consisting of employees with the least tenure (0 to 3 years) accounted for 70 respondents, representing 24.82% of the total participants. The second group, composed of employees who have served from 4 to 6 years, had 25 respondents, making up 8.87% of the total. Lastly, the third group, which is composed of employees with the longest tenure (7 years and above), had the highest representation with 187 respondents, constituting 66.31% of the total participants.

The data suggests that most of the respondents are seasoned employees who have been with LSGH for a significant period. In contrast, the relatively smaller percentages of the first two groups imply a lower influx of newer employees or a higher retention rate among long-serving staff.

Table 3: Frequency and Percentage of Participants Based on Job Position

Job Position	Frequency	Percentage
Administrator	33	11.70
Faculty	160	56.74
Faculty Assigned in Offices	21	7.45
Support Staff	68	24.11
Total	282	100.00

Total of eligible staff: 380
Total of responses received: 282
Percentage of respondents: 74.21%

Table 3 presents the distribution and percentage of employees according to their job position. The respondents were categorized into four groups: Administrator, Faculty, Faculty Assigned in Offices (FAO), and Support Staff. The group of administrators accounted for 33 respondents, representing 11.70% of the total participants. Teaching faculty had 160 respondents, constituting 56.74%, whereas non-teaching or FAO accounted for 21 or 7.45% of the total respondents. Lastly, the group of support staff had 68 participants or 24.11%.

The data shows us that the highest number of respondents came from the group of Faculty, followed by the group of support staff, administrators, and FAO. The trend aligns with the current actual spread of employees into the four groups, where faculty has the highest number of employees and FAO has the lowest.

Employee Performance Self-Evaluation.

Table 4: Frequency and Percentage of Participants Based on Years of Service

Years of Service	Frequency	Percentage
0 to 3 Years	37	22.56
4 to 6 Years	16	9.76
7 years and above	111	67.68
Total	164	100.00

Table 4 shows the distribution and percentage of respondents based on their years of service at LSGH. The participants were categorized into three groups: those with 0 to 3 years of service, those with 4 to 6 years, and those who have been with LSGH for 7 years or more. The first group consisting of employees with the least tenure (0 to 3 years) accounted for 37 respondents, representing 22.56% of the total participants. The second group, composed of employees who have served from 4 to 6 years, had 16 respondents, making up 9.76% of the total. Lastly, the third group, which is composed of employees with the longest tenure (7 years and above), had the highest representation with 111 respondents, constituting 67.68% of the total participants.

The data suggests that many of the respondents are seasoned employees, similar with the observation made with the result of the Online Administrator's Evaluation, who have been with LSGH for a significant period. In contrast, the relatively smaller percentages of the first two groups imply a lower influx of newer employees or a higher retention rate among long-serving staff.

Table 5: Frequency and Percentage of Participants Based on Job Position

Job Position	Frequency	Percentage
Administrator	23	14.02
Faculty	86	52.44
Faculty Assigned in Offices	18	10.98
Support Staff	37	22.56
Total	164	100.00

Table 5 presents the distribution and percentage of employees according to their job position. The respondents were categorized into four groups: Administrator, Faculty, Faculty Assigned in Offices (FAO), and Support Staff. The group of administrators accounted for 23 respondents, representing 14.02% of the total participants. Teaching faculty had 86 respondents, constituting 52.44%, whereas non-teaching or FAO accounted for 18 or 10.98% of the total respondents. Lastly, the group of support staff had 37 participants or 24.11%.

The data shows us that the highest number of respondents came from the group of Faculty, followed by the group of support staff, administrators, and FAO. The trend aligns with the current actual spread of employees into the four groups, where faculty has the highest number of employees and FAO has the lowest. The similar observation has also been noted in the participants of the Online Administrator's Evaluation.

Results

Question 1. What are leadership behaviors frequently exhibited by the administrators?

Table 6: Mean Ratings of the Transformational Behavior, Transactional Behavior, and Lasallian Identity Perceived to be Exhibited by Administrators
(Grouped according to factors)

Category	Factors	Factor Mean (SD)	Description	Category Mean (SD)	Description	Overall Mean (SD)	Description
Transformational Behavior	Identifying and articulating a vision	4.51 (SD: 0.85)	The behavior is observed almost always	4.35 (SD: 1.07)	The behavior is observed almost always	4.35 (SD: 1.06)	The behavior is observed almost always
	Providing an appropriate model	4.41 (SD: 0.98)	The behavior is observed almost always				
	Fostering the acceptance of group goals	4.49 (SD: 0.91)	The behavior is observed almost always				
	High performance expectations	4.43 (SD: 0.95)	The behavior is observed almost always				
	Providing individualized support	3.79 (SD: 1.50)	The behavior is observed more than half of the time				
	Intellectual stimulation	4.41 (SD: 0.92)	The behavior is observed almost always				
Transactional Behavior	Contingent reward behavior	4.17 (SD: 1.27)	The behavior is observed more than half of the time	4.17 (SD: 1.27)	The behavior is observed more than half of the time		
Lasallian Identity	Faith	4.44 (SD: 0.88)	The behavior is observed almost always	4.44 (SD: 0.91)	The behavior is observed almost always		
	Service	4.45 (SD: 0.92)	The behavior is observed almost always				
	Communion	4.44 (SD: 0.94)	The behavior is observed almost always				

Table 6 displays the mean ratings of the three leadership styles of administrators in LSGH: Transformational, Transactional, and Lasallian Identity. Under each category of leadership behavior, multiple factors describe the behaviors of the administrators. Listed above are the mean and standard deviation (SD) of ratings as perceived to be exhibited by the administrators.

The transformational behavior is characterized by leadership qualities that inspire and motivate employees. The factors under this leadership style include identifying and articulating a vision (4.51 ± 0.85), providing an appropriate model (4.41 ± 0.98), fostering the acceptance of group goals (4.49 ± 0.91), high performance expectations (4.43 ± 0.95), providing individualized

support (3.79 ± 1.50), and intellectual stimulation (4.41 ± 0.92). This leadership style had an overall mean rating of 4.35 ± 1.07 , implying that administrators generally exhibit transformational leadership behaviors “almost always”.

Transactional behavior, which is a type of leadership based on rewards in exchange for achieving a goal, has only one factor, which is the contingent reward. This factor had a mean rating of 4.17 ± 1.27 , suggesting that the leadership style is observed “more than half of the time”. Furthermore, the mean rating suggests that leadership quality is present but not as frequently observed as transformational behaviors.

The Lasallian Identity is a type of leadership style that is distinct in a Lasallian community. This leadership is based on the Lasallian core values of faith, service, and communion, reflecting the mission-driven approach of Lasallian institutions. These factors had a mean rating \pm SD of 4.44 ± 0.88 , 4.45 ± 0.92 , and 4.44 ± 0.94 , respectively, resulting in a category mean rating \pm SD of 4.44 ± 0.91 for Lasallian Identity. The rating suggests that the leadership qualities are consistently observed in the administrators.

The mean ratings in each category and factor show that Lasallian Identity is the leadership style that is mostly exhibited by administrators, followed by transformational leadership and transactional leadership. This suggests that administrators of LSGH are driven by the Lasallian core values complemented by transformational leadership, where a combination of articulating vision, setting high expectations, and promoting shared goals can be expected. On the other hand, actions towards individualized support and structured incentive systems can be improved to incorporate transactional behavior in the leadership style of LSGH administrators.

Question 2. What is the participants’ perception on employee performance?

Table 7: Mean Ratings of Participants’ Responses on the Self-Rating Survey on Employee Performance and Lasallian Identity (Grouped according to factors)

Category	Factors	Factor Mean	Description	Category Mean	Description	Overall Mean	Description
Employee Performance	Timeliness	4.79 (SD: 0.47)	The behavior is observed almost always	4.65 (SD: 0.73)	The behavior is observed almost always	4.68 (SD: 0.66)	The behavior is observed almost always
	Diligence	4.85 (SD: 0.37)	The behavior is observed almost always				
	Collaboration	4.36 (SD: 1.08)	The behavior is observed almost always				
	Proactiveness	4.59 (SD: 0.68)	The behavior is observed almost always				
Lasallian Identity	Faith	4.72 (SD: 0.49)	The behavior is observed almost always	4.72 (SD: 0.53)	The behavior is observed almost always		
	Service	4.67 (SD: 0.59)	The behavior is observed almost always				
	Communion	4.78 (SD: 0.49)	The behavior is observed almost always				

Table 7 showcases the mean ratings for employee performance and Lasallian Identity and the factors under these categories. The four factors under employee performance are: timeliness (4.79 ± 0.47), diligence (4.85 ± 0.37), collaboration (4.36 ± 1.08), and proactiveness ($4.59 \pm$

0.68). The Lasallian Identity, on the other hand, has three factors under it, specifically, faith (4.72 ± 0.49), service (4.67 ± 0.59), and communion (4.78 ± 0.49).

Among the four factors in employee performance, diligence had the highest mean rating, while the rest had lower mean ratings. Nonetheless, all four factors had mean ratings that translate to all behaviors being “observed almost always”. The factors under Lasallian Identity also had similar mean ratings and interpretations. The data suggests that employees perceive themselves as employees who value work ethics and productivity, as well as working towards serving the Lasallian mission.

Question 3. How do these behaviors influence or affect the performance of the employees?

Table 8 contains results of the one-way analysis of variance (ANOVA), examining how employees from different job positions perceive various leadership behaviors. The four job positions in this study are administrator, faculty, FAO, and support staff.

The statistical analysis revealed that perceptions on leadership behavior significantly differ across the different job positions ($p\text{-value} < 0.05$). This was evident in almost all the leadership behavior except for high-performance expectations ($p = 0.426$). This indicates that while employees from different job positions hold varying perceptions on leadership behaviors, they still share a common perspective on that leadership behavior. In essence, employees across all job positions seemed to agree that high-performance expectations were exhibited by their leaders “almost always”. The consistency of employees’ perceptions regarding this leadership behavior underscores the importance of setting clear performance expectations.

As for the rest of the leadership behaviors, significant differences were observed in the perception of employees across different job positions. This suggests that employees in different job positions experience leadership behaviors differently. Notably, the group of support staff consistently gave the highest mean ratings for all leadership behaviors. This may indicate that support staff perceive their leaders more positively, which can be influenced by their expectations from their leaders compared to faculty, FAO, and administrators.

Table 8: Means, Standard Deviations, and One-Way Analyses of Variance in Leadership Behaviors and Job Position

Leadership Behaviors		Job Position	N	Mean	SD	F	Sig
TRANSFORMATIONAL	Identifying and articulating a vision	Administrator	72	4.42	.913	3.47	0.016
		Faculty	590	4.48	.803		
		Support Staff	101	4.73	.645		
		FAOs	28	4.36	.782		
		Total	791	4.50	.798		
	Providing an appropriate model	Administrator	72	4.39	1.011	4.90	0.002
		Faculty	590	4.36	.975		
		Support Staff	101	4.74	.627		
		FAOs	28	4.30	1.021		
		Total	791	4.41	.950		

TRANSACTIONAL	Fostering the acceptance of group goals	Administrator	72	4.45	1.028	4.17	0.006
		Faculty	590	4.45	.903		
		Support Staff	101	4.77	.615		
		FAOs	28	4.31	.969		
		Total	791	4.48	.892		
	High Performance expectations	Administrator	72	4.33	.941	0.93	0.426
		Faculty	590	4.31	1.096		
		Support Staff	101	4.49	.853		
		FAOs	28	4.32	.723		
		Total	791	4.33	1.044		
	Providing individualized support	Administrator	72	4.16	.946	7.68	0.000
		Faculty	590	3.59	1.241		
		Support Staff	101	3.92	.986		
		FAOs	28	4.10	.973		
		Total	791	3.70	1.193		
	Intellectual Stimulation	Administrator	72	4.30	1.001	3.79	0.010
		Faculty	590	4.18	1.271		
		Support Staff	101	4.61	.715		
		FAOs	28	4.15	.931		
		Total	791	4.25	1.187		
	Contingent Reward Behavior	Administrator	72	4.17	1.004	6.27	0.000
		Faculty	590	3.91	1.249		
		Support Staff	101	4.39	.714		
		FAOs	28	4.33	.880		
		Total	791	4.01	1.173		
LASALLIAN IDENTITY	Faith	Administrator	72	4.31	.851	7.95	0.000
		Faculty	590	4.39	.938		
		Support Staff	101	4.68	.628		
		FAOs	28	3.75	1.590		
		Total	791	4.40	.940		
	Service	Administrator	72	4.31	.928	6.00	0.000
		Faculty	590	4.41	.941		
		Support Staff	101	4.68	.703		
		FAOs	28	3.89	1.434		
		Total	791	4.41	.944		
	Communion	Administrator	72	4.40	.922	6.45	0.000
		Faculty	590	4.40	.939		
		Support Staff	101	4.69	.727		
		FAOs	28	3.85	1.464		
		Total	791	4.42	.946		

In terms of years of service, Table 9 shows the ANOVA analysis, examining how various factors contribute to employee performance based on the perspectives of employees with different tenures. This data was a result of a self-rating survey administered through Google Forms. The participants were categorized into three groups according to their tenures: Least tenure (0-3 years), mid tenure (4-6 years), and the most tenure (7 years and above). For most of the employee performance factors, there were no statistically significant differences ($p > 0.05$) that were noted, indicating that employees with different tenures similarly perceive their performance. The consistently high mean ratings across tenure groups suggest that employees frequently perform the factors listed above, rating themselves as demonstrating those behaviors “almost always”. However, a statistically significant difference was observed for one employee performance factor - collaboration ($p = 0.039$). This indicates that tenure can influence how employees perceive their ability to work with others. One reason could be is that the most tenure may have already developed stronger professional relationships, while the least and mid tenures may still be in the process of learning the team dynamics and still trying to find their place within the group. This adjustment phase could contribute to lower self-rating in the collaboration aspect of employee performance.

Table 9: Means, Standard Deviations, and One-Way Analyses of Variance in Employee Performance and Years of Service

Employee Performance	Years of Service	N	Mean	SD	F	Sig.
Timeliness	0 to 3 years	37	4.72	0.389	1.20	0.305
	4 to 6 years	16	4.75	0.376		
	7 years and above	111	4.82	0.324		
	Total	164	4.79	0.345		
Diligence	0 to 3 years	37	4.86	0.258	1.40	0.250
	4 to 6 years	16	4.74	0.436		
	7 years and above	111	4.86	0.264		
	Total	164	4.85	0.284		
Collaboration	0 to 3 years	37	4.28	0.510	3.30	0.039
	4 to 6 years	16	4.16	0.507		
	7 years and above	111	4.43	0.447		
	Total	164	4.37	0.474		
Proactiveness	0 to 3 years	37	4.54	0.583	0.19	0.825
	4 to 6 years	16	4.58	0.522		
	7 years and above	111	4.60	0.458		
	Total	164	4.59	0.492		
Faith	0 to 3 years	37	4.69	0.389	1.50	0.226
	4 to 6 years	16	4.56	0.512		
	7 years and above	111	4.75	0.405		
	Total	164	4.72	0.414		
Service	0 to 3 years	37	4.69	0.434	1.42	0.867
	4 to 6 years	16	4.63	0.453		
	7 years and above	111	4.67	0.426		
	Total	164	4.67	0.428		
Communion	0 to 3 years	37	4.78	0.386	0.02	0.977
	4 to 6 years	16	4.79	0.453		
	7 years and above	111	4.77	0.436		
	Total	164	4.78	0.425		

Table 10 contains the results of the one-way analysis of variance (ANOVA), examining how employees from different job positions perceive employee performance factors. The data were gathered from the self-rating survey administered through Google Forms. The four job positions in this study are administrator, faculty, FAO, and support staff.

Descriptive statistics revealed that various job positions provided the highest mean ratings but mostly were noted from the group of Faculty. Whereas the support staff group consistently provided the lowest mean ratings across all employee performance factors. Moreover, ANOVA illustrates that statistically significant differences were found in collaboration ($p = 0.007$), proactiveness ($p = 0.013$), service ($p = 0.019$), and communion ($p = 0.00$). This translates to the perceptions of employees regarding their performance being different from one another as influenced by their respective job positions. In contrast, no significant differences were found in timeliness ($p = 0.515$), diligence ($p = 0.062$), and faith ($p = 0.144$). This can indicate that employees across all job positions perceive their punctuality, adherence to deadlines, and hardwork in a similar manner. Moreover, the way they integrate faith-related values into their work might have been influenced by their shared organizational culture that is reinforced into their identity as part of the Lasallian community.

Table 10: Means, Standard Deviations, and One-Way Analyses of Variance in Employee Performance and Job Position

EMPLOYEE PERFORMANCE	JOB POSITION	N	Mean	SD	F	Sig.
Timeliness	Administrator	23	4.84	.282	0.766	0.515
	Faculty	86	4.77	.370		
	FAO	17	4.88	.288		
	Support Staff	37	4.76	.349		
	Total	163	4.79	.346		
Diligence	Administrator	23	4.86	.259	2.493	0.062
	Faculty	86	4.89	.243		
	FAO	17	4.86	.337		
	Support Staff	37	4.74	.343		
	Total	163	4.85	.285		
Collaboration	Administrator	23	4.61	.309	4.162	0.007
	Faculty	86	4.39	.478		
	FAO	17	4.35	.516		
	Support Staff	37	4.18	.474		
	Total	163	4.37	.475		
Proactiveness	Administrator	23	4.59	.456	3.728	0.013
	Faculty	86	4.70	.437		
	FAO	17	4.45	.593		
	Support Staff	37	4.41	.521		
	Total	163	4.59	.489		
Faith	Administrator	23	4.71	.430	1.83	0.144
	Faculty	86	4.78	.360		
	FAO	17	4.67	.486		

Service	Support Staff	37	4.59	.472	3.397	0.019
	Total	163	4.72	.414		
	Administrator	23	4.64	.481		
	Faculty	86	4.77	.344		
	FAO	17	4.65	.547		
	Support Staff	37	4.51	.449		
	Total	163	4.68	.422		
	Administrator	23	4.88	.398		
	Faculty	86	4.88	.289		
	FAO	17	4.78	.457		
Communion	Support Staff	37	4.49	.542	9.302	0.00
	Total	163	4.78	.421		

Question 4. Which leadership behavior or dimension is associated with the performance of the employees?

Table 11 examines how the leadership styles correlate with the general employee performance and Lasallian core values. The Pearson correlation, *R*, represents the strength of the relationship between the variables. The Sig. (2-tailed) or *p*-value shows the statistical significance of the relationship (*p*-value < 0.05) and the *N* represents the value of the sample size for correlation test.

While transformational leadership is significantly correlated with Lasallian Identity, none of the leadership behaviors significantly affects the general employee performance. Looking into other forms of motivation, strategies, and other variables that directly affect the performance of employees can be considered.

Table 11: Pearson-R Correlation Results for Leadership Behaviors and Overall Employee Performance

			Leadership Behaviors			Employee Performance	
			Transformational Leadership Behavior	Transactional Leadership Behavior	Lasallian Identity	Factors	Lasallian Identity (SR)
Leadership Behaviors	Transformational Leadership Behavior	R	1	.733**	.895**	.070	.176*
		Sig. (2-tailed)		.000	.000	.373	.024
		N	791	758	788	164	164
	Transactional Leadership Behavior	R	.733**	1	.700**	.039	.141
		Sig. (2-tailed)	.000		.000	.623	.075
		N	758	758	755	159	159
	Lasallian Identity	R	.895**	.700**	1	.055	.111
		Sig. (2-tailed)	.000	.000		.482	.155
		N	788	755	788	164	164
Employee Performance	Factors	R	.070	.039	.055	1	.642**
		Sig. (2-tailed)	.373	.623	.482		.000
		N	164	159	164	164	164
	Lasallian Identity (SR)	R	.176*	.141	.111	.642**	1
		Sig. (2-tailed)	.024	.075	.155	.000	
		N	164	159	164	164	164

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Question 5. Which leadership behavior or dimension predicts the performance of the employees?

Table 12: Regression Coefficients for Predicting Leadership Behaviors Over Employee Performance

Variable	B	95% CI		SE	β	t	p
		Lower Bound	Upper Bound				
(Constant)	4.360	4.006	4.715	.179		24.326	.000
Identifying and articulating a vision	-.008	-.169	.153	.082	-.021	-.102	.919
Providing an appropriate model	.040	-.122	.201	.082	.121	.487	.627
Fostering the acceptance of group goals	-.074	-.227	.080	.078	-.220	-.949	.344
High performance expectations	.113	.024	.201	.045	.306	2.516	.013
Providing individualized support	-.010	-.072	.053	.032	-.030	-.308	.759
Intellectual stimulation	.036	-.094	.165	.066	.104	.543	.588
Transactional Leadership Behavior	.043	-.057	.144	.051	.123	.858	.393
Faith	-.085	-.247	.077	.082	-.236	-1.039	.301
Service	-.071	-.257	.116	.094	-.219	-.748	.456
Communion	.088	-.099	.276	.095	.268	.928	.355

Table 12 displays the results of a multiple regression analysis, which examines the relationship between the different leadership behaviors and employee performance. Values under the variable β pertain to unstandardized coefficients. These values give an estimate of the relationship between the independent variable (leadership styles) and the dependent variable (employee performance). For instance, for every unit of increase in identifying and articulating a vision, there is a .008 decrease in employee performance. In essence, these values represent the direction of the relationship of the two variables. A positive value would indicate a direct relationship while a negative value indicates an inverse relationship. On the other hand, values under the beta column pertain to the standardized coefficients or variables that are incommensurable (Kwan et al., 2011). Values under the t and p columns are used to validate and test the null hypothesis, usually these are p-value < 0.05.

Based on Table 12, only the high-performance expectation ($\beta = 0.306$, $p = 0.013$) was found to be a predictor of employee performance that is also statistically significant at the 0.05 level. The beta value tells us that setting high expectations have a moderately positive influence on overall employee performance. This suggests that high-performance expectations have a vital role in motivating employees to perform better. Furthermore, setting clear and challenging goals motivates employees to improve their work habits and productivity. Although the rest of the leadership attributes did not show any significant relationship to employee performance, it does not necessarily mean that these attributes are unimportant. Rather, they may still have indirect influences on employee performance and can be further investigated in future research using a different tool and model.

Summary

Leadership Behaviors of Administrators

Administrators at La Salle Green Hills are perceived to demonstrate both transformational and transactional leadership behaviors while embodying the Lasallian Identity through the core values of faith, service, and communion. Among these leadership styles, the Lasallian Identity is observed most frequently, followed by transformational and transactional leadership.

Among the various leadership behavior factors, providing individualized support received the lowest mean rating, suggesting that employees may not be receiving sufficient feedback on their performance from administrators or there is a limited time for mentoring or one-on-one engagement with employees. Additionally, significant differences were observed in how employees rated administrators based on their tenure. Senior employees provided lower ratings than their newer and mid-tenure counterparts, possibly because they have had more time to observe leadership behaviors and feel more comfortable expressing their opinions. In contrast, newer and mid-tenure employees may still be building relationships and could be more cautious in their assessments.

Significant differences were also found in the ratings of administrators based on job position, with support staff, faculty, administrators, and faculty assigned to offices rating leadership behaviors differently. However, the perception of high-performance expectations remained consistent across all groups, suggesting that employees, regardless of position, recognize that administrators set high standards for performance.

Performance of Employees

Employees of LSGH have self-rated their performance highly, particularly in diligence and timeliness. When analyzed by length of service, no significant differences were observed in self-ratings of performance except for collaboration. Senior teachers (with 7 or more years of experience) rated their collaboration skills higher than newer teachers, likely because they have adapted to the environment and built strong relationships with colleagues over time, enhancing their ability to collaborate effectively.

Job position also influences how employees perceive their performance. Faculty, administrators, support staff, and faculty assigned to offices differ in their views on collaboration, proactiveness, communion, and service, likely due to variations in their job functions, responsibilities, and workplace interactions. Teachers focus on student learning and development, requiring frequent collaboration with colleagues and students, fostering teamwork, and contributing to a shared mission. In contrast, support staff and faculty assigned to offices primarily handle clerical, technical, and independent tasks, limiting their interaction with other members of the institution. This reduced collaboration may explain why they consistently rated themselves lower in collaboration, proactiveness, service, and communion compared to other job positions.

Administrators, on the other hand, perform managerial and administrative tasks, viewing collaboration and communion more as departmental coordination rather than daily interpersonal interactions. Their roles require initiative and leadership, which may explain their stronger perceptions of proactiveness, and service compared to other employees.

Correlation Between Leadership Behaviors and Employee Performance

Transformational leadership behavior is strongly associated with both transactional leadership behavior and Lasallian Identity. This suggests that leaders who exhibit transformational leadership behaviors are also perceived to demonstrate transactional leadership behaviors and uphold Lasallian core values.

Among the three leadership styles, only transformational leadership shows a significant association with employee performance. Specifically, the high-performance expectations factor has a weak positive correlation with proactiveness, faith, service, and communion. This implies that when employees perceive their leaders as transformational, they are more likely to demonstrate better performance.

Transactional leadership, particularly contingent reward behavior, is also linked to communion. This suggests that when employees receive recognition and rewards for their performance, they are more motivated to contribute to the achievement of a shared mission.

Predictor of Employee Performance

Among all the factors of leadership behavior, high-performance expectations emerge as a consistent predictor of employee performance. This suggests that leaders who set clear quality standards, establish achievable goals, and reinforce a culture of excellence can significantly influence employee productivity and engagement.

Conclusion

The study highlights the significant role of leadership behaviors in shaping employee performance at La Salle Green Hills. Administrators are perceived to exhibit transformational and transactional leadership behaviors while embodying the Lasallian Identity through faith, service, and communion. Among these, the Lasallian Identity is the most frequently observed, reflecting the institution's commitment to its core values. However, providing individualized support received the lowest rating, suggesting a need for greater focus on mentorship, feedback, and one-on-one engagement with employees.

Employees generally rated themselves highly in diligence and timeliness, reflecting strong individual performance across all respondents. Collaboration, however, varied based on tenure and job position, with senior employees demonstrating stronger collaborative skills due to established professional relationships. Additionally, differences in job roles influenced perceptions of collaboration, proactiveness, communion, and service, as teachers engaged more in collaborative efforts, while support staff and office-assigned faculty tended to work more independently.

Among leadership behaviors, transformational leadership was the only style significantly associated with employee performance. In particular, high-performance expectation was positively correlated with proactiveness, faith, service, and communion, suggesting that when employees perceive strong leadership, they are more motivated to excel in their roles and contribute to organizational success. Additionally, transactional leadership, particularly contingent reward behavior, reinforces a sense of communion, highlighting the importance of recognition and incentives in strengthening employees' commitment to a shared mission.

Finally, high performance expectations emerged as a consistent predictor of employee performance. Leaders who establish high expectations, clear quality standards, establish achievable goals, and reinforce a culture of excellence can significantly influence employee performance. Resembling the findings of Hao et al. (2017), supervisors should act with responsibility and integrity to cultivate a positive motivational process that boosts employee performance. To maximize employee engagement and productivity, leaders should balance high expectations with meaningful support and recognition, ensuring a motivated and mission-driven workforce.

Recommendations

Based on the findings of the study, the following recommendations are proposed to enhance leadership effectiveness and employee performance at La Salle Green Hills:

1. Strengthen Individualized Support and Feedback Mechanisms

Administrators should provide more regular and structured feedback through one-on-one mentoring or coaching to directly guide and address employees' concerns. Open communication where employees feel comfortable seeking feedback and discussing their progress are also encouraged.

2. Implement a Leadership Development Program for Administrators

Provide training on transformational leadership strategies, focusing on balancing high expectations with employee support and engagement. Conduct workshops on effective communication, mentorship, and motivation techniques to help administrators improve

their leadership effectiveness. Establish a leadership evaluation system where employees can provide feedback on administrators, helping leaders continuously improve their approach.

3. Enhance Collaboration Among Job Positions

Provide opportunities for faculty, administrators, and support staff to work together and share best practices. Offer workshops and leadership training to improve teamwork skills and foster a culture of shared responsibility.

4. Improve Employee Recognition and Reward Systems

Strengthen transactional leadership practices, such as contingent rewards, by developing an employee recognition program that acknowledges outstanding or excellent performance. Provide both monetary and non-monetary incentives, such as career development opportunities, additional leave benefits, or public recognition. Ensure that reward systems are fair, transparent, and aligned with institutional goals to encourage a sense of shared mission and commitment.

5. Foster a Stronger Sense of Lasallian Identity

Encourage administrators to serve as role models by actively demonstrating the Lasallian core values in their leadership approach. Create opportunities for employees to engage in service-oriented activities that strengthen their commitment to the institution's mission.

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Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

In preparing the final version of the paper, the authors utilized AI tools like Grammarly and ChatGPT to refine grammar and sentence structure. Following the use of these tools, the authors thoroughly reviewed and edited the entire paper and take full responsibility for its content.

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Investigating Japanese Students' Attitudes Towards and Perceptions of English Presentations

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Abstract

Oral presentation skills are crucial for higher education students. In an increasingly globalized world, the ability to persuasively deliver an oral presentation in English is especially advantageous. However, Japanese university students have lower communication confidence than their other Asian counterparts (Samimy & Kobayashi, 2004). To cultivate communicative competence, oral presentations have been gradually incorporated into EFL classes, with an increasing number of relevant teaching materials and resources available (Yamada, 2021). Nevertheless, whether this trend has enabled students to sufficiently understand the skills required to be a good presenter is undetermined, as little research has been conducted on their attitudes toward and perceptions of such presentations. Thus, the present study aims to explore students' perceived abilities of presentation skills and their attitudes toward English presentations. Approximately 100 university EFL students in Japan were asked to complete an 18-item questionnaire adapted from a previous study (Yukishige et al., 2007). The collected data were factor-analyzed, and three factors were extracted: "Need for presentations," "Confidence in the performance stage," and "Confidence in the preparation stage." The analyses highlighted the participants' characteristics in terms of the extracted factors. Furthermore, the students' academic majors had a significant impact on some of these factors. The detailed results and their pedagogical implications are discussed with the hope of motivating and enhancing communication confidence through presentation instruction.

Keywords: English presentation, factor analysis, Japanese university students

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Introduction

Oral presentation skills are essential for both working professionals and university students. For professionals, these skills significantly help promote their career advancement (Kawano, 2023; Masaki et al., 2019; Miles, 2014). For university students, mastering presentation skills can create new opportunities, support academic success, and foster self-reflection (Mak, 2021; Nakano, 2018). In an increasingly globalized world, the ability to deliver presentations in English has become particularly desirable, enabling both professionals and students to achieve their goals in international business (Koike & Terauchi, 2010; Xu et al., 2021) and in science and technology (Kawano et al., 2024; Shimamura, 2021). In the business sector, the ability to effectively present in English is critical for succeeding in competitive job markets and achieving business success. In science and technology, strong presentation skills can enhance global recognition of Japanese research. Given this situation, developing presentation skills in English is crucial at the university level.

Owing to the importance of presentation skills in English, an increasing number of relevant teaching materials and resources are now available (Yamada, 2021), and much research on English presentations focuses on pedagogy, particularly instructional methods (e.g., Brooks & Wilson, 2015; Iwami, 2022; Miki, 2020). However, relatively few studies have explored Japanese students' perceptions of their presentation skills and their attitudes toward presenting in English. To address this gap, this study investigates Japanese university students' attitudes toward and perceptions of English presentations.

Literature Review

When addressing English presentations for Japanese students, the topic of speaking English is inseparable, perhaps even central to understanding their presentation experience. Thus, reviewing the literature on English speaking is essential for understanding Japanese students' attitudes toward and perceptions of English presentations.

Acquiring speaking skills is often regarded as essential and simultaneously one of the most challenging aspects for Japanese university students. According to a survey conducted by Benesse i-Career (2024) involving 800 Japanese university students, more than half of the respondents expressed a desire to improve their English-speaking skills, but felt that their progress had stagnated after entering university. In relation to English classes, one student commented in an interview that she had fewer opportunities to give presentations at university than in high school. Although a fully established theoretical framework for oral presentations is yet to be developed (De Grez et al., 2009), certain research areas offer valuable insights into communication-related issues surrounding English presentations for Japanese university students. Three key areas—communication confidence, willingness to communicate, and project-based learning—are reviewed in the following sections.

Communication Confidence

Communication confidence—or conversely, the absence of English-speaking anxiety—is a key factor that influences oral presentation skills. For instance, compared to their counterparts in other Asian countries, Japanese EFL university students tend to exhibit lower confidence in communication (Apple, 2011; Cutrone & Beh, 2024; Samimy & Kobayashi, 2004). Additionally, those students often struggle to express their opinions due to heightened anxiety (Anuardi et al., 2023; Maher & King, 2020). To mitigate English-speaking anxiety

and enhance communication confidence, Elliott and Vasquez (2021) recommended incorporating various oral communication activities. Similarly, Masutani (2021) suggested that instructors in Japanese contexts should focus on boosting students' confidence, reducing speaking pressure, and setting achievable realistic goals. These studies highlight that while Japanese university students often face challenges related to communication confidence, targeted interventions such as teacher support and practice through activities such as oral communication can play a significant role in helping them overcome these difficulties and build confidence.

Willingness to Communicate (WTC)

Willingness to communicate (WTC) is another important area of research on communication issues. MacIntyre (2007) defines WTC as “the probability of speaking when free to do so,” (p. 564) emphasizing micro-level processes and situational factors that can promote or inhibit L2 communication. A substantial body of research has examined WTC and has highlighted its role in fostering students' active engagement in communication. In particular, tasks have been shown to play a significant role. For instance, Toyoda et al. (2021) investigated how task-based language learning influences the situational nature of WTC in Japanese students. Their findings revealed that well-designed situational L2 tasks positively affected students' communication skills. This suggests that instructors should carefully design tasks that are tailored to their students' needs and proficiency levels to foster WTC and promote active participation.

Oral presentation tasks are learner-centered, providing meaningful opportunities for communication (Gürbüz & Cabaroğlu, 2021). By incorporating oral presentation tasks aimed at maximizing WTC, teachers can foster greater student participation and deeper engagement in classroom communication.

Project-Based Learning (PBL)

Previous studies have demonstrated that project-based learning (PBL) enhances students' interdisciplinary competence (Brassler & Dettmers, 2017; Yamada, 2021). In line with this, oral presentations have been increasingly incorporated into PBL as a key component of English education. Early examples of this integration can be seen in graduation projects where students delivered presentations (Yukishige et al., 2007). However, oral presentations were not commonly used during this period, and the technological resources available for creating visual aids were limited. For instance, PowerPoint, which is now widely used in educational and professional contexts, was relatively rare and considered an innovative tool. Despite the early use of such tools, instructional materials and practical guidance for incorporating oral presentation tasks into English language curricula were still underdeveloped.

As technological tools have evolved, the application of PBL in Japanese EFL contexts has expanded (Kimura, 2024; Yamada, 2021), providing greater opportunities for students to develop both linguistic and non-linguistic skills. Nevertheless, challenges remain, particularly concerning how teachers can facilitate meaningful interactions and maximize student engagement in PBL activities. This issue was addressed by Kimura (2024), who introduced a project-based English program designed to cultivate not only the four traditional language skills—reading, listening, speaking, and writing—but also additional skills such as research, authoring, collaboration, and output. Through this program, students can collaborate with

their peers, use technological tools, and practice delivering oral presentations, collectively enhancing their practical communication skills. Existing literature suggests that as technological advancements continue, the integration of PBL in Japanese English classrooms will likely become more widespread. This is expected to provide students with increased opportunities to engage in learner-centered communication. Moreover, the learner-centered nature of PBL holds promise in addressing ongoing issues related to classroom engagement and communication confidence, both of which are crucial for improving students' overall speaking abilities and willingness to communicate in English.

This review focuses on communication-related issues crucial to understanding presentation education. Additionally, exploring the relationship between students' attitudes toward their studies and their academic backgrounds is important because variations in these factors can be highly influential.

Variation in Students' Attitudes and Academic Backgrounds

When learners are examined as a collective group, the observed phenomena often appear uniform. However, closer examination frequently reveals the underlying variations. These variations can be attributed to several factors, primarily learners' background characteristics such as age, year at university, and gender. Among these factors, academic majors stand out as a particularly influential source of variation. For instance, Chiba (2016) interviewed university students about learning support and found different attitudes toward studying. In science, students who write experimental reports tend to follow instruction manuals, allowing them to proceed without confusion about themes or formats. However, they often seek advice from peers, senior students, or instructors regarding experimental methods and discussions and occasionally practice presentations after consultation. In contrast, humanities students, especially those writing argumentative essays, often choose broad topics and rely on online resources rather than books unless explicitly instructed. They generally work independently, but review their drafts for errors before submission. For presentations, often in group settings, students tend to consult with others and practice in advance.

These findings suggest that differences in students' academic majors might influence their attitudes toward and perceptions of English presentations. Students in fields where presentation skills are seen as essential may display a more constructive outlook and find greater value in presentations than those in fields where such skills are less emphasized.

Objectives of the Study

As discussed above, educators are increasingly incorporating oral presentations into EFL classes in Japan to enhance communicative competence and highlight the growing importance of presentation tasks. However, it remains unclear whether this emphasis helps learners develop a clear understanding of what a good presentation entails. Moreover, research exploring students' attitudes toward and views on English presentations is limited. To address this gap, the present study investigates the following research questions:

RQ1: What factors underlie Japanese university students' perceived presentation skills and their attitudes toward presentations?

RQ2: What are the relationships between the identified factors of Japanese university students' perceived presentation skills and their attitudes toward presentations?

RQ3: How do Japanese university students' academic majors influence the extracted factors related to their perceived presentation abilities and attitudes toward presentations?

Method

Participants

A total of 110 students from two universities in Japan (31 males; 79 females) participated in this study. Of these, 50 were first-year students and 60 were second-year students. They were enrolled in general English courses and specialized in education- and science-related disciplines (62 and 48 students, respectively).

Research Instruments

This study employed a three-part questionnaire to collect data. The first part comprised items measuring participants' attitudes toward and perceptions of the English presentations. The second part included items assessing students' academic motivation for university learning. The third part contained items related to the participants' background information (e.g., academic major, year at university, gender, and most recent TOEIC score). Considering that this study aimed to explore Japanese university students' attitudes toward and perceptions of English presentations, only the items from the first part and the academic majors from the third part were analyzed.

The analysis focused on 18 presentation-related items. These items were adapted from Yukishige et al. (2007) and measured on a 6-point Likert scale. They addressed two primary areas: (1) students' perceived abilities in presentation skills, such as "*I'm good at using body language effectively during presentations in English*" and "*I can use visual aids well to explain concepts during presentations in English*"; and (2) their attitudes toward presentations, as reflected in statements like "*I think giving presentations in English is important for future jobs*" and "*I actually enjoy giving presentations in English.*"

Data Collection Procedures

Data were collected during the spring and fall semesters of 2024. The questionnaire was distributed to the students before, during, or after class.

Data Analysis Procedure

The data obtained were analyzed using IBM SPSS Statistics 29. For RQ1, the dataset from the questionnaire was subjected to factor analysis to reveal the underlying structures of Japanese university students' attitudes toward and perceptions of their presentations. For RQ2, correlational techniques were used to describe the strength and direction of the linear relationships between the factors identified in RQ1. Finally, for RQ3, a Multivariate Analysis of Variance (MANOVA) was conducted to examine the influence of learners' academic majors on the factors identified through the factor analysis.

Findings and Discussion

Factors Underlying Japanese University Students' Perceived Presentation Skills and Their Attitudes Toward Presentations (RQ1)

For RQ1, we first examined whether the data met the necessary statistical assumptions for exploratory factor analysis. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy ($= .87$), which assesses the proportion of variance in the variables that may be attributed to the underlying factors, was equal to or greater than $.60$. Additionally, Bartlett's test of sphericity ($\chi^2 = 1382.18$, $p < .001$), which evaluates whether the variables are sufficiently correlated for factor analysis, was significant ($p < .05$), confirming the suitability of the data for factor analysis.¹ Subsequently, we conducted a maximum likelihood factor analysis with promax rotation, which yielded a three-factor structure accounting for 60.31% of the total variance. Cronbach's alpha values for the three factors ranged from $.85$ to $.90$, demonstrating adequate internal consistency.

Table 1 shows a factor matrix, with item loadings greater than $.30$ as the cut-off criterion, and Kaiser's criterion with eigenvalues greater than 1 (Field, 2009).

Table 1: Summary of Factor Analysis Results

Factors	Factor loadings			M	S.D.
	1	2	3		
Factor 1: <i>Need for presentations</i> ($\alpha=.90$)				3.82	1.16
• Necessary to make presentations in English for future jobs (P12)	.88			3.95	1.60
• Important to learn how to give presentations in English classes (P17)	.87			4.43	1.21
• Hoping to become proficient in English presentations (P18)	.84			4.73	1.28
• Necessary to give presentations in English for future study (P13)	.82			3.60	1.60
• Rewarding to give presentations in English (P15)	.62			3.21	1.45
• Fun to give a presentation in English (P14)	.53			2.99	1.37
Factor 2: <i>Confidence in the performance stage</i> ($\alpha=.90$)				2.89	0.96
• Confident in handling the Q&A session in English after a presentation (P9)		.97		2.33	1.01
• Good at giving presentations in English while considering time and environments (P10)		.76		2.82	1.14
• Proficient to speak with proper pronunciation and intonation (P3)		.75		3.01	1.26
• Confident in giving presentations in English (P11)		.73		2.31	1.33
• Good at speaking clearly with appropriate volume and speaking pace (P2)		.59		3.58	1.14
• Proficient to use body language effectively during presentations in English (P1)		.52		3.28	1.17
Factor 3: <i>Confidence in the preparation stage</i> ($\alpha=.85$)				3.84	0.95
• Good at creating appropriate visual aids that match the content and topic (P5)			.91	4.08	1.16
• Can use various devices and media effectively during presentations in English (P4)			.90	3.83	1.37
• Can effectively use visual aids to explain concepts during presentations in English (P6)			.74	3.58	1.24
• Can understand what makes a good English presentation (P16)			.40	3.63	1.23
• Can create a script in English after writing an outline (P8)			.39	3.95	1.25
• Can write a presentation script in English after considering the overall structure (P7)			.30	3.97	1.26

¹ <https://www.onlinespss.com/statistical-tests-in-spss/reporting-factor-analysis-in-spss/#1583256390770-88abcc1c-bfb65b58-11128773-e8b2>

A closer examination of the results provided insight into the characteristics of each factor. Six items were loaded onto Factor 1, all of which related to how students perceived the need for and importance of presentation skills. Representative items include “*It is necessary to make presentations in English for future jobs*” (P12) and “*It is important to learn how to give presentations in English classes*” (P17). Accordingly, this factor was labeled “Need for presentations.” For Factor 2, six items were loaded onto this factor pertaining to confidence in presentation performance. Examples include “*I’m proficient to speak with proper pronunciation and intonation*” (P3) and “*I’m confident in giving presentations in English*” (P11). Therefore, this factor was labeled “Confidence on the performance stage.” Finally, six items were loaded onto Factor 3 reflected the aspects of presentation preparation. Representative items include “*I’m good at creating appropriate visual aids that match the content and topic*” (P5) and “*I can create a script in English after writing an outline*” (P8). Given the focus on presentation preparation, this factor was labeled “Confidence in the presentation stage.”

In the next step, we combined six items for each factor to generate composite scores, which allowed us to examine the overall characteristics of each factor. As shown in Table 1, the highest mean score was 3.84 for “*Confidence in the preparation stage*.” The second highest was 3.82 for “*Need for presentations*,” and the third was 2.89 for “*Confidence in the performance stage*.” These results showed that Japanese university students tended to feel more confident about preparing presentations and perceived presentation skills to be necessary. However, their confidence diminished when they had to deliver presentations in English.

The Relationships Between the Extracted Factors of Japanese University Students’ Perceived Presentation Skills and Their Attitudes Toward Presentations (RQ2)

Correlation analyses were performed for RQ2. Table 2 presents the Pearson product-moment correlation coefficients. As shown in the table, the factors exhibited moderate to strong correlation. Specifically, the correlation coefficient between “*Confidence in the performance stage*” and “*Confidence in the preparation stage*” was .69, indicating a relatively strong association between these two dimensions of confidence. This suggests that both preparation and performance confidence contribute significantly to learners’ overall confidence in delivering presentations. Additionally, “*Need for presentations*” demonstrated a higher correlation with “*Confidence in the performance stage*” ($r = .44$) than with “*Confidence in the preparation stage*” ($r = .39$). This implies that the more confident the students became, the more they saw presentations as necessary, and vice versa.

Table 2: Correlation Coefficients for the Extracted Factors

Factors	1	2	3
1. <i>Need for presentations</i>	1.00		
2. <i>Confidence in the performance stage</i>	.44*	1.00	
3. <i>Confidence in the preparation stage</i>	.39*	.69*	1.00

* $p < .001$

Difference in Students’ Academic Majors and Extracted Factors Related to Perceived Presentation Skills and Attitudes (RQ3)

For RQ3, we examined the effects of students’ majors (science vs. education) on the three extracted factors. Prior to conducting the analysis, we confirmed that the data met the

statistical assumptions for MANOVA. Box's M test (Box's Test for Equivalence of Covariance Matrices), a parametric test used to assess the equality (homogeneity) of covariance matrices, yielded a non-significant result ($p = .18$), indicating that the covariance matrices were found to be equal (homogeneous) and the assumption was satisfied. We subsequently performed a one-way MANOVA with the mean scores of the three factors as dependent variables. The result showed that all multivariate F statistics (Pillai's trace, Wilks' lambda, Hotelling's trace, and Roy's largest root) were significant, with Wilks' lambda = .71, $F(3, 106) = 14.38$, $p < .001$, $\text{partial } \eta^2 = .29$, indicating a significant multivariate effect of student majors. Subsequently, we conducted a univariate analysis of variance for each of the three dependent variables. The results revealed a significant effect of major on Factor 1 ($F(1, 109) = 43.67$, $p < .001$, $\eta^2 = .29$) and Factor 2 ($F(1, 109) = 4.66$, $p = .03$, $\eta^2 = 0.04$). However, no significant effect of major was observed for Factor 3 ($F(1, 109) = 3.71$, $p = .06$, $\eta^2 = .03$).

Table 3 presents the descriptive statistics for the mean scores of the factors categorized by factor and student major. The results indicated notable differences between education and science majors in terms of "*Need for presentation*" and "*Confidence in the performance stage*." Specifically, educational majors reported a greater perceived need for presentations and higher confidence in presentation performance. These results suggest that students' academic majors may play a role in shaping their perceived need for presentation skills and confidence.

Table 3: Descriptive Statistics on Factors and Majors

Factor	Major	<i>n</i>	<i>M</i>	<i>S.D.</i>
<i>Need for presentations</i>	Education	62	4.37	0.94
	Science	48	3.11	1.04
<i>Confidence in the performance stage</i>	Education	62	3.06	1.05
	Science	48	2.67	0.79
<i>Confidence in the preparation stage</i>	Education	62	3.99	0.99
	Science	48	3.65	0.86

Discussion and Conclusion

This section discusses the findings of the study and presents the conclusions. Based on the three research questions, we can draw the following conclusions: (1) Japanese students tend to have greater confidence in presentation preparation and a stronger sense of the necessity of presentation skills; (2) they are less confident in delivering presentations in English; and (3) academic majors have an impact on both the necessity of presentation skills and confidence in presentation performance.

From a pedagogical perspective, we propose two suggestions. First, previous research has shown that Japanese students often lack confidence in English communication because of factors such as speaking anxiety (e.g., Maher & King, 2020; Samimy & Kobayashi, 2004; Sato, 2020). Our findings support this claim, although variations exist depending on the academic major. Therefore, in presentation education, emphasis should be placed on fostering students' speaking confidence, particularly when speaking in front of an audience and engaging in Q&A sessions. These moments can be especially anxiety-inducing for them (Kobayashi, 2021).

Regarding academic background, previous research frequently suggests that students with different academic backgrounds display different attitudes toward studying (Chiba, 2016) and that science majors require presentation skills, particularly in English (e.g., Iwami, 2022; Shimamura, 2021). However, our findings indicate that this may not always be the case. One possible explanation for this discrepancy is that education majors tend to have more opportunities to present their work and participate in activities, such as volunteering and part-time jobs. These experiences may contribute to both greater confidence and a heightened sense of the necessity for presentation skills. Nevertheless, as students advance in their studies, science majors may begin to recognize the importance of presentation skills and adjust their attitudes accordingly. Therefore, we suggest raising students' awareness of the relevance of presentation skills in their future careers and increasing their opportunities for presentation practice.

For future research, we propose two directions. First, students' motivation to study at the university level may influence their attitudes toward and views of presentations. Examining this factor along with other potential influences could yield valuable insights. Second, further research on effective measures to boost students' presentation confidence, including preparation methods and strategies to enhance English-speaking confidence, would be beneficial. Addressing these concerns is essential for educators to better understand the needs of Japanese university students and improve pedagogical practices and assessment methods through both quantitative and qualitative research.

English-speaking proficiency is essential for Japanese university students, and presentation education can serve as the first step in developing this ability. Developing English presentation skills not only opens doors to academic success but also helps equip students for their professional careers.

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Enhanced Motivation in an English-as-a-Foreign-Language Classroom: One-to-One Remote Lessons, Hylable Discussion, and Group/Paired Work

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Abstract

This study reports how an English classroom practice with information and communication technology (ICT) enhanced 17 Japanese university students' motivation and self-assessment regarding their speaking skills. This involved a 15-week class, meeting weekly for 90 minutes, plus additional 12 mandatory online lessons with English-speaking instructors from the Philippines. Each online lesson was 25 minutes long and based on a textbook that introduced topics focusing on personal interests and social issues. The Japanese students were required to speak on a one-to-one basis with the instructors, and a flipped-classroom format was used for in-person class sessions, wherein students shared their outcomes in groups and prepared for their next online lesson in pairs. Each group was provided with a recording device (Hylable Discussion) that recorded each member's utterances and analyzed the relative volume of talk among members, directions and frequencies of interactions, and talker/listener tendencies. At the end of the course, the participants reflected on their Hylable analysis results over the semester and answered questionnaires about course activities, including overseas online lessons, group work, and paired work. Most respondents felt an improvement in their speaking skills and decreased anxiety. Group and paired work were almost equally popular among the participants, although the Hylable analyses was not included in the paired work. This study provides practical tips for using ICT to enhance classroom activities.

Keywords: remote lessons, Hylable, paired work

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Introduction

Japanese learners are generally rather quiet and not confident in speaking English. The Japanese school system is often criticized as ineffective because most Japanese people are unable to communicate in English well. However, a survey by Benesse Educational Research and Development Institute (2014) reported that more than 90% of junior and high school students felt enthusiastic about the idea of speaking English, and that they believed that the most important factor in learning English was to regularly speak the language.

In 2019, the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT) updated the course of study, highly promoting collaborations among students in the classroom (Matsuoka & Mizumoto, 2018). Group and paired activities are common in English classes at primary and secondary schools, and this has now extended to other subjects because active involvement and interaction with others while doing tasks is now preferred in the new course of study.

Another important consideration is how the pandemic influenced education practices. In 2020 and 2021, most classes were held online via Zoom, MS Teams, or other platforms. Although face-to-face classes have now been implemented again, remote lessons have the advantage of being able to conduct classes without physical restrictions. In particular, the use of information and communication technology (ICT) can help language learners relate to the speakers of their target languages, practice listening and speaking, and have a real conversation through online platforms. Thus, combining ICT with an active learning environment could help enhance Japanese students' motivation and confidence in communicating in English. In this paper, I would like to share my teaching experience in my English Presentation class at my university, wherein two types of ICT were incorporated: Hylable Discussion (a device that records and analyzes conversation) and *Logical Speaking* (an overseas remote one-to-one lesson program).

Hylable System for Communication Analysis in a Group

Hylable is a system that can analyze individual speakers' communication styles during a group discussion (Aburai, 2024; Matsuoka & Mizumoto, 2018; Matsuoka et al., 2022; Otake et al., 2024). We started using this system during the COVID-19 pandemic as an alternative to Zoom breakout rooms. During these breakout sessions, it is impossible to monitor all online groups simultaneously, which is one of the largest differences from the face-to-face classroom setting (see also Matsuoka et al., 2022; Nabei & Harada, 2022). When using Hylable, the students were more serious and actively participated in online group discussions since they were aware that they were being recorded and that their personal contributions would be analyzed (Matsuoka et al., 2022; Otake et al., 2024).

I previously reported an analysis on the use of Hylable in a content-based online class in 2021 (Toya, 2023). Students had group discussions regarding the provided topics of language acquisition theories and research based on an English textbook (*How Languages are Learned*). The discussions were done in Japanese, their first language, and Hylable had a positive effect on the students. In 2018, before the pandemic, Hylable was originally available with an egg-shaped microphone/recorder for analyzing face-to-face interactions. Aburai (2024) reported that his group discussion data was collected using the physical recorder in 2019, while the online version was used in 2020. Meanwhile, Matsuoka et al. (2022) used the online version of Hylable in her university English classroom, revealing that students desired more feedback from the system and their peers as they made progress in speaking. Moreover, Otake et al.

(2024) reported that students had positive perceptions regarding the assessment feedback from the Hylable system, which enabled them to objectively evaluate their communication styles and plan for further improvement.

In Fall 2023, I utilized the face-to-face version of Hylable, known as *Hylable Discussion*, for the first time in the same content-based class and the English Presentation class. Unlike the online version, the recorder needed to be physically set on the group table (Matsuoka & Mizumoto, 2018). The Hylable recorder is an egg-shaped device, around the size of a hand, with a circular base-sheet at the bottom that determines the directions of the individual speakers. For the purposes of teaching and research, the recorder was placed in the center of a group of four students (marked as A, B, C, or D, seated 90° to each other). The recorders were remotely controlled via a computer, and all utterances were immediately recorded for the automatic analysis.

Using the recorded data, the Hylable offers automatic, real-time analyses of the participants' communication styles. One graph indicates speaking dominance/volume by time, wherein individual speakers are marked in different colors, allowing a visualization of who spoke the most and when. This facilitates an analysis of turn-taking and the total utterance time by the speaker. The turn-taking figure includes arrows that indicate the directions and frequencies of speaking between the speakers. The individual speakers are represented by dots/circles, with their size indicating who spoke the most. The bar graphs of total utterance time also illustrate which participant spoke the most during the discussion. The most unique analysis offered is the triangle radar chart that indicates the personal communication patterns of each individual speaker. The top axis of the triangle shows the total utterance volume, the bottom-left indicates backchanneling, and the bottom-right indicates how much the speaker enlivens the conversation in the group. For example, a participant may be rather quiet (i.e., little total volume) yet backchanneled well by responding to the other speaker (i.e., "Really?," "Wow", etc.). This person may score high on the liven-up axis, which means that other members became lively and talkative after this person speaks. This analysis of the three axes can help us understand the various roles of the speakers during the discussion. In my classes, the results of these analyses were made available to the students.

Overseas One-to-One Remote Lessons With *Logical Speaking*

The second ICT introduced in my class was the course material called *Logical Speaking*, a 12-unit program including remote, one-to-one real-time speaking lessons with English-speaking instructors in the Philippines. The topics of the lessons are fixed and available in a printed workbook, and students are tasked to prepare for their online paired work using this workbook. The material was developed by Gakken in Japan, with a strong focus on speaking with a logical framework. The learner level is aimed at CEFR A2 to B1.

During the remote lesson, the English-speaking instructor appears on the top-right of the computer screen. Although the image is small, it is visually clear enough to understand facial expressions and gestures. A content slide that demonstrates the logical talk framework can be shared in the main screen, and a chat box is also available on the bottom-right. Although small talk and free exchanges were allowed, the 25-minute lesson was built around topics based on the *Logical Speaking Workbook*, which was used in my English Presentation class. The first three lessons tackle personal interests such as hobbies, where to visit, and future dreams. The remaining lessons thereafter introduce debatable issues such as free access to the Internet among children, whether to have pets, living in the city versus countryside, and so on. The

workbook provides a structural framework for speaking in three steps. First, take a stand by expressing “yes” or “no”. Second, give two reasons to support the opinion. Lastly, conclude the remark using a discourse marker such as “so” or “therefore”. Since the material matched the interests of the university students, this motivated them to express their opinions. Due to limitations such as the network on campus and availability of instructors, my students were asked to take online lessons outside of class, employing a flipped-classroom design.

Purpose of the Study

Since Japanese learners are generally hesitant toward speaking English, my lessons were planned using the *Logical Speaking* topics, utilizing the overseas remote lessons outside of class. I also used Hylable for group activities in class in order to have an objective understanding of communicative behaviors during the discussion. Thus, this study aims to: 1) discover how ICTs such as Hylable and *Logical Speaking* can contribute to Japanese learners’ improvement in speaking English; 2) compare the effects of using ICT with face-to-face communication in a real classroom; and 3) determine what combinations of activities (i.e., online/offline, inside/outside of class) would be effective in increasing the motivation and confidence of Japanese learners to speak English with ease.

Methodology

The participants were 24 university students enrolled in an English Presentation course (Intermediate) from Grades 1–4. Analyses were conducted only for students who consented for responses to be used. Classes were held once a week for 90 minutes over 15 weeks total (October 2023 to February 2024). Students were requested to take *Logical Speaking* remote lessons outside the class, but Lesson 1 was conducted remotely in class to ensure that the students were properly familiarized with the process. The Hylable system was first used in week 5 with the company support staff participating via Zoom. Weeks 14 and 15 were the end-of-term presentations, and thus no group or paired work was done.

The typical flow of the day from weeks 4 to 13 started with greetings, followed by mini speeches given in front of the class by a few students based on the personal topics of Units 1 to 3. Afterward, we proceeded with group work in preassigned groups of four, which was a review of the previous lesson (i.e., reflecting on the remote individual lesson they took before coming to class), and this activity was recorded using the Hylable system. The latter half of the class was allotted for circular paired work, wherein students can practice conversing to prepare for the next remote lesson. Students were paired, talked with their partner for 4–6 minutes, then moved to a new seat to talk to a new partner afterward. After class, students were expected to take a remote lesson based on what they practiced during paired work before the next class. During the next class, the final version of their speech on that topic would be shared during the Hylable group work.

Figure 1 shows the classroom arrangement for the group work using Hylable. Students are designated as A, B, C, or D to indicate their position in the Hylable recordings. The recording devices are represented by the red ovals in the middle of each group. The groupings were initially done randomly, but later on, students were grouped according to their skill level.

Figure 1: Hylable Group Work Arrangement

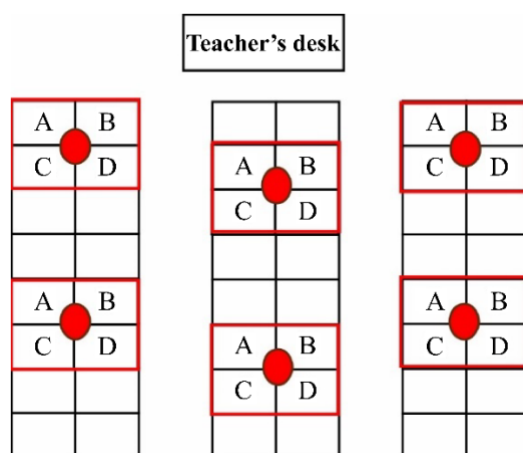
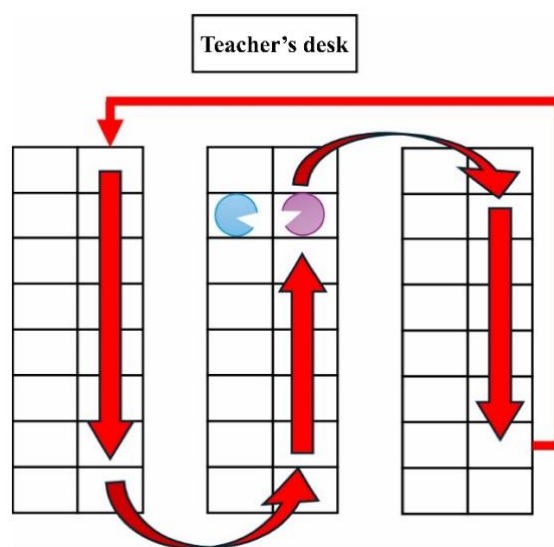


Figure 2 shows the classroom arrangement for the paired work. Students were initially paired based on their seats, and thus the activity always began by talking to their seatmates. After 4–6 minutes, students (represented by the purple icon) are signaled to move to the next seat, following the arrows indicated in the figure. The students talk to their new partners for 4–6 minutes, and the cycle is continued until the time is up for the activity. Occasionally, some time was allotted for the students to take notes on the expressions they used and/or they wanted to use for the next partner.

Figure 2: Circular Paired Work Arrangement



The effects of this teaching methodology were analyzed based on the end-of-term questionnaire results, which were part of the course requirements. There were two types of questionnaires on Google Forms, one for reflecting on the *Logical Speaking* remote lessons and another for the effectiveness paired and group activities, including the use of Hylable Discussion. The class included 24 students, but not all students completed the forms and/or consented to their data to be used in the analysis. The first and second questionnaires had a total of 20 and 17 valid responses, respectively.

Results

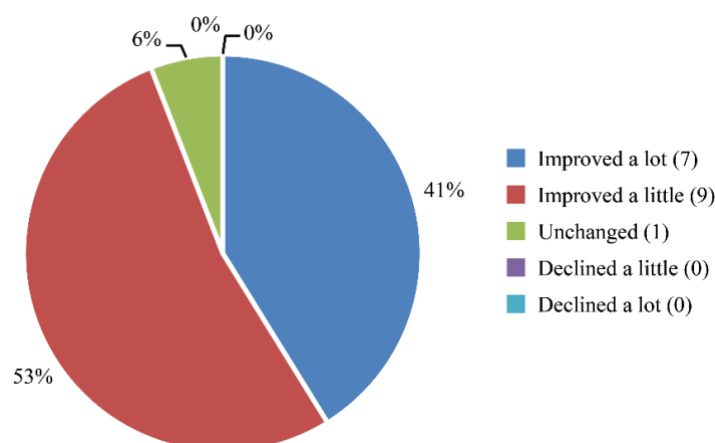
For the question “Do you feel that your English-speaking skill improved through the group and paired work activities in class?” ($n = 17$), 53% answered “Improved a little,” while 41% answered “Improved a lot” among the 5 choices given (Figure 3).

The reasons for their positive responses are summarized as follows:

- Speaking based on preparation and review was not too difficult and felt safe.
- Topics beyond the daily conversation were sufficiently challenging and led to a fair amount of vocabulary growth.
- The friendly and acceptable atmosphere made us feel at ease to speak.
- There were ample opportunities for speaking and communicating with others.
- Our classmates who were proficient in speaking were helpful and supportive, serving as models for good English speakers.
- The reflection time given to help us find the expressions to use was effective.

One student who answered “unchanged” wrote, “I don’t think my English speaking improved. However, I feel that the psychological barrier for speaking became weaker.”

Figure 3: Self-Evaluation of Change in English-Speaking Skills



For the question “Do you feel that your English-speaking anxiety decreased through the group and paired work activities in class?” ($n = 17$), 59% answered “Decreased a lot,” 23% answered “Unchanged,” and 18% “Decreased a little” among the 5 choices given (Figure 4).

Those who answered “Decreased a lot” gave the following reasons:

- The class atmosphere was generally relaxing and supportive. I felt that making mistakes was allowed and well-accepted.
- We were able to adequately prepare for speaking because the topics were provided beforehand.
- My classmates’ positive and active attitudes toward speaking stimulated my speaking behavior.

Those who answered “Decreased a little” gave the following reasons:

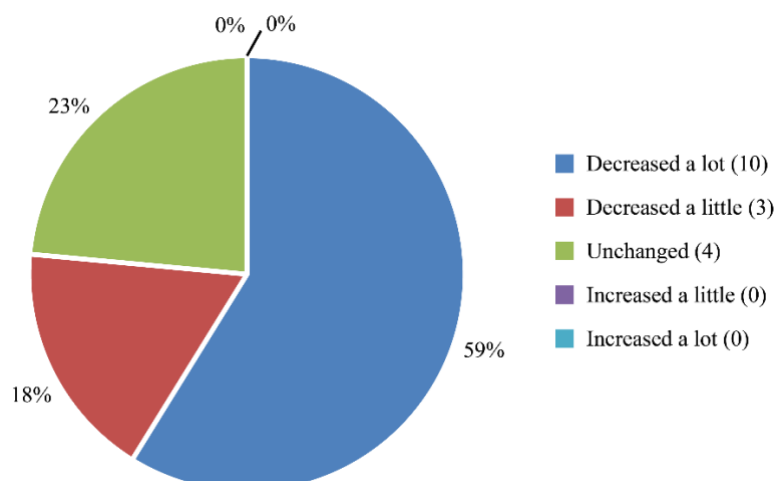
- There was lot of repetition during the activities, so it was easy to get accustomed to what to say.
- Lots of practice time for speaking was provided.

- Speaking with Japanese classmates was good, but the remote lessons with native speaker instructors provided good challenges.

The student who answered “Unchanged” responded:

- The answering pattern was too fixed, and I would prefer to speak more freely. I also needed more practice to further reduce the stress of speaking.

Figure 4: Self-Evaluation of Change in English-Speaking Anxiety



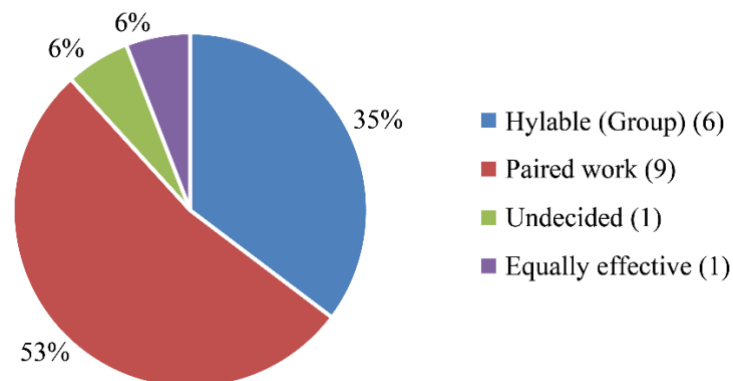
For the question “Which activity did you feel was more effective in improving your English-speaking skills, the group work with Hylable or the paired work?” ($n = 17$), 53% preferred the paired work, while 35% preferred the group work with Hylable. One person was undecided, while another said that both were equally effective (Figure 5).

The reasons for their preferences illustrated the advantages of both methodologies. In groups of four, students could listen to more opinions, and the discussion could develop more deeply. Additionally, when grouped by English proficiency levels, some students felt more relaxed to speak up. The awareness of being recorded and analyzed with Hylable also seemed to encourage group members to be more cooperative with each other. However, the paired work provided multiple opportunities to constantly interact with new partners, helping students refine their ideas and expressions as they went through multiple partners. The students were exposed to a wider variety of ideas, expressions, and pronunciations. The one-to-one setting also pressured students to speak. Compared to the group work, students felt that the paired work more closely simulated real communication.

When asked about the use of the Hylable system in class, the answers were generally positive. The respondents cited three advantages. First, the analyses of the Hylable system enhanced students’ self-awareness in communication. Second, the results of the analysis provided directions for changes and improvement, which enriched the group discussion. Third, because the results analyzed the entire group, it was possible to improve their own communication styles by learning from other members. However, one disadvantage was commonly cited by the students. Since the Hylable recorder detects the voice directions of each speaker to identify the group members, the recording must be done in a certain sitting arrangement. However, since the tables in the classroom were fixed, students had to be conscious about their facial directions while speaking. They felt that these physical restrictions were inconvenient. Another student commented that the use of artificial intelligence could help further improve the

analysis. Nevertheless, the participants were more positive toward the new technology and had less negative attitudes toward being recorded because the Hylable results provided visualization of the unconscious styles of participation.

Figure 5: Perceived Effectiveness for the Activity Types



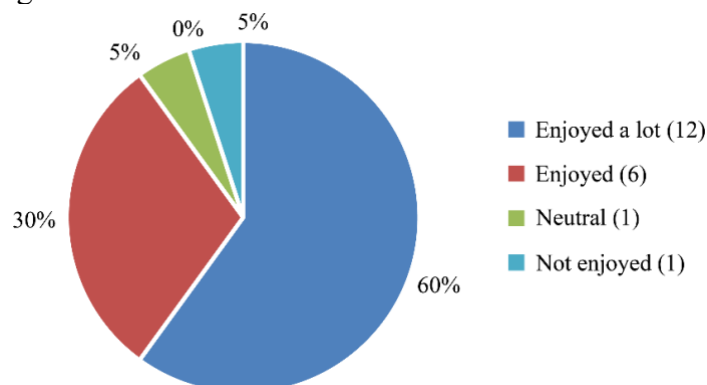
Lastly, for the question of “Did you enjoy the remote overseas lessons with *Logical Speaking*?” ($n = 20$), 60% said “Enjoyed a lot,” while 30% answered “Enjoyed.” One person was neutral, while another did not enjoy. This was based on 5 choices provided (Figure 6).

The reasons for their positive answers are summarized as follows:

- The native-speaking instructors from the Philippines showed positive, kind and friendly attitudes and were very supportive.
- Communicating with overseas foreigners was a new experience. Learning about the life and culture outside Japan was exciting.
- Communicating online caused less nervousness compared to face-to-face, in-person interactions.
- We are more used to English spoken by American and/or British native speakers. The English accents of the Philippine instructors were somewhat unfamiliar, but I enjoyed it.

The student who was neutral said, “I’m naturally shy and get nervous talking to strangers, but I was happy when I could get my message across to the instructor somehow.” Interestingly, the comment of the student who did not enjoy was positive, written as “I rarely have a chance to talk with foreigners or try to actively communicate in English, so the experience was something different from my daily life. The small chats with the instructors were fun, and I could enjoy the online lessons.” Thus, it was unclear why the student provided that answer.

Figure 6: Evaluation of Overseas Remote Online Lessons



Conclusion

Both the group and paired work had positive effects on students' perceived speaking improvement, but in different ways. The group work with the Hylable analyses helped the participants objectively understand their communication styles and compare themselves to other members. However, the paired work provided an environment wherein the students are exposed to a wider variety of opinions and expressions, allowing them to refine their speech by encountering different speakers. Therefore, having a variety of activities in class would be beneficial for students with diverse learning styles and characteristics.

The flow of having pre-remote lesson practice in class, followed by an overseas remote lesson outside of class, then by reviewing and reflecting in class seemed to work well. Japanese students, in particular, prefer to prepare first before speaking in English. Although this flow contained repetitive work, students were exposed to a wider vocabulary and expressions as they communicated with different people.

The use of Hylable, a device that analyzes communication, was appreciated by the students because it allows them to visualize their personal style of real-time communication. The circular paired work provided an opportunity for students to talk and share ideas in English with various classmates in a relaxed and efficient manner. The mandatory out-of-class remote lessons with overseas instructors additionally served as extra opportunities to communicate in English. The various native-speaker instructors who had a different style from American/British English, as well as the pressure for speaking in a one-to-one environment, encouraged students to try hard to get their messages across.

Acknowledgment

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Preventing Online Harassment: Discipline in the Digital World

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Abstract

One of the most significant concerns facing educational institutions nowadays is the issue of online harassment, which poses a significant threat to the well-being of students and educators. To analyze its prevalence and underlying roots, a scoping review was conducted, sourcing 386 articles using EBSCO and Scopus databases. After rigorous screening, 52 articles were considered significant from 2014 to 2024. Three key themes emerged: *the dynamics and nature of online harassment, its impact on individuals and the school community, and technology's role in facilitating and preventing it*. The researchers noticed and established relationships between themes through a systematic literature review and thematic analysis. Findings from this suggest that educational institutions must formulate and implement targeted programs addressing the underlying factors of online harassment. This emphasizes the need for comprehensive strategies leveraging technology in preventing and addressing online harassment. Given the rapid development of technology, continuous observation of the nature of online harassment, and the development of timely and relevant interventions and policies focused on digital citizenship in educational institutions are crucial in ensuring a safe and positive online environment for students and educators.

Keywords: online harassment, cyberbullying, digital citizenship

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Introduction

Education is one of the most important pillars of society and has the potential of transforming lives and shaping nations. The 21st century, driven by technological advancement, has brought significant changes to the education system (Zhao et al., 2024). New ways of communication and learning have appeared in the form of digital tools and platforms, which can be used by teachers as useful tools for improving the quality of the teaching and learning process and, at the same time, act as a source of additional information for students. The evidence presented shows the various advantages that come with the use of technology, such as improved access to information, personalized learning experiences and expanded opportunities for collaboration, irrespective of distance. Nonetheless, it introduces considerable challenges, especially regarding cybersecurity and protection against different issues in the digital world, such as online harassment, which has emerged as a significant issue in educational settings.

Online harassment encompasses a wide range of violent behaviors in the online space characterized by recurring attacks (Celuch et al., 2022). Online harassment includes dangerous behaviors such as cyberbullying, cyberstalking, online threats, and hate speech, which pose a serious threat to the overall safety, well-being, and academic success of both students and educators.

The manifestation of these behaviors can be observed across various activities on digital platforms, such as messaging applications, online forums, gaming environments, and, most of all, social media. A national survey conducted by the Pew Research Center in 2020 revealed that online harassment was observed across different social media platforms, such as Instagram at 63%, Twitter at 24%, WhatsApp at 34%, Facebook at 46%, Telegram at 18%, and Snapchat at 39%. The online harassment index, which involves posting images and videos with comments, was the highest on Instagram (Abarna et al., 2022).

The statistics above prove how this behavior creates a pervasive and persistent atmosphere of intimidation and fear, which may contribute to significant mental health issues among individuals. To further understand this pressing concern, this study aims to analyze the complex nature of online harassment within schools, its impact on teachers and students, and the role of technology in facilitating and addressing it.

A scoping review synthesizes existing or emerging literature on a particular topic and is accomplished through a systematic and iterative process (Mak & Thomas, 2022). Since online harassment is a widespread and complex problem with considerable consequences for students and teachers, a solid understanding of the existing literature is essential to approach this issue properly. Using a scoping analysis of relevant literature, we seek to identify key themes and establish a comprehensive understanding of the problem. This study aims to provide significant insights for educational institutions and technological companies in facilitating the development of effective strategies aimed at preventing and addressing online harassment. Creating a safe and secure digital learning environment enables students and teachers to effectively utilize technology, thereby maximizing its potential while reducing concerns associated with its use.

Methodology

Research Questions

This research is mainly guided by the core question of *“How can schools effectively prevent and address online harassment and foster a safe and secured digital learning environment?”*

From here, the following research questions have been formulated:

- What is the prevalence of online harassment among educators and students as school community members?
- What are the impacts of online harassment on individuals within the school community?
- What is the role of technology in the facilitation and prevention of online harassment within the school community?

Data Sources and Search Strategy

The beginning of data sourcing commenced in August 2024. To enhance the efficiency of the search process, the researchers conducted a thorough review and refinement of the search queries, ensuring that they were closely aligned with the overarching research objectives. This scoping review utilized a comprehensive search strategy to identify relevant literature. The key search terms used by the researchers include "online harassment," "preventing online harassment," "online safety," "digital citizenship," "social media," "school policies," "students," "faculty," and "education." These terms were combined with Boolean operators (AND, OR, NOT) to refine the search and identify articles specifically focused on the role of discipline within the digital world in preventing online harassment.

The study employed two significant databases: Scopus and EBSCOhost. The selection of Scopus is attributed to its extensive coverage of diverse academic disciplines and its stringent indexing methodologies. The inclusion of EBSCOhost expands the search parameters, thereby facilitating access to a broader range of relevant research, encompassing scholarly articles from diverse academic journals.

Similar search terms were utilized in the EBSCOhost database as well. In the preliminary phase of the research methodology, researchers systematically screened abstracts to assess and eliminate articles deemed irrelevant. This approach was implemented to optimize the search process and improve overall efficiency.

Given the fact that the area of online harassment is characterized by both constant technological and social changes, identifying relevant literature is crucial. Technological advancements and shifts in social behaviors can significantly affect the online environment making previous research findings invalid or insufficient. Thus, a careful identification of the sources, prioritizing the most recent ones, is necessary to understand the most current knowledge of this vast and dynamic issue. This is supported by an article published by Charlesworth Author Services (2021) which states that time period is one of the most important factors to consider when planning a literature review. With this, filters are employed to ensure that the year of publication is from 2014-2024. In addition, a filter was made to limit the searches to publications using the English language.

Citation Management

To enhance the efficiency of the research process, the researchers employed Mendeley, Google Sheets, and Google Drive as tools for the organization and management of all identified journal articles. The collaborative practice made by the researcher enabled the systematic identification and elimination of duplicate entries, improving the overall efficiency of the scoping review. The implementation of a meticulous screening procedure, characterized by a thorough examination of the titles and abstracts of each article, facilitated the selection of only the most relevant literature for inclusion in the final dataset.

Eligibility Criteria

A screening process was initiated to ensure that the scoping review is narrowed down to online harassment in educational institutions where the target is students and teachers. Given the rapid changes brought by technological advancements integral to the explored topic, the researchers decided to include literature published within the last ten years to ensure the research's relevance and timeliness. Research conducted in languages other than English was excluded. However, studies published from various countries were included, provided they directly addressed the topic of online harassment within educational settings. Research that deviated from the scope of online harassment in educational settings, such as studies on online harassment in other contexts (e.g., workplaces, community-based) or those focusing on unconventional forms of online harassment (e.g., revenge porn), were excluded. Only articles deemed directly relevant to the topic of "online harassment to students and teachers in educational settings" were included.

Title and Abstract Relevance Screening

The initial screening process focused primarily on the article titles for the benefit of time and resources. Articles with relevant titles according to the inclusion criteria were taken through the abstract screening stage. The abstracts were reviewed by two investigators who excluded studies they considered non-relevant or beyond the scope of the review. After this process of independent screening, both researchers met and discussed the remaining articles to come up with a final list of the studies to include in the study.

Screening Results

Our database keywords search found 386 articles were eligible for inclusion in title screening with filters employed to ensure that the year of publication is from 2014-2024 and in the English language. Of the 386 articles, 52 were retained following the criteria set. All identified studies were meticulously compiled into a single, shared spreadsheet for comprehensive data management. The two researchers collaboratively edited and updated the spreadsheet to ensure data accuracy and consistency. Key data fields include title, year of publication, assigned codes, and corresponding theme. Thematic analysis was employed as the primary method for identifying and interpreting patterns within the collected data.

Figure 1: Search and Scoping Procedures Used in EBSCOhost

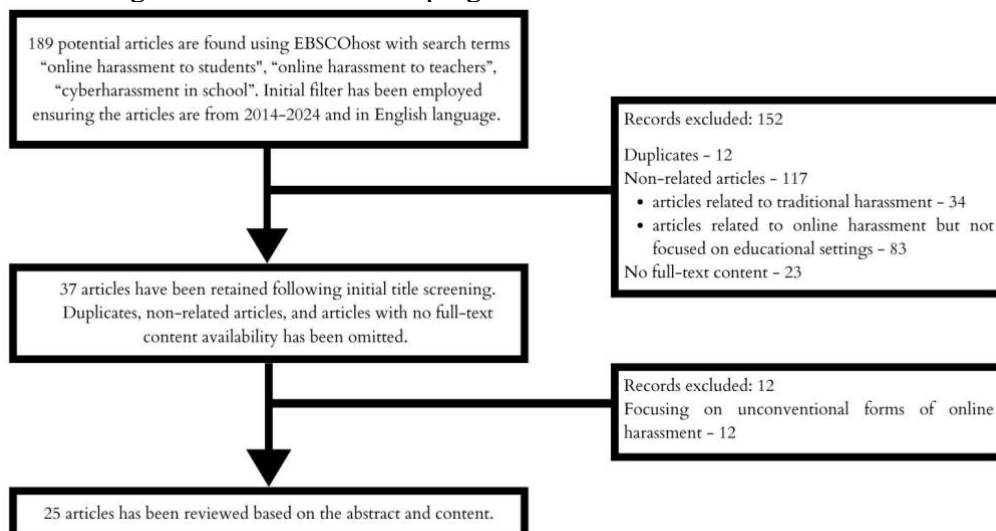
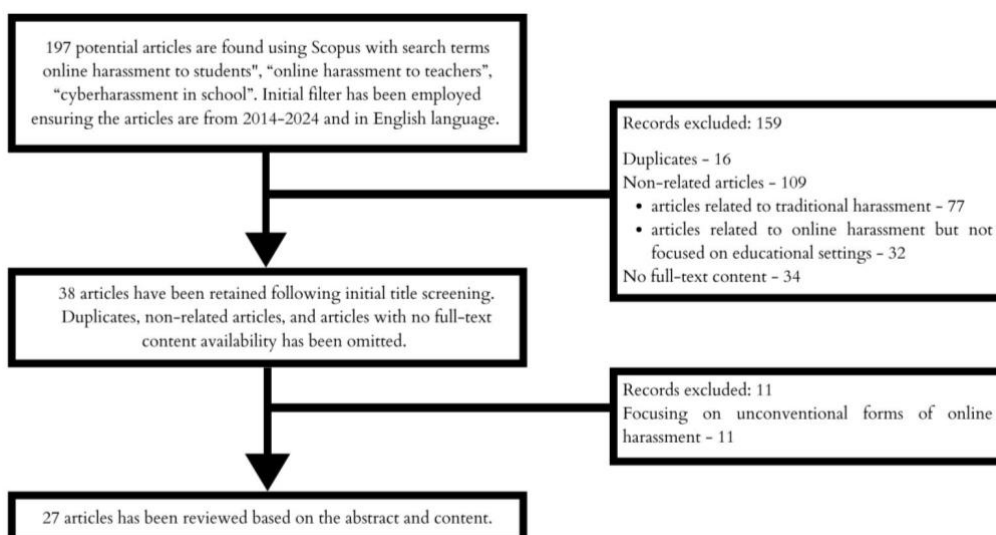


Figure 2: Search and Scoping Procedures Used in Scopus



Results and Discussion

The 52 articles underwent an abstract review and content screening to examine the complex issue of online harassment within educational settings. Through the use of thematic analysis, we were able to identify three themes that tackle the dynamics, impacts, and complex role of technology in this phenomenon. This process started with a title screening, followed by an abstract review of the selected articles, content screening, and detailed coding and categorization of relevant information by the two researchers. From this, the three themes were developed: *Dynamics of Online Harassment within the Educational Settings*, *The Impacts of Online Harassment*, and *Technological Challenges and Interventions to Online Harassment*. These themes, derived from the codes presented below, provide a structured guide to understanding the complexities of online harassment in educational contexts.

Table 1: Codes and Themes

Code	Themes
<ul style="list-style-type: none"> ● Prevalence of Online Harassment ● Online Harassment of Students ● Online Harassment of Faculty 	Dynamics of Online Harassment within the Educational Settings
<ul style="list-style-type: none"> ● Psychological Impacts ● Academic Impacts ● Social Impacts 	The Impacts of Online Harassment
<ul style="list-style-type: none"> ● Facilitation of Online Harassment ● Prevention of Online Harassment 	Technological Challenges and Interventions to Online Harassment

Understanding the complex nature of online harassment within educational settings requires an in-depth assessment of the various factors that contribute to its occurrence and manifestation, beginning with the oversight of the *dynamics of online harassment within educational settings*.

Several studies discuss the mechanisms and circumstances that facilitate online harassment. For instance, Sari et al. (2024) pointed out that “overposting” is a major factor that causes online harassment, especially among the faculty. In another study, Peluchette et al. (2015) provide concrete evidence of the extent to which content shared on social media weakens a person’s resistance to online harassment. Their research shows that personal posts, especially those that may be provocative or contain negative information and the content shared by an individual’s friends on the same social network platform, raise the chances of online harassment. This underlines the interrelation of online social networks and their effect on the harassment experiences of individuals.

In addition, the study of Rosenberg et al. (2022) shed light on the alarming prevalence of student photos being shared online, often with identifying information. This is a significant privacy issue and raises the question of how this highly available information can be misused. This work also supports further developing data protection strategies and increasing students’ digital literacy in educational institutions.

One of the interesting findings and adding another layer to this issue came from the study of van Baak et al. (2022), who introduced the crucial concept of “neutralization techniques,” which are cognitive mechanisms used by cyber harassers to justify their actions. These techniques, encompassing denial of responsibility, minimization of harm, victim blaming, and appeals to higher principles, enable perpetrators to alleviate guilt and continue their abusive actions. Such psychological processes should be known to design proper prevention measures targeting the origins of online harassment.

These works offer a complex picture of online harassment in educational contexts as a phenomenon that is not only diverse but also complex. By considering over-posting, the effects of social media content, the dangers of data privacy breaches, and the cognitive reasons used by offenders, researchers can design better and more efficient ways of preventing and reducing cyber harassment in educational settings. Therefore, the nature of online harassment and the prevalence of online harassment for both students and faculty members were seen as a pattern from these articles.

Moving beyond the dynamics, it is also equally crucial to examine the *impact of online harassment* on individuals within educational environments.

Cyber aggression and prolonged cyberbullying significantly harm teachers emotionally, physiologically, and behaviorally. The study of Kopecký and Szotkowski (2017) highlights key psychological impacts: anger, sadness, insecurity, and anxiety. These emotions can decrease work motivation and teaching performance. Long-term cyber aggression affects not just immediate feelings but also sustained negative moods, contributing to physical issues like sleep problems, headaches, and reduced immunity. This can also lead to increased conflicts in personal and professional relationships.

For students, the research provides compelling evidence across all three domains. Asio, Dojello et al. (2022) establish that cyberbullying, which is a form of online harassment, is likely to lead to adverse psychological outcomes, including anxiety and depression. This psychological distress may have a ripple effect on learning in that it may affect concentration, motivation, and attendance in school. In addition, it affects a student's social relations and causes isolation, loneliness, and low self-esteem. Lahti et al. (2024) also highlight the relationship between online harassment and adolescent mental health with a focus on social media threats to further stress the psychological effects of this vulnerable population.

Moreover, Arikli (2023) discussed in his study the impact of online harassment on academicians and the significant role of technology, particularly social media platforms, in facilitating these activities. The study revealed that the majority of participants encountered harassment on social networking sites. Furthermore, those facing threats on these platforms sought recourse by reporting and pursuing legal action, including criminal complaints, and advocated for the establishment of a dedicated legal department and digital violence unit within the academic institution to better address and prevent such incidents.

In this issue, technology plays a complex yet crucial role, both in facilitating and preventing such activities. The following literature confirms technology's complex role in *challenges and interventions to online harassment*.

Alim and Khalid's (2019) work is helpful in explaining the hybrid nature of social media platforms. These are useful apps for connection, community building, and raising awareness on various issues, yet they can be used to spread negativity, as well as cyberbullying. This duality is further underlined by the study of Sterner and Felmlee (2019) on cyberbullying on Twitter, which gives an idea of how the platform itself may enable cyberbullying through the fast forwarding of the messages, the amplification of abusive content and the construction of echo chambers that encourage the negative behavior.

At the same time, the articles also show how technology can help reduce online harassment. Silva et al. (2016) show this potential in creating BullyBlocker – an application that aims to identify and prevent cyberbullying on social media. A similar initiative has been done by Lempa et al. (2015) in creating a cyberbullying blocker for Android, and they intend to expand this to IOS in the future. These works are revolutionary as they demonstrate how technology can be used in order to avoid online harassment by identifying and blocking negative behavior with the help of technology.

The literature consistently demonstrates the complex and multifaceted relationship between technology and online harassment. While technology undeniably facilitates the occurrence and

spread of online harassment, it also offers promising avenues for prevention and mitigation. To this end, it is possible to use technology and develop new solutions, provide effective educational programs, and promote digital citizenship to make the online environment safer and more tolerant.

Conclusion

This study aimed to understand how schools can effectively prevent and address online harassment to foster a safe and inclusive digital learning environment. By conducting a scoping analysis on different academic papers and journals, the researchers established a concrete structure and relationship among the themes formed from the related literature's thematic analysis. The academic papers and journal articles mainly examined the dynamics and nature of online harassment, the impact of online harassment on the victims and the school community, and the role that technology plays in the prevalence of online harassment.

Based on the result of this study, online harassment is pervasive among the school community members, from the students to the teachers. Multiple aspects can lead to people conducting and being a victim of online harassment, like the desire for acceptance, denial that the victims are harmed as the harassment is conducted virtually, and implying that the victims deserve it. The impact of online harassment is also alarming for both students and faculty members. Students who fall victim to online harassment may suffer from severe emotional distress, social isolation, academic difficulties, and even physical health problems. Similarly, faculty members can experience professional harm, emotional distress, and workplace disruption. Lastly, this scoping study also explored the different utilizations of technology in relation to online harassment. Technology can be both a facilitator and an inhibitor of online harassment. Unsecured social media sites and unhealthy digital practices can encourage perpetrators to harass you, while different applications and online peer groups raise awareness to combat online harassment.

The three themes that arise from the scoping study are related; one leads to the other. As has been seen from the various academic papers and journals used to explain the dynamics and nature of online harassment and its effects, the cause and effect of online harassment was quite clear. Technology is important in helping to stop online harassment or, in fact, facilitate the harassment. The way that the current school relies on the internet, social media, and other information communication technologies has helped the technology become important in combating online harassment. Understanding the interconnectedness of the themes of the scoping study is essential in formulating comprehensive measures to address cyberbullying and support safer internet use in learning institutions.

Different institutions and organizations can benefit from the results of this scoping study. First, educational institutions can use the results of this study to create and implement disciplinary policies and practices regarding online harassment. By understanding the nature and the impact of online harassment on the different members of the school community, educational institutions will be properly guided and be research-driven in making or adjusting school policies and promoting initiatives to create a culture of respect both offline and online. Different technological and social media companies can also use this study to create a safer digital environment for their users, especially students and academicians. Cyberbullying, cyberstalking, information phishing, and other forms of online harassment on different social media platforms can be better averted if the companies making policies are well informed on their nature and impact on their users.

To conclude, fostering discipline in the digital world needs to have a holistic approach. It requires clear policies and reporting mechanisms, educational initiatives for all members of the school community, technological safeguards, and a strong commitment to cultivating a safe and respectful learning environment that transcends the digital space for all members of the educational community to thrive.

Recommendation

As this study is focused on technology and technology is time-sensitive due to rapid changes, researchers can build upon this study to produce more fitting and relevant research that can help them address online harassment applicable to the time of the conduct of their study.

A multifaceted approach is needed to address online harassment. This scoping provided a picture of the different aspects we must consider in addressing this issue. For schools to combat and tackle issues surrounding online harassment, they should consider the nature and dynamics of online harassment, the impact on the different members of the school community, and how to utilize technology to prevent these issues. By understanding where the problem of online harassment originates from, educational institutions can eradicate related cases of online harassment from its roots. Schools and universities should also understand how to take advantage of technology to promote a positive online culture and incorporate their school's core values to reach a broader range of students and faculty members. This is crucial and important for schools to develop and foster a safe and inclusive digital learning environment.

Technological challenges can also have technological solutions. AI can be leveraged as a prevention and detection tool. A development of AI-powered tools for the detection and prevention of online harassment, prioritization of privacy-preserving technology for data security, and demand for greater accountability from online platforms to keep their systems safe and secure for all users because, as a service provider, they should continuously develop mechanisms to ensure proper use of their platforms.

Aside from that, educational initiatives should also be present through implementing comprehensive digital literacy programs covering online safety, ethical communication, and the impact of online behavior, including specific training on "neutralization techniques." Providing faculty training on digital citizenship and online harassment management would also be a big help so faculty members can learn to protect students by guiding them and protecting themselves. Parent engagement in online safety and communication workshops is also ideal as they will be equipped with the skills and knowledge to guide their children in navigating the online world - this will strengthen the school and parent partnership.

School administration must also be firm in establishing clear, comprehensive policies against online harassment applicable to all, with easily accessible, confidential reporting mechanisms. They must also ensure consistent policy enforcement and provide support services for victims.

Lastly, educational institutions must foster a climate of respect and empathy online through school-wide initiatives and by challenging harmful norms like victim-blaming and even neutralization techniques. Creating platforms that promote safe spaces for open dialogue about online experiences is also a good addition to the initiative that must be done by every educational institution. These strategies are crucial for creating a safer online learning environment.

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Examining Academic, Screening, and Structural Correlates of Nursing Licensure Examination Success in a University

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Abstract

The changing landscape of higher education institutions (HEIs) brings new complexities to the dynamics of teaching and learning, which significantly affects graduates' preparation and readiness for national assessment. This study investigates the factors associated with Nursing Licensure Examination (NLE) performance through an analysis of academic, screening, and structural factors among nursing graduates. Drawing empirical evidence from historical data of 204 Nursing graduates, the study probes various factors, such as entrance examination scores, screening assessments, and cumulative academic performance of the graduates in related learning experiences (RLE) and professional courses. Additionally, the curriculum type, preparatory practices, and learning modalities are examined to determine the structural factors influencing board examination results. The inferential analysis reveals that graduates consistently achieved exemplary board examination results, with no variation in performance based on entrance examination scores. However, performance does vary based on screening test results, which include Nursing Aptitude Test (NAT) and battery examination scores. Changes in structural factors, such as pre-board examination setup, the instructional modalities employed, and the curriculum type, also significantly contribute to variation in performance. Finally, the correlation analysis further highlights that the significant correlates of board examination results are the NAT scores, battery examination points, pre-board examination ratings, and performances both in RLE and professional courses. Notably, entrance examination scores did not show a significant impact on examination results. These findings underscore the critical role of targeted preparatory and screening strategies in enhancing success rates in licensure examination.

Keywords: correlation analysis, licensure examination readiness, nursing education outcomes, student performance analysis

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Introduction

A key measure of both individual success and the efficiency of educational institutions in producing qualified nurses is performance on the board examination. In the Philippines, the Nursing Licensure Examination (NLE) serves as a gateway for graduates to enter the nursing profession and is the main metric in ensuring they meet the required standards to provide safe and high-quality patient care (Oducado & Penuela, 2014; Pacis et al., 2020). The performance of the graduates in the NLE suggests that those who pass have acquired the necessary knowledge, skills, and competencies through their pre-board training and learning experiences. The primary responsibility for producing professional nurses of such quality falls on educational institutions and universities, where students are taught and trained until they graduate and meet licensure requirements before practicing the profession (De Leon, 2016). Various factors including academic components, screening and admission processes, and institutional support systems within the educational environment influence performance in the NLE (Del Rosario & Estrada, 2010; Navarro et al., 2011; Ong et al., 2012). The actual performance on the licensure examination is an interrelation of different factors covering individual characteristics, academic variables, institutional and programmatic factors, and circumstances affecting the nature of the examination (Dator, 2016).

Subsequently, the disparity of student performances across academics, screening processes, and other key parameters and its impact on licensure examination success has raised these fundamental questions: First, *what are the factors that significantly influence the NLE performances of the graduates in the licensure examination?* This question addresses a pressing problem within the realm of education and highlights the need to understand, identify, and address the underlying determinants of success in the nursing licensure examination. Second, *do the identified factors correlate with NLE outcomes in terms of overall passing performance?* Similarly, this question explores the relationships between the identified determinants and the actual licensure examination performance.

Given the multifaceted nature of success in the licensure examinations, this study investigated the interplay of academic, screening, and structural determinants of NLE outcomes. By identifying the key factors that correlate with NLE outcomes, universities offering the program can develop more targeted interventions to improve overall outcomes.

Related Works

Prior studies provide a context for understanding the goals of the study and highlight how the authors approached the ongoing discourse in this domain.

Challenges Impacting Nursing Education in the Philippines

The role that nurses play in society requires a fusion of certain skills, competencies, sensitivity, compassion, care, and dedication grounded on the comprehensive knowledge they acquired and the practical application they were exposed to (De Leon, 2016). Previous studies using NLE data have reported growing concerns about the state of nursing education in the Philippines (Bautista et al., 2018; Montegrico, 2019; Rosales et al., 2014). Consequently, efforts to improve nursing care in the Philippines led to the adoption of standards aimed at enhancing the skills and competencies of aspiring nurses. The different regulatory agencies in the Philippines, particularly the Commission on Higher Education (CHED), set program standards through policy development, quality assurance, and program

monitoring. As such, there were many revisions in the curriculum for the past years (CHED Memorandum of Agreement, 2008, 2009, 2011, 2017), which led to new or modified content in the nursing curriculum. The changes in the program curriculum continue to encourage curriculum planners and instructional designers to create learning opportunities that can be adapted regardless of the learner types, current settings, and available resources (De Leon, 2016). The outcomes of curricular transformation provide the basis for continuous improvement of future approaches to nursing education (Aul et al., 2021).

The evolving landscape of education significantly influences the delivery of the nursing program and requires adjustments to the changing healthcare environments, the emergence of advanced and disruptive technologies, and pedagogical shifts. In particular, the academic restrictions imposed by the pandemic severely impacted program delivery, as unforeseen changes in healthcare settings disrupted traditional learning and training methods (Rood et al., 2022; Smith et al., 2021). Abrupt shifts in teaching methodologies, from in-person learning setup to online modes, followed by the transition to the hybrid approach affected the preparation and readiness of aspiring nurses for the NLE. This has also caused many institutions offering the program to feel uncertain as the traditional teaching practices that worked well before the pandemic have become indeterminate (Crismon et al., 2021). This situation has forced administrators and faculties in HEIs offering the nursing program to be innovative, flexible, and agile in their learning delivery (Roper-Padilla et al., 2021) as they transitioned to new learning modalities (Amankwaa et al., 2022; Okunji, 2013). The pedagogical transition to online modality reduced the opportunities for social interactions among students and affected several aspects of their learning experiences (Langegard et al., 2021). However, a study suggests that a hybrid or blended learning approach offers pedagogical benefits to the learners, thereby there are differences in student preferences for modes of education and learning activities which are directly reflected in their performances (Poon, 2013).

On the outside, the surge in nursing job opportunities overseas in the 1990s fueled the rapid expansion of the nursing education sector in the Philippines and led to its commercialization, as evidenced by the increase of nursing schools from 40 in 1970 to around 170 in 1990, and reaching 478 in 2007 (Lorenzo et al., 2007). Similarly, CHED monitoring data indicate a dramatic fourteen-fold increase in nursing enrollment from 27,833 in AY 2000-2001 to 397,195 in AY 2005-2006 and an eight-fold rise in nursing graduates from only 4,409 in AY 2000-2001 to 34,589 in AY 2004-2005 (Lorenzo et al., 2007). On the contrary, the number of students pursuing the program declined over the past years, starting 2009 to 2011 due to the oversupply of nursing graduates (Arends-Kuenning et al., 2015). Nonetheless, the downtrend in enrollment did not last long due to several factors, such as the aging population, the retirement of baby boomers, and increased demand for nurses in other sectors, which resulted in a global nursing shortage (Department of Health, 2017).

Trends in nursing education in the Philippines have been largely affected by the rising and falling demand for Filipino nurses in developed countries, particularly in the United States and Europe (Masselink & Shooou-Yih, 2010; Ortiga, 2018). Based on data from the Philippine Overseas Employment Agency (POEA), 92,277 nurses from the Philippines were deployed to other countries between 2012 and 2016 (Cabanda, 2017), hence starting around 2018 to 2019, nursing enrollment began to soar significantly due to increasing demand for nurses abroad. Locally, there is also a big requirement for nurses as a result of rising demand for healthcare services. According to Statista, in 2023, one public health nurse was serving 5,863 people in the Philippines. Several regions account for the highest nurse-to-population ratio at 7,963

(Statista, 2023). The high demand and the lifting of the moratorium on undergraduate nursing programs by the CHED further fueled the rapid increase in schools offering nursing and led to a significant surge in enrollment from 2020 to the present (Yang, 2022).

Pressured to address ongoing demands for nurses, the continual increase of nursing schools can lead to the decline of the quality of nursing education, as reflected in the unstable passing percentage in the NLE over the past years. Existing data from the Professional Regulation Commission (PRC) show a decline in the NLE passing rates, from 80-90% during 1970-1980, to 41-57% between 1998-2008, and further to 33-57% from 2009-2019 (Bautista et al., 2018; Montegrigo, 2019). Since 2021, a significant improvement in the national passing rates has been observed (Professional Regulation Commission, 2021). While the quality of nursing programs can be assessed through several indicators including accreditation level, quality of clinical exposure, and faculty composition, it is still the licensure examination performance that draws the most attention when evaluating the program quality (Gutierrez, 2016; Jeffreys, 2015).

Factors Affecting NLE Performance

Salustiano (2013) and De Guzman and Guy (2013) concur that academic performance is one of the significant parameters that predicts the nursing licensure examination results. Their studies reveal that academic performance demonstrates how students meet the standards of the curriculum. Since the curriculum includes the evaluation of student knowledge, skills, and attitudes, a comprehensive assessment could viably reflect their future licensure examination performance (Salustiano, 2013). Romeo (2013) highlights the influence of critical thinking ability, measured through standardized assessment, on student success or failure in licensure examinations. More so, Palompon et al. (2012) conclude that student capabilities, such as intelligence quotient (IQ), aptitude towards a future task, academic performance, and pre-board examination rating influence their licensure examination performance, with academic performance and pre-board examination rating as strong predictors. Ignacio et al. (2016) confirm that the pre-board nursing examination is a reliable basis for predicting performance in the NLE. In a study by Soriano (2016), the graduates' grades in all the nursing professional subjects are found to be positively correlated with their performance in specific areas of NLE including Health Education and Nursing Research. The relationship of grades in nursing subjects with NLE performance is highly supported by the studies conducted by Navarro et al. (2011) and Neri (2009). Banua (2017) corroborates that academic performance has a profound influence on the NLE, hence students who perform well have a higher chance of passing the licensure examination. Academic performance, which is reflected in the general weighted average (GWA) of the student, emerged as the most significantly correlated academic factor with NLE ratings, with the grade in Nursing Care Management course as the strong predictor (Ignacio et al., 2016; Kiblasan & Ligligen, 2020). Likewise, Llego et al. (2020) identify classroom, clinical, and pre-board performance of the students in a private university as significant predictors of licensure examination. Furthermore, Rosales, et al. (2014) substantiate that preparation for clinical exposure is a critical part of the nursing curriculum since the NLE measures not only the theoretical knowledge of the graduates but also their clinical judgment. Soriano (2016) reveals in his study that the nursing program in a learning institution is considered substandard if a low percentage of their graduates pass the licensure examination, and this could be attributed to institutional factors like faculty competence and the availability of affiliated training hospitals, laboratories, and libraries. In a study by Bautista et al. (2018), they claim that the decrease in the passing rate of Filipino graduates in licensure examinations is an indicator of the declining quality of higher

education institutions in the Philippines, which could be attributed to numerous interplaying factors.

On a global level, prior studies on the predictors of success in licensure examinations were also undertaken. In a study by Davenport (2007), he explores the academic and non-academic variables that have the potential to predict performance in the licensure examination. Academic variables include study habits, such as the number of hours spent studying, academic performance/grades, and IQ, while non-academic variables include demographic variables, stress, number of hours of sleep, and exercise. In another study by Beerman and Waterhouse (2003), the influence of non-academic determinants on licensure examination success, particularly hours of study, is proven to be significant. Twidwell and Records (2017) reveal that standardized assessments effectively influence success in completing the rigorous requirements of the program and attaining success in the first attempt on licensure examinations. Using micro-data, Cappellari (2004) explores the relationship between the type of high school attended (general versus technical; private versus public) and good licensure performance. Geiser and Santelices (2007), however, claim that high school grades are often viewed an unreliable criterion for college admissions and performance, owing to differences in school grading systems. The same study supports the 'de-emphasis' on standardized tests as a basis for program admissions (Geiser & Santelices, 2007). The acquired competencies of the graduates through structured and supervised learning experience or RLE prepare them to figure out real problems in a given clinical scenario where practical knowledge and skills are more effectively assessed (Jacobson, 2008).

Findings in the reviewed studies independently reveal varying insights into the correlates of licensure examination success. Likewise, the existing literature showed limited scope of the factors affecting NLE performance, thereby the authors find it necessary to conduct this study. In addition, numerous efforts have been made to define the factors that influence licensure examination performance; however, limited research using historical data on student performance across different areas and its impact on NLE outcomes has been observed. Against this backdrop, the authors investigated the influence of various parameters, encapsulating different facets related to academic, screening, and structural determinants, on licensure performance, thus providing a better understanding of the issues and concerns about NLE outcomes.

Theoretical Framework Underpinning the Study

Astin's Input-Environment-Outcome (IEO) Model (1993) provides the framework for evaluating the various factors influencing student outcomes. Its wide usability in educational assessment and research makes it highly appropriate for studying determinants of nursing licensure examination success. The key components of the model such as Input (i.e., the characteristics and abilities that the students have before entering the learning environment), Environment (i.e., the educational or institutional settings influencing student learning and development), and Output (i.e., the learning gains or development occurring as a result of student exposure to educational environment) were generally framed within the context of the study.

Methodology

The methodological approach utilized in this study detailed the data sources, analytical techniques, and tools employed to extract meaningful insights.

Research Locale

This study was conducted in a selected private university in the Philippines, which offers the Nursing program under its distinguished 116-year-old college. For more than a century, the college has been known for its proven track record in academic excellence and holistic student development, providing its graduates with a quality education that is globally relevant, innovative, and accessible. Notably, it ensures that graduates in the nursing program are equipped with the knowledge, skills, and competencies, and they perform outstandingly in the NLE. This is evident in the remarkable board performance of its graduates as it consistently achieves 100% passing rates and produces topnotchers, hence the selected private university serves as an ideal environment for studying the various determinants of NLE outcomes. Guided by the theory underpinning this study and utilizing the five-year data requested from its different units, the determinants that have likely influenced the NLE performance of the selected university's Nursing graduates were explored.

Data Extraction

Data extraction was done in line with the objectives and research questions of this study. The evidence covered the graduates' academic profiles including entrance examination scores, screening interview results, Nursing Aptitude Test (NAT) scores, general weighted average (GWAs/GPAs) for first-year academic courses, pre-board performance ratings, GWAs both for RLE and Nursing professional courses, overall GWAs, and NLE scores as well as the institutional support which includes the curriculum design/type and learning environment. Both the authors and data owners adhered to a clear data extraction protocol to reduce bias and involved a third reviewer to resolve discrepancies.

Data Collection

In the initial phase of the study, the first wave of data covered the 204 licensure examination takers for five years, all of whom successfully passed the NLE. The authors then conducted a retrospective-records review of the extracted data. After cleaning, the data was reduced to 129, forming the final dataset, which included only those with complete or valid entries. Data exclusions were done to ensure accuracy, validity, and reliability of findings and to maintain consistency which may be negatively impacted by duplicate instances or incomplete entries. Careful assessment was done in this process to maintain data integrity.

Data Analysis

A descriptive, inferential, and correlational research design was used to: (1) describe the profiles of the NLE board takers and test for significant differences, (2) identify the determinants of NLE performance, and (3) determine the relationships between the NLE performance of the board takers and the identified determinants.

Results and Discussion

The key characteristics and emerging patterns of the filtered dataset, comprised of records of the 129 board takers, were analyzed to highlight significant findings and insights.

Table 1: Descriptive Information of the 129 Nursing Board Takers

Variable	Group	Frequency	Percentage
Entrance Examination Score	Above Average (AA)	7	5.4%
	High Average (HA)	31	24.0%
	Average (A)	77	59.7%
	Low Average (LA)	10	7.8%
	Below Average (BA)	4	3.1%
Screening Test Result	Passed 3 screening (A)	71	55.0%
	Passed 2 screening (B)	47	36.4%
	Passed 1 screening (C)	11	8.5%
Curriculum Design/Type	Old Curriculum	93	72.1%
	New Curriculum	36	27.9%
Learning Modality	Hybrid	93	72.1%
	In-person	36	27.9%

Table 1 shows an overview of the distribution of the board takers based on the results of their entrance examination and screening tests. Out of the 129 board takers, 7 had level AA in the entrance examination, accounting for 5.4% of the total. Thirty-one board takers made it to level HA, representing 24.0% of the total. Seventy-seven board takers were in level A, comprising the majority with 59.7% of the total. Ten board takers got level LA, accounting for 7.8% of the total, while four board takers got level BA, representing 3.1% of the total. In terms of screening, the board takers underwent three screening tests: an interview, the NAT (with a minimum 80th percentile requirement), and maintaining a GWA of at least 2.0 for required academic courses during their first year in the university. A total of 71 board takers passed all three screening tests, representing 55.0% of the total, while 47 board takers passed two screening tests, accounting for 36.4% of the total. Eleven of the board takers passed only one screening test, which makes up for the remaining 8.5% of the total. Furthermore, the nursing board takers were trained under two different curricula: CMO No. 14 Series 2009 and CMO No. 15 Series 2017. In the old curriculum, there were 93 board takers, accounting for 72.1% of the total, while in the new curriculum, there were 36 board takers, representing 27.9% of the total. Likewise, the board takers experienced two learning modalities: hybrid and in-person. Ninety-three board takers, or 72.1%, had experienced the hybrid modality, which was a combination of in-person and online learning for their classes and related learning experiences. Meanwhile, 36 board takers, or 27.9%, had experienced solely the in-person modality.

Inferential Analysis

The observed differences between variables were analyzed by employing inferential statistical methods. The identified performance parameters were categorized into three: *Student Assessments*, *Program Interventions*, and *Student Academic Profiles*.

Table 2: Inferential Analysis of Factors on Student Assessments Affecting NLE Scores

Test Factor	NLE Performance per Group	Test Statistic	p-value	Significance
Entrance Examination Score	Group AA (83.5 ± 2.46) Group HA (84.8 ± 2.45) Group A (83.5 ± 2.16) Group LA (83.5 ± 1.54) Group BA (83.0 ± 3.83)	7.24	.129***	Not significant
Screening Test Result	Group A (84.6 ± 2.14) Group B (83.0 ± 2.05) Group C (82.1 ± 2.49)	19.9	< .001***	Significant

***p < .05

For student assessments, there were two variables considered in measuring the capability of the students to pursue the nursing program and eventually pass the NLE such as the *Entrance Examination* and *Screening Tests*. Table 2 presents the mean NLE scores and standard deviations for each group of board takers. The highest mean NLE score ($M = 84.8$) is obtained for Group HA, while the lowest mean NLE score ($M = 83.0$) is obtained for Group BA. The mean NLE scores show little disparity among the five groups. Notably, the standard deviation ($SD = 1.54$) for Group LA indicates less variability in performance, while the standard deviation ($SD = 3.83$) for Group BA suggests greater variability. Group AA ($SD = 2.46$) and Group HA ($SD = 2.45$) have almost similar variability, however, Group A has slightly lower variability ($SD = 2.16$) compared to the other two groups. An analysis using Kruskal-Wallis test revealed that there is no significant difference ($p = .129$) and no variations between the NLE performances of the five groups. They have fairly the same performance in the NLE regardless of their entrance examination results. This is supported by Geiser and Santelices (2007) suggesting a ‘de-emphasis’ on standardized tests in determining college admissions. The table also provides the summary statistics for three groups labeled A, B, and C, indicating their overall performances in the screening tests. Among the three groups, Group A has the highest mean NLE score ($M = 84.6$), followed by Group B ($M = 83.0$) and Group C ($M = 82.1$). The standard deviations demonstrate that there is less variability in NLE scores for Group A ($SD = 2.05$) than Group B ($SD = 2.14$) and Group C ($SD = 2.49$). The Kruskal-Wallis test results revealed a significant difference ($p < .001$) and variations between the NLE performances of the three groups. Palompon et al. (2012) confirmed that student capabilities, such as IQ, aptitude towards a future task, and academic performance, have influences on NLE performance.

Table 3: Inferential Analysis of Factors on Program Interventions Affecting NLE Scores

Test Factor	NLE Performance per Group	Test Statistic	p-value	Significance
Curriculum Type	Old Curriculum (82.8 ± 2.40) New Curriculum (84.2 ± 2.16)	1119	.004***	Significant
Learning Modality	Hybrid Modality (82.8 ± 2.40) In-person Modality (84.2 ± 2.16)	1119	.004***	Significant
In-house Review with Pre-Board Exam	Yes (Pre-pandemic) (83.8 ± 2.30) No (Pandemic) (81.6 ± 3.25)	1755	< .001***	Significant

***p < .05

For program interventions, there were two main variables considered, which have direct and/or indirect effects on NLE outcomes namely *Curriculum Design/Type*, *Learning Modality*, and *In-House Review with Pre-Board Examination*. Table 3 shows the mean NLE

scores of the two groups based on implemented curriculum design/type. For the old curriculum, the mean NLE score is 82.8, while for the new curriculum, it is 84.2. This suggests that the group trained under the new curriculum performed better than the group trained under the old curriculum. For the new curriculum, the standard deviation is 2.16, while for the old curriculum, it is 2.40, suggesting that the group under the new curriculum had relatively more homogeneous performance than the group under the old curriculum. An analysis using the Mann-Whitney T-test revealed a significant difference ($p = .004$) and variations between the NLE performances of the two groups. Aul et al. (2021) deduced that the positive outcomes of curricular transformation serve as a platform for continuous improvement of future approaches to nursing education, hence validating the findings. Similarly, the table shows the mean NLE scores of the two groups based on learning modality. For the in-person modality, the mean NLE score is 82.8, while for the hybrid modality, it is 84.2. Although the difference is relatively small, this indicates that the group who experienced the hybrid modality performed better on the NLE than the group who underwent the in-person modality alone. For the in-person modality, the standard deviation is 2.40, while for the hybrid modality, it is 2.16. This suggests that the group in the hybrid modality had relatively more homogeneous performance compared to the group in the in-person modality. The Mann-Whitney T-test results revealed a significant difference ($p = .004$) and variations between the NLE performances of the two groups. The pandemic has driven HEIs offering health-related courses to be innovative, flexible, and agile (Roperopadilla et al., 2021) as they transitioned to new learning modalities (Amankwaa et al., 2022; Okunji, 2013), and this had an impact on student development. The table also shows the mean NLE scores of the board takers based on whether they had in-house review with pre-board examination or not. The mean NLE score for those who had an in-house review is 83.8, while for those who did not, it is 81.6, revealing a better performance by the first group than the second group. For those who had an in-house review, the standard deviation is 2.30, while for those who had not, it is 3.25. The standard deviation is notably lower for the group who underwent in-house review with pre-board examination, indicating a more homogeneous performance than the other group. The Mann-Whitney T-test results also revealed a significant difference ($p < .001$) and variations between the NLE performances of the two groups. Pre-board or mock board examination turned out to be useful in influencing the graduates' performance in the actual NLE (Ignacio et al., 2016).

The academic profiles serve as an invaluable resource to investigate various aspects of student performance and effective teaching methodologies, hence assessing student academic progress and achievements is paramount in this study. For the student academic profiles, there were three related variables considered, namely *GWA for Related Learning Experience*, *GWA for Professional Courses*, and *Overall GWA*.

Table 4: Differences in GWA for Professional Courses, GWA for RLE, and Overall GWA Between Hybrid and In-Person Groups

Variable	Academic Performance	Test Statistic	p-value	Significance
GWA for Professional Courses (PC)	Hybrid (1.63 ± 0.107) In-person (1.89 ± 0.137) <i>Both Groups (1.70 ± 0.164)</i>	181	< .001***	Significant
GWA for Related Learning Experience (RLE)	Hybrid (1.61 ± 0.102) In-person (1.87 ± 0.129) <i>Both Groups (1.68 ± 0.159)</i>	209	< .001***	Significant
GWA for all Academic Courses/Overall GWA (O)	Hybrid (1.64 ± 0.117) In-person (1.88 ± 0.145) <i>Both Groups (1.71 ± 0.167)</i>	301	< .001***	Significant

***p < .05

Table 4 presents the mean GWAs of all the board takers for RLE ($M_{RLE} = 1.68$), professional courses ($M_{PC} = 1.70$), and all academic courses ($M_O = 1.71$). Mean GWAs are consistently high for these performance metrics, thereby showing the board takers' good academic performances. The low standard deviations suggest homogeneous performance among the board takers. The performance of the group in hybrid learning ($M_{H-RLE} = 1.61$, $M_{H-PC} = 1.63$, and $M_{H-O} = 1.64$) is better than the group in in-person classes ($M_{I-RLE} = 1.87$, $M_{I-PC} = 1.89$, $M_{I-O} = 1.88$). For their RLE, the standard deviation of the group who attended hybrid classes ($SD_{H-RLE} = 0.102$) is lower than the group who participated in in-person classes ($SD_{I-RLE} = 0.129$), indicating a more homogeneous performance for the first group. The same is observed in the obtained mean GWAs and standard deviations for professional courses ($SD_{H-PC} = 0.107$ for the hybrid group and $SD_{I-PC} = 0.137$ for the in-person group) and for all academic courses ($SD_{H-O} = 0.117$ for the hybrid group and $SD_{I-O} = 0.145$ for the in-person group). As stated in a study by Langegard et al. (2021), the pedagogical transition to online modality reduced the opportunities for more engaging social interactions among students but otherwise offered pedagogical benefits. The inferential analysis further revealed a significant difference ($p < .001$) and variations between the academic profiles of the two groups of board takers, particularly in GWAs for RLE, GWAs for professional courses, and overall GWAs. As Poon (2013) affirmed, there is variability in student preferences for education forms and learning activities, which are often reflected in their performances.

Correlational Analysis

The results of correlation analysis present the potential associations between various factors and the significance of the observed relationships, hence uncovering meaningful patterns for predicting NLE performance. The nominal variables such as entrance examination score and screening test result were converted into quantitative values through appropriate coding to facilitate correlation analysis. Furthermore, to maintain interpretability and consistency, the academic performance variables, particularly GWA for RLE, GWA for professional courses, and overall GWA, were transformed using negation in the analysis.

Table 5: Correlation Analysis of Predictors of NLE Scores

Independent Variable (IV)	Dependent Variable (DV)	Correlation Coefficient (r)	p-value	Significance
Entrance Examination Score	NLE score	0.173	.082***	Not significant
Screening Test Result	NLE score	0.394	< .001***	Significant
Pre-board Exam Score	NLE score	0.688	< .001***	Significant
GWA _{RLE}	NLE score	0.588	< .001***	Significant
GWA _{PC}	NLE score	0.625	< .001***	Significant
GWA _{Overall}	NLE score	0.632	< .001***	Significant

***p < .05

Table 5 indicates that entrance examination scores had a weak correlation with NLE scores ($r = 0.173$, $p = .082$), and was not statistically significant. This suggests that the entrance examination score was not a strong predictor of success in the NLE. Geiser and Santelices (2007) asserted that reducing the emphasis on standardized tests in college admissions is crucial, as this is often seen as a less reliable criterion for NLE performance. In contrast, the screening test results showed a moderate positive correlation with NLE scores ($r = .394$, $p < .001$), indicating that they had an impact on NLE performance. As Salustiano (2013) pointed out, integrated with the curriculum is the evaluation of student knowledge, skills, and attitudes, which are measured through comprehensive assessment. Among all the academic performance indicators, the pre-board examination scores had the strongest correlation with NLE performance ($r = .688$, $p < .001$), significantly concluding that pre-board examination performance influences NLE scores. In a study by Ignacio et al. (2016), it was inferred that mock board examination is associated with success in the NLE. Additionally, GWA in RLE (GWA_{RLE}) and GWA in professional courses (GWA_{PC}) had moderate positive correlations with NLE scores ($r = .588$ and $r = .625$ respectively, both with $p < .001$), further supporting the assertion that academic performance in both theoretical and practical components of the nursing curriculum is crucial for licensure success. Jacobson (2008) inferred that what the graduates learned in the RLE is essential as these competencies help board takers figure out real problems in a given clinical scenario. Likewise, the correlation of grades in nursing subjects with NLE performance is significantly supported by the studies conducted by Navarro et al. (2011) and Neri (2009). The overall GWA (GWA_{Overall}) also had a significant correlation with NLE scores ($r = .632$, $p < .001$), reinforcing the importance of consistently good performance in the program. According to Banua (2017), academic performance was found to have a great influence on the NLE, hence students who perform well in nursing school are most likely to pass the NLE.

Conclusion

The descriptive, inferential, and correlational analyses revealed insightful perspectives into the various factors influencing NLE performance based on the examined historical data. First, entrance examination scores had no significant influence on NLE performance as all graduates passed the NLE regardless of their entrance examination results. Taking these results into account, the university must explore other comprehensive methods of evaluating applicants to better assess their potential for success both in the nursing program and NLE, such as portfolio assessment, structured interviews, pre-admission performance tasks, and situational judgment tests in basic healthcare.

On the contrary, screening test results showed that the moderate positive correlation with NLE performance was significant, which suggests that the comprehensive screening

assessments the graduates underwent gauge their readiness and success in the licensure examinations. In light of this, the university must strengthen the existing screening processes to better identify students who may need additional support in terms of further developing their potential to perform better in the NLE.

Pre-board examination scores demonstrated the strongest correlation with NLE outcomes, which highlights the importance of rigorous preparatory assessments in enhancing licensure performance. Participation in an in-house review with pre-board examinations was significantly associated with NLE scores, which reinforces the effectiveness of structured review programs in preparing aspiring nurses for licensure examinations. Developing and implementing more comprehensive preparatory programs that focus on the essentials for NLE success, such as critical thinking and clinical skills can greatly contribute to licensure examination success.

Academic performance indicators, particularly GWAs both for RLE and professional courses, showed moderate positive correlations with NLE scores. These outcomes emphasize the significance of a strong theoretical foundation combined with practical training in ensuring graduates' readiness for the NLE. High academic performance is better achieved by ensuring that clinical exposure is well-integrated into the curriculum, coupled with clear monitoring of the student progress both in classroom and clinical settings. More so, the faculty members are the curriculum implementers, therefore continually providing training and professional development opportunities will equip them with the best teaching practices and expose them to cutting-edge technologies, hence constantly aligning their know-how with the global standards.

The graduates who were trained under the enhanced nursing curriculum outperformed those who were trained under the old curriculum, highlighting the positive impact of curriculum enhancement on NLE success. Given these outcomes, it is important to establish a regular review process to integrate the current healthcare best practices, emerging healthcare trends, and evidence-supported methods into the curriculum to ensure that the graduates are equipped with the knowledge, skills, and competencies to pass the NLE. Moreover, the graduates who engaged in hybrid learning performed better than those who participated solely in in-person learning, therefore incorporating learning environments that cater to diverse learning needs can be more beneficial.

Future research may explore additional factors influencing NLE outcomes like faculty teaching effectiveness, clinical exposure quality, and psychological preparedness to provide a more comprehensive understanding of the determinants of licensure examination success in nursing education.

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Development of an ASR-Based Subtitle Generation System for Lecture Videos to Improve Searchability

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Abstract

This study focused on improving the searchability of video-based online learning, specifically for Japanese lecture videos. A prototype semantic search API was developed to enhance search functionality using automatic speech recognition (ASR) and text embeddings. The system employs OpenAI Whisper to generate subtitles from uploaded videos. Text embeddings were generated using two models. The embeddings were stored in a vector database, enabling semantic search by calculating similarity between query embeddings and stored data. The system was evaluated on macOS using mlx-whisper, an optimized version of Whisper for Apple silicon. The preliminary evaluation demonstrated high ASR accuracy and efficient embedding generation, with the ruri-large model in particular providing more relevant search results for Japanese lecture videos.

Keywords: auto speech recognition, lecture video, text embedding, semantic search, web API

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Introduction

Online learning frequently utilizes video content, which typically includes audio explanations accompanied by slides, computer screens, and other visual elements. However, the major limitation of video-based learning is the inability to easily search for specific information within the videos. This lack of searchability is a significant problem, especially when learning with lengthy videos or large collections of video files.

Recent advancements in machine learning have improved the accuracy of speech recognition software and made system implementation easier. Among these, Open AI Whisper, an open-model software, has demonstrated high recognition accuracy in many languages including Japanese, in addition to English (Radford et al., 2022). Furthermore, some automatic speech recognition (ASR) software like Whisper can preserve timestamps in transcription results and export subtitle data in formats such as SRT or VTT.

Document search methods include full-text search and semantic search, as well as hybrids of the two. The Japanese language poses unique challenges due to its three distinct scripts: Hiragana, Katakana, and Kanji. These scripts can represent the same word in different forms, leading to inconsistencies in written expressions. For this reason, the implementation of semantic search is important to realize highly accurate search for speech recognition results of videos using Japanese.

Objectives

The objectives of this study are to develop a Web API and vector database server with the following functions:

1. Automatically generate subtitle text data and the embeddings for uploaded videos.
2. Return relevant video IDs and time segments as search results for the query sentence sent to the API.
3. Evaluate server performance and search result accuracy for some lecture videos in Japanese.

Text embeddings are numerical representations of text that encode semantic meaning and contextual relationships between words, phrases, or documents. These embeddings transform textual data into high-dimensional vectors, enabling machines to process and analyze language effectively. In this study, a prototype of a semantic search API for videos, particularly those in Japanese, was designed, implemented, and evaluated. The system leverages text embeddings generated from the subtitle text of video content to implement semantic search functionality.

Proposed System

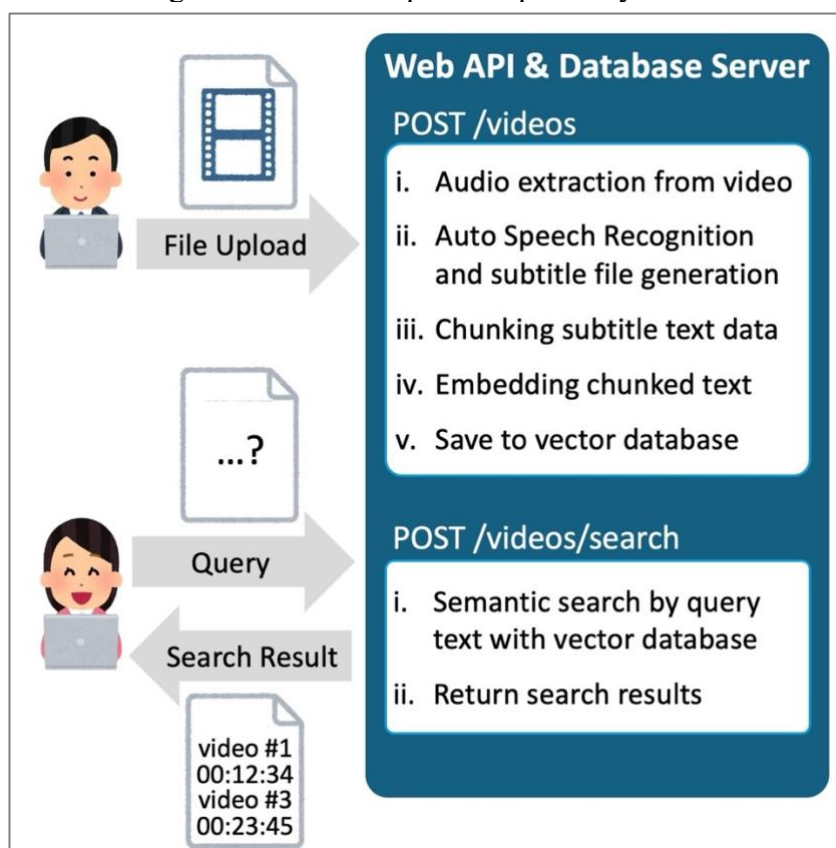
Using FastAPI, a Python framework, I developed a backend server consisting of a Web API and a vector database (Figure 1). This API system processes based on two operations via HTTP/HTTPS:

1. Uploading lecture video files by the instructor.
2. Inputting search terms or search queries by the learner.

When an instructor uploads a video file, the system extracts the audio track from the file and uses it as input for the ASR process. ASR and embeddings in this study are explained in the following subsections. It should be noted that this study did not develop a graphical user

interface (GUI) to upload videos or perform semantic searches. Instead, all functionality was implemented and evaluated using a command-line interface (CUI).

Figure 1: The Concept of Proposed System



ASR: Auto Speech Recognition

This study utilizes OpenAI Whisper's "large-v3-turbo" model as speech recognition software (Radford et al., 2022). The "large-v3-turbo" model, one of multilingual models, was selected for its accuracy and speed balance. While Whisper provides the option to configure multiple parameters, this study specified only the model and the language (Japanese) settings. The main objective of this study is to perform a preliminary evaluation of the proposed system, so the "initial_prompt" parameter was not configured.

Although the output subtitle texts exhibited high accuracy, some misrecognitions were observed. These misrecognitions, along with character variations (Japanese has three writing systems), underscore the necessity of implementing semantic search functionality.

Embedding

Whisper's VTT output divides the recognition results into segments of appropriate length. In this study, some segments were merged into larger segments, ensuring that the total length did not exceed a specified maximum token size. The maximum token size parameter was carefully configured to maintain the semantic integrity of the subtitle text while allowing for the specification of playback positions within an appropriate time range during semantic search. Text embeddings were subsequently converted from the text in merged segments.

To generate text embeddings, two open-source embedding models were used: multilingual-e5-large (Wang et al., 2024) and ruri-large (Tsukagoshi & Sasano, 2024). The former model supports many languages including Japanese, whereas the latter model is especially specialized for Japanese. JMTEB, a benchmark for Japanese embedding models, reports results of STS (semantic textual similarity) tasks for various embedding models. Table 1 presents the JMTEB STS scores reported for the two embedding models utilized in this study, along with a comparison to a commercial model, OpenAI's text-embedding-3-large, which is widely used as a cloud-based service. In particular, the ruri-large model has demonstrated a high STS score for Japanese language.

Table 1: JMTEB STS Scores for Embedding Models (JMTEB, 2025)

Model	STS
cl-nagoya/ruri-large	83.13
OpenAI/text-embedding-3-large	82.52
intfloat/multilingual-e5-large	79.70

The text embeddings are stored in vector database, Chroma (Chroma, 2025). When saving text embeddings, the original text, playback time in the video, and video id were saved together as metadata. The embeddings stored in the vector database are utilized to process search queries entered by learners. When the search API is invoked with a term or phrase, an embedding is generated using the same model used to generate embeddings from the subtitle data. Semantic search is performed by calculating the similarity between this query embedding and the embeddings previously stored in the Chroma DB. The API returns multiple search results, ranked in descending order of similarity.

Evaluation

The proposed API system was evaluated for its functionality on a macOS device (Apple M4 Max, 16 cores, 64 GB RAM). The ASR system utilized in this evaluation was mlx-whisper, a version of the Whisper model optimized for Apple Silicon using the MLX framework. The API system was validated using several Japanese lecture videos, and the results confirmed its ability to achieve highly accurate automatic speech recognition and efficient embedding generation. End-to-end processing required approximately 3% of the video's duration.

While two embedding models produced similar similarity rankings for many search terms, the ruri-large model provided more appropriate results for certain queries.

Conclusion

The proposed system enables semantic search of video files using ASR-generated subtitles. Initial evaluations demonstrate highly accurate semantic search via a Japanese-optimized embedding model (Tsukagoshi & Sasano, 2024) as inferred from the JMTEB STS scores.

Since both embedding models have the same number of dimensions, there is no notable difference in terms of system load. Also, the system can run entirely in a local environment and can accommodate videos with non-public information.

Future work includes, first, the development of an API with a hybrid search function combining full-text search with semantic search. Additionally, the development and evaluation of a web-based user interface for searching and playing lecture videos using the API will be pursued.

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Drivers of Suba Language Endangerment in Kenya and the Role of Artificial Intelligence (AI) in Mitigation

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Abstract

This study investigates the critical factors contributing to the endangerment of the Suba language in Kenya. Primarily spoken by older members of the Suba community, the language faces significant challenges driven by several interconnected factors. A literature review and ethnographic research identified four primary drivers of Suba language decline: the influence of dominant languages, cultural assimilation through integration with Luo communities, geographical dispersion, and economic migration driven by shifts in livelihood opportunities. Proposed AI-driven solutions include digital ecosystems for Suba language learning, virtual cultural repositories, and AI-enabled economic platforms. These tools aim to document Suba's linguistic heritage, foster intergenerational knowledge transfer, and empower the community economically. Additionally, AI-powered community networking platforms and localized broadcasting are proposed to bridge the geographical and cultural gaps among dispersed Suba speakers. The research suggests a strategic framework for using AI to counter these drivers of language decline, prioritizing community collaboration and cultural sensitivity. This approach aims to preserve the Suba language and offers a scalable model for safeguarding endangered languages in Kenya and beyond.

Keywords: Suba, AI, endangerment, revitalization

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Introduction

Endangered languages in Kenya, including Suba, face various threats that align with global trends. The dominance of widely spoken languages, economic migration, and cultural assimilation significantly contribute to the erosion of minority languages (Obiero, 2008). Limited resources for documentation and preservation further worsen these issues, leaving many Indigenous languages at risk of extinction. The loss of these languages goes beyond linguistics; it represents the disappearance of unique worldviews, traditional knowledge, and cultural heritage (Rovira, 2008).

The Suba language, primarily spoken by the Suba community in Kenya, is a notable example of this challenge. Representing a significant piece of Kenya's linguistic and cultural heritage, the Suba language is rooted in the history of the Suba people. The Suba community is a heterogeneous Bantu group and ties to the Ganda, Luhya, and Soga tribes (Ndenda, 2019). Historically, the Suba migrated to Kenya, settling around Lake Victoria, particularly on Rusinga and Mfangano islands, where they developed a rich oral tradition that preserved their cultural knowledge, folklore, and identity (Ndenda, 2019). However, the Suba language has experienced a steep decline over time. With an estimated 157,787 speakers, many of whom are older, the language is increasingly at risk as younger generations shift to dominant languages such as Luo and Swahili (KNBS, 2019). This generational language shift raises concerns about losing a vital component of Kenya's cultural identity and diversity.

This study aims to investigate the critical factors driving the endangerment of the Suba language and explore how Artificial Intelligence (AI) can play a transformative role in addressing these challenges. By examining the interplay of linguistic, cultural, and socio-economic factors, the research seeks to identify actionable strategies for preserving the Suba language. In doing so, the study highlights the potential of AI-driven tools to support documentation, analysis, and revitalization efforts, fostering a sustainable approach to safeguarding endangered languages in Kenya and beyond.

Materials and Methods

This study adopts a qualitative approach using secondary data to investigate the drivers of Suba language endangerment and the potential role of Artificial Intelligence (AI) in its preservation. The literature review focused on peer-reviewed articles, books, and reports on language endangerment, particularly on studies on the Suba language and other minority languages in Kenya. Key sources included census data, historical accounts, and government policy documents, providing a comprehensive understanding of the historical, cultural, and socio-political contexts impacting the Suba language. Additionally, the study reviewed existing AI-based tools and frameworks for linguistic documentation, analysis, and revitalization to assess their applicability in addressing the challenges specific to the Suba language.

The collected secondary data were analyzed using a thematic analysis approach. Key themes were identified to categorize the drivers of language decline. These themes were used to establish patterns and connections, highlighting the interplay of these factors and their cumulative effect on the decline of the Suba language. This systematic analysis provided critical insights into the Suba language's challenges and the opportunities for leveraging AI in its preservation.

Key Drivers of Suba Language Endangerment

Table 1 presents the primary factors contributing to the decline of the Suba language, alongside proposed AI-driven strategies to mitigate each issue. The identified drivers include the influence of dominant languages, cultural assimilation, economic migration, and geographical dispersion. Corresponding AI interventions encompass digital language learning platforms, virtual cultural repositories, AI-enabled economic initiatives, and community networking tools. This alignment underscores the potential of AI technologies in addressing the multifaceted challenges facing the preservation of the Suba language.

Table 1: Key Drivers of Suba Language Endangerment and Corresponding AI Mitigation Strategies

Driver	AI Mitigation
Influence of Dominant Languages	AI-powered digital ecosystems for Suba language learning (e.g., chatbots, bilingual dictionaries, language learning apps).
Cultural Assimilation	AI-based cultural repositories, transcription tools, and virtual reality (VR) for documenting and showcasing Suba traditions.
Economic Migration and Livelihoods	AI-enabled digital marketplaces, recommendation systems, and livelihood training programs tailored for Suba speakers.
Geographical Dispersion	AI-driven community networking platforms, virtual storytelling sessions, and geotargeted broadcasting in the Suba language.

Influence of Dominant Languages

Luo, Swahili, and English dominance has significantly marginalized the Suba language. During the colonial era, missionary activities were a pivotal factor in this marginalization, as they often relied on Luo-speaking intermediaries, entrenching Luo in religious and educational domains. The perception of Luo as a language of prestige and opportunity compels many Suba families to encourage their children to adopt it, especially in environments dominated by Luo speakers, such as market transactions and public meetings. In regions like Rusinga and Gembe, Luo has almost entirely replaced Suba as the language of everyday communication. Suba is now spoken primarily by older generations and is often reserved for private or symbolic uses, such as rituals and storytelling (Obiero, 2010).

Educational policies that promote English and Swahili as the primary languages of instruction in Kenyan schools further diminish the functional value of Suba. The elevation of English as the language of science, technology, and socio-economic mobility has accelerated Suba's decline by displacing it from educational and formal domains. Consequently, children are introduced to English and Swahili early in their education, leaving Suba largely absent from formal learning environments. Furthermore, the lack of Suba literacy materials and codified instructional resources reinforces its invisibility within institutional contexts. This institutional neglect alienates young speakers, as schools prioritize English and Swahili for formal instruction and Luo for informal socialization (Barasa, 2023).

The prevalence of these dominant languages in education, governance, and public life continues to erode Suba's functional utility, rendering it less relevant in daily interactions and

institutional contexts. Wamalwa and Oluoch (2013) highlight that the shift to dominant languages represents a strategic adaptation by families seeking socio-economic mobility, often at the expense of their linguistic heritage. For many families, the tangible benefits of mastering English or Swahili frequently outweigh the perceived cultural value of preserving Suba.

Cultural Assimilation Through Integration With Luo Communities. The historical process of assimilation, beginning as early as the 19th century through intermarriage, migration, and trade, has brought Suba culture and traditions to extinction. Key elements of Luo culture, including naming systems and marriage customs, have been widely adopted by the Suba, significantly diluting their unique identity (Obiero, 2008). This cultural convergence was further driven by Suba's active participation in Luo-dominated economic and social networks, where trade and intermarriage facilitated the integration of Luo norms and practices (Ndenda, 2019).

In many cases, the assimilation has been so extensive that Suba speakers no longer identify with their linguistic heritage, fully aligning themselves with Luo culture and language. Luo has become the first language of younger generations, marking a profound cultural and linguistic allegiance shift. Some members of the Suba community now self-identify as Luo, with Suba culture surviving only as a relic preserved by older people or showcased during specific events such as funerals or festivals (Omollo & Kingwara, 2024).

The emergence of the term "Luo Abasuba" underscores the depth of this assimilation, describing Suba individuals who have fully integrated into Luo society. This linguistic and cultural absorption is also reflected in historical land migrations and disputes between the Suba and Luo, where geographic proximity necessitated compromise and adaptation to Luo dominance (Ndenda, 2019). As a result, Suba's distinct cultural identity has been gradually overshadowed by the pervasive influence of Luo traditions and practices.

Economic Migration and Changing Livelihood Opportunities. The Suba community traditionally relied on fishing, farming, and boatbuilding for their livelihoods. However, these activities have significantly declined due to economic and environmental changes. Environmental pressures, such as natural resource degradation and overfishing in Lake Victoria, have rendered fishing less viable as an occupation (Ndenda, 2019). Expanding commercial fishing enterprises dominated by non-Suba groups have marginalized traditional fishing practices, forcing many Suba to adopt alternative livelihoods (Obiero, 2008). Conservation initiatives, including fishing restrictions in certain areas to protect biodiversity, have inadvertently displaced Suba fishermen, compelling them to seek other income sources (Odundo, 2016). These economic and environmental shifts have driven the Suba to integrate into Luo-dominated markets, where Luo language and norms prevail, further weakening the use of Suba within households.

Urban migration has emerged as another significant livelihood strategy for the Suba community in response to these rising economic and environmental challenges. Many younger Suba have moved to urban centres, such as Nairobi, due to limited employment opportunities in rural areas, particularly in traditional Suba industries like fishing and subsistence farming (Obiero, 2008). This migration has created a generational divide, with older Suba speakers remaining in rural areas while younger generations lose connection to their linguistic heritage in urban settings (Barasa, 2023).

Children raised in urban environments, where school systems prioritize English and Swahili, often have little to no exposure to the Suba language or culture. This disconnection may lead

to identity crises as they struggle to reconcile their ancestral heritage with their socio-educational environment. Consequently, urban migration has disrupted traditional livelihoods and accelerated the erosion of Suba's cultural and linguistic identity. Ndenda (2019) emphasizes that economic migration has fragmented rural Suba-speaking communities, making it increasingly difficult to maintain a critical mass of active speakers who can preserve and transmit the language.

Geographical Dispersion

The Suba community faces significant challenges due to their geographical spread across areas such as Mfangano, Rusinga, Takawiri Islands, Gwasi Hills, and Migori (Ndenda, 2019). The isolation of these locations, particularly the islands and remote mainland regions, has made communication among Suba groups difficult. This separation has forced them to rely heavily on Luo-speaking neighbours for trade and daily activities, further reducing the use of the Suba language. On Rusinga Island and parts of Gwasi, many Suba people now predominantly use Dholuo, which has become the primary language for governance and social interactions. In areas like Migori, where Suba communities are scattered among Luo-dominated populations, younger generations have ultimately adopted Luo, severing their connection to the Suba language (Omollo & Kingwara, 2024).

This geographical dispersion has also weakened Suba subgroups' cultural and linguistic ties. Physical separation hinders the maintenance of shared traditions and limits opportunities to pass on the language to future generations (Obiero, 2008). As a result, the uneven use of the Suba language across different regions isolates communities. It accelerates its decline by reducing the opportunities for younger generations to learn, practice, and sustain it.

AI Mitigation Strategies

Digital Ecosystems for Suba-Language Learning and Use

AI-powered digital ecosystems offer a promising solution to counter the decline of the Suba language amidst the dominance of Luo, Swahili, and English (Ondiba, 2025a). These ecosystems combine technological tools, cultural preservation strategies, and user-centric design to support language learning and revitalization (Low et al., 2022). Beyond traditional educational tools, they integrate cultural identity to address barriers to language preservation. The revitalization of te reo Māori through AI tools, educational initiatives, and community engagement illustrates how digital ecosystems can empower endangered languages to reclaim their relevance in modern sociolinguistic contexts (Raj, 2024).

AI chatbots can facilitate conversational practice in Suba as virtual language tutors, enabling contextual language learning while incorporating dominant languages like Luo, Swahili, and English (Low et al., 2022). Digital Language Ecosystem (DLE) features like quizzes, forums, and interactive workshops could enhance language learning while promoting problem-solving and creative skills in Suba-specific contexts (Pinto-Llorente & Izquierdo-Álvarez, 2024). These tools help users maintain a connection to Suba even in environments where other languages dominate, offering interactive and adaptive learning experiences.

Translation AI is another critical component of this ecosystem. AI-powered translation tools can bridge linguistic gaps between Suba and dominant languages by creating bilingual dictionaries, subtitling traditional media, and enabling real-time translation during cultural

events or community gatherings (Jafari, 2023). For instance, Microsoft's collaboration with the Nunavut government to develop AI models for Inuktitut languages demonstrates the transformative potential of such tools in fostering intergenerational communication and creating multilingual archives (Low et al., 2022). For Suba, these tools could document and preserve linguistic heritage while integrating the language into modern educational and cultural contexts. Additionally, AI-driven translation systems can provide immediate, context-specific feedback to learners, enhancing comprehension and communication skills in multilingual settings (Pinto-Llorente & Izquierdo-Álvarez, 2024). These efforts promote Suba's practical utility and elevate its status, ensuring its presence in educational, cultural, and public domains.

Cultural Repositories and Virtual Reality

One way to address cultural assimilation challenges in the Suba community is by creating AI-powered digital archives. These archives can preserve Suba cultural artefacts, oral histories, and traditional practices, safeguarding them for future generations. As Ondiba (2025b) emphasizes, integrating AI technologies can ensure accurate transcription and annotation of Suba oral traditions and the ethical and secure handling of sensitive Indigenous knowledge. This provides younger generations with engaging and educational access to their cultural roots. Bekele et al. (2018) also highlight how virtual reality (VR) and augmented reality (AR) technologies can enhance cultural preservation by transforming digitized artefacts and data into interactive formats. For example, the Digital Periegesis project used VR to document Greek cultural heritage (Bekele et al., 2018). A similar approach could be adapted for Suba oral histories and practices, ensuring accessibility and interactivity.

Smartphone applications using gamified learning techniques can also play a key role in preserving Suba language and culture. These apps could include interactive features for vocabulary building, storytelling, and participation in cultural activities (Gray, 2023). For instance, gamified scenarios based on traditional practices, like crafting fishing gear or narrating folk tales, could engage users while transmitting cultural knowledge. Inspired by Māori examples, community-driven storytelling apps and role-playing tasks rooted in cultural practices could sustain engagement and encourage intergenerational knowledge transfer (Low et al., 2022).

Gamification strategies, such as rewards for language milestones or role-playing based on Suba traditions, have improved language and cultural retention. Studies indicate that gamified learning creates immersive and enjoyable experiences, which are highly effective for sustaining engagement and promoting long-term cultural preservation (Hamari et al., 2014).

Economic Empowerment Through Language Revitalization

AI-driven strategies inspired by successful rural tourism models can empower Suba speakers economically while preserving their linguistic heritage. One approach is the creation of Suba-centric digital marketplaces, leveraging AI to help local entrepreneurs sell traditional goods such as fishing crafts, textiles, and artisanal products (Semwal et al., 2024). These platforms, modelled after AI-enabled virtual marketplaces that connect tourists with local artisans, could incorporate the Suba language in branding and product descriptions, promoting Suba culture while creating economic incentives for its preservation.

AI-powered recommendation systems could match sellers with global buyers, translating Suba-language content for international audiences and increasing the visibility of Suba's identity.

Research shows that integrating cultural elements into digital marketplaces boosts community participation and economic benefits (Siddiqui et al., 2022). Additionally, participatory decision-making frameworks could involve Suba stakeholders in shaping these platforms to reflect their cultural and financial priorities (Semwal et al., 2024).

AI-driven livelihood training programs can equip the Suba community with modern sustainable fishing and farming skills while incorporating Suba terminologies and traditional ecological knowledge. These programs could use AI tools, such as virtual simulations and predictive analytics, to teach best practices tailored to the community's cultural context (Jayadatta, 2024). For instance, an AI application could guide fishermen in identifying optimal fishing seasons while embedding Suba terminology for species and techniques, seamlessly integrating the language into daily economic activities. Similar initiatives have successfully preserved indigenous knowledge in other communities facing modernization and environmental challenges (Low et al., 2022).

AI innovations in skill development can also help address job displacement caused by modernization. For example, platforms like M-Shamba in Kenya provide personalized agronomic advice and real-time market data, empowering smallholder farmers with actionable insights (Olagunju, 2024). Tailored versions of such platforms could be developed for Suba fishermen and farmers, integrating their linguistic and ecological knowledge into AI-based recommendations. These tools would enhance economic outcomes and ensure the active use and preservation of the Suba language.

Connectivity and Networking

To address the challenges of geographical dispersion, AI-driven community networking platforms can provide dispersed Suba populations with virtual spaces for interaction and collaboration. These platforms could include regional forums, group messaging systems, and event planning tools that promote the use of the Suba language. For instance, AI-powered platforms for revitalizing the Māori language have successfully hosted virtual cultural events, storytelling sessions, and gamified language learning experiences (Sharofova, 2023). A similar platform for the Suba community could host virtual storytelling sessions, allowing members from different regions to share oral traditions in their native language. This preserves Suba cultural heritage and fosters linguistic ties across geographically separated groups. As demonstrated in UNESCO-supported projects, interactive forums within language learning apps can further enhance collaboration between learners and native speakers, fostering a sense of community (Sharofova, 2023).

AI-enabled language broadcasting offers another impactful strategy for connecting dispersed Suba speakers. By leveraging AI tools, localized radio programs and online streaming content can be produced entirely in the Suba language, featuring news, cultural stories, and educational material. Geotargeted broadcasts tailored to areas with high Suba populations ensure content relevance and accessibility. For example, transcription tools like those used in the Cherokee language project can convert oral narratives into scripts, enabling high-quality radio segments and podcasts that feature Suba folklore (Sharofova, 2023). Research shows that broadcasting in indigenous languages enhances language retention and fosters cultural pride in diverse communities (Raj, 2024).

Conclusion

This study explored the critical factors contributing to the endangerment of the Suba language in Kenya and demonstrated how AI-driven solutions can address these challenges. The findings identified four primary drivers of language decline: the dominance of Luo, Swahili, and English; cultural assimilation through integration with Luo communities; economic migration; and geographical dispersion. These interconnected factors have significantly eroded the use and transmission of Suba, placing it at risk of extinction. By leveraging AI technologies, such as digital ecosystems for language learning, virtual cultural repositories, AI-driven economic platforms, and community networking tools, this study highlighted practical strategies for preserving the Suba language. These tools offer scalable solutions to document and promote Suba culture while fostering economic empowerment and connectivity among dispersed populations.

While the proposed solutions show promise, the study acknowledges limitations, such as the need for community buy-in and access to digital infrastructure, which are critical for successful implementation. Future research should focus on refining these AI frameworks and assessing their long-term impact on language preservation and community engagement. Ultimately, this research emphasizes the transformative potential of AI in safeguarding endangered languages. For the Suba community, adopting these strategies supports linguistic and cultural preservation and strengthens their collective identity and resilience in a rapidly evolving world.

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Challenges to the Use of Generative AI in Teaching and Learning Among Students and Faculty

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Abstract

Today, generative AI is creating disruptions in education, urging schools and universities to reconsider their lesson designs. If generative AI has the potential to reshape education and learning, swift action is required to prepare for this transformation. This study examines the impacts of generative AI on students and teachers, its potential future influence, and the educational challenges it poses. A web-based survey collected responses from 8,769 participants, including 5,942 students and 2,827 teachers from Japanese high schools and universities. After excluding invalid responses, 6,939 valid responses were analyzed (4,323 from students and 2,616 from teachers). As of March 2024, 30.3% of students had used generative AI, leaving about 70% yet to adopt it. Among teachers, the usage rate was 19.3%, 11 percentage points lower than that of students. Notably, 27.8% of students who used generative AI admitted copying AI-generated outputs into their assignments. Furthermore, 50% of high school students using generative AI reported uncertainty about what constitutes academic misconduct. These findings highlight the urgent need for ethics education aligned with institutional guidelines to prevent academic misconduct. Such education should address risks like dishonesty while fostering proper use and citation of generative AI. Additionally, it is crucial to introduce positive applications of generative AI in education. For teachers, specialized training programs should cover the basics of generative AI, strategies for integrating it into teaching, and approaches to revising assessment methods. These measures are essential for effectively addressing the challenges posed by generative AI in education.

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Introduction

Towards Evidence-Based Utilization and Support of Generative AI in Education

Today, generative AI is causing disruptions in educational settings. It may necessitate a reconsideration of instructional design in schools and universities. If generative AI has the potential to transform the future of teaching and learning, it is needed that we take proactive measures to prepare for this shift. In response to the increasing societal adoption of generative AI, Japan's Ministry of Education, Culture, Sports, Science and Technology (2023) issued a notice in July 2023 titled "Guidelines for the Use of Generated AI at the Elementary and Secondary Education Level (Tentative Version)." This notice emphasizes the importance of considering the actual educational practices in each school when formulating responses to generative AI in academic institutions.

Accordingly, the notice calls for institutions to provide appropriate guidance for students and faculty while also ensuring that policies and approaches are periodically reviewed in light of technological advancements and the evolving implementation of such guidelines. In alignment with this policy initiative by MEXT, universities and other educational institutions have been developing operational policies and usage rules for generative AI.

When looking at the international landscape, UNESCO (2023) has identified a "human-centered approach" as a key pillar in the future direction of education policies concerning the use of generative AI in the education sector. This approach emphasizes the need to provide opportunities for students to develop the necessary competencies for the appropriate use of generative AI in education while ensuring that they can benefit from its use. It also highlights the importance of implementing continuous education policies that take into account the long-term impact of generative AI on teaching and learning.

To effectively address the opportunities and challenges posed by generative AI in educational settings, it is essential to refer to prior research that has examined institutional policies, student behavior, and pedagogical implications. These previous studies offer valuable insights into how generative AI is integrated into teaching and learning, highlighting ethical concerns, technical limitations, and instructional possibilities. By synthesizing the findings from these research efforts, a more comprehensive understanding of the current landscape can be established. The following section reviews key studies to provide a contextual foundation for the subsequent examination.

Previous Researches

Policies and Challenges of Generative AI in Education

The emergence of generative AI has introduced challenges in both education. In the field of education, it necessitates a re-examination of lesson design and is expected to bring significant transformations in the future. In response, numerous educational institutions have started developing policies to guide the use of generative AI in academic settings.

For example, Boston University's Center for Computing & Data Sciences mandates that any use of generative AI must be acknowledged, requiring students to include an appendix detailing their interactions with the AI and the rationale behind its use (Welker, 2023). Monash University, on the other hand, has implemented policies that ensure students are

informed about the ethical and responsible application of generative AI in academic work while enforcing strict measures against academic misconduct (Monash University, 2023). Meanwhile, the University of Southern California encourages exploratory engagement with AI, provided that research ethics considerations are thoroughly addressed in accordance with university guidelines (University of Southern California, 2023).

In Japan, the Ministry of Education, Culture, Sports, Science and Technology has begun compiling reference materials to support schools in managing the use of generative AI in educational settings (Ministry of Education, Culture, Sports, Science and Technology, Special Committee on Digital Learning Infrastructure, 2024).

Exploring the Impact and Challenges of Generative AI in Education

In this section, previous studies on the impacts and challenges of generative AI in education are reviewed to provide a foundation for understanding its role in academic settings. Klarin et al. (2024) examined the relationship between generative AI usage in schools, students' executive functioning, and academic performance. Their study found that students with executive function challenges were more likely to perceive generative AI as a valuable tool for problem-solving. Generative AI was commonly utilized for task completion, information retrieval, and learning support in various educational activities. However, the study did not establish a clear correlation between AI usage and academic performance.

Lee and Low (2024) emphasized that while generative AI holds great potential in education, fostering critical thinking remains essential. They cautioned that educators should not treat generative AI merely as an information-providing tool but rather as a means to cultivate students' critical thinking, creativity, and ethical awareness. Moreover, the risk of bias in AI-generated outputs was highlighted, as biases present in training data can influence the AI's responses (Angwin et al., 2016). Therefore, developing students' ability to critically assess AI-generated content is crucial in mitigating these biases.

Further reinforcing this perspective, Dilling and Herrmann (2024) investigated university students training to become elementary and middle school mathematics teachers. Their research underscored the importance of equipping future educators with the skills to critically evaluate the outputs of large language models (LLMs) and recognize their limitations.

Additionally, Fatahi et al. (2024) analyzed responses from ChatGPT and human users, utilizing sentiment analysis tools to quantify emotional expression. Their findings revealed that while ChatGPT can effectively generate objective responses, it struggles to match the natural and emotionally expressive qualities of human communication.

Drawing on these previous studies, this study explores the challenges of integrating generative AI into educational settings by examining its usage and perceptions among students and educators.

Survey Concept

In light of the increasing accessibility and societal integration of generative AI, determining how this technology should be used in educational contexts has become a matter of growing importance. To examine this issue, a large-scale web-based survey was conducted to investigate how generative AI is currently being utilized by both students and educators, as

well as to identify their perceptions of its benefits, risks, and related educational challenges. The study targeted individuals on both sides of the learning environment—students as learners and teachers as facilitators of instruction—across various educational levels.

The survey gathered responses from a total of 8,769 participants, comprising 5,942 students and 2,827 teachers. After excluding invalid responses, a total of 6,939 valid responses were analyzed, with 4,323 from students and 2,616 from educators. Participants included high school students aged 15 and above, as well as teachers from elementary, junior high, and high schools, vocational schools, universities, and graduate schools. The survey was administered online between March 21 and March 25, 2024, by the AI Education and Research Team at Sendai University.

The aim of this survey was to provide an evidence-based foundation for understanding the actual conditions and challenges surrounding the use of generative AI in educational settings. By capturing a broad spectrum of experiences and perspectives, the survey seeks to inform the development of appropriate guidelines, instructional strategies, and support systems for integrating generative AI into education in a responsible and effective manner.

Table 1: Overview of the Survey

Item	Details
Objective	Given the current situation where generative AI is easily accessible, the question of whether and how it should be utilized in education and learning has become a pressing issue. In response to changes in the educational environment, this survey aims to clarify how students, as learners, and teachers, as providers of education, are utilizing generative AI, what perceptions they hold, and what educational challenges need to be addressed.
Targets	Students: Aged 15 and above (equivalent to high school students)
	Teachers: Elementary, junior high, and high school teachers, as well as educators from specialized training colleges, vocational schools, universities, and graduate schools.
Method	Web-based questionnaire
Respondents	8,769 participants (Valid responses: 6,939) Students (n = 4,323) Teachers (n = 2,616)
Period	March 21, 2024 – March 25, 2024
Conducted by	AI Education and Research Team, Sendai University

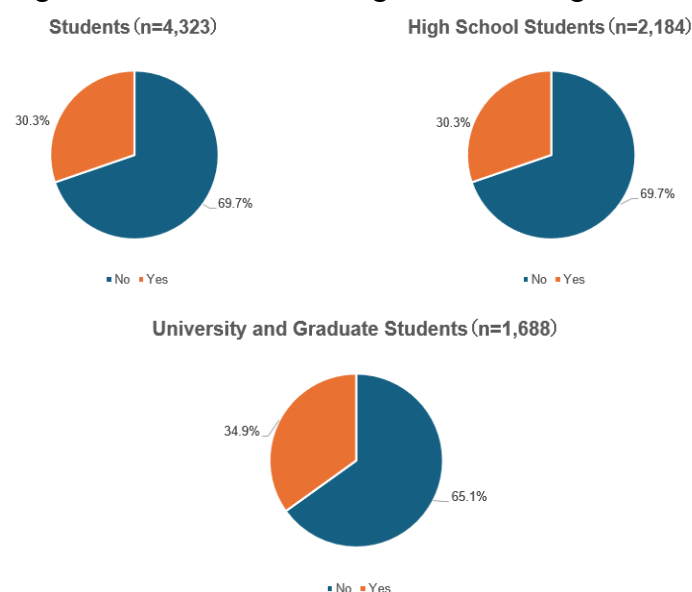
Analysis Results

Usage of Generative AI by Students and Educators

Students' Usage of Generative AI. As of March 2024, 30.3% of high school students and 34.9% of university and graduate students reported using generative AI. Despite the widespread societal presence of generative AI tools, approximately 70% of students had not yet utilized them at the time of the survey. This indicates that a significant proportion of students had not incorporated generative AI into their learning practices.

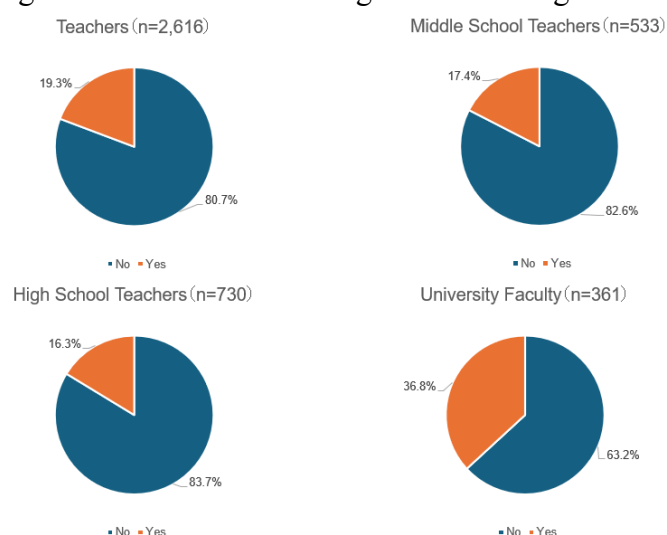
The data also show a difference in usage rates between educational levels, with a higher percentage of university and graduate students reporting use compared to high school students.

Figure 1: Generative AI Usage Rates Among Students



Teacher's Usage of Generative AI. Focusing on educators, 19.3% reported using generative AI. This proportion is approximately 11 percentage points lower than the usage rate reported by students. When broken down by type of educational institution, faculty members at universities and graduate schools reported the highest usage rate at 36.8%, while educators at elementary, junior high, and high schools showed lower adoption rates. The data indicate clear differences in the use of generative AI among educators depending on the educational level at which they teach. This higher usage rate among university and graduate school faculty may be attributed to their utilization of generative AI not only for educational purposes but also for research activities.

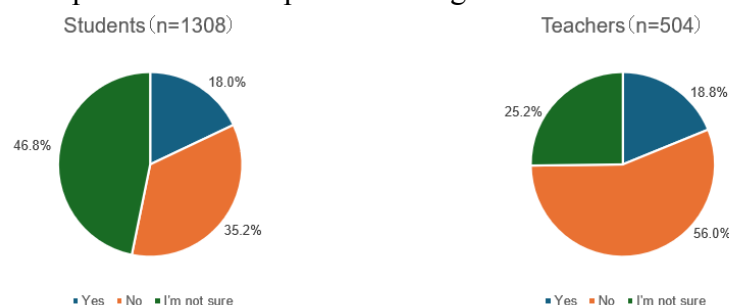
Figure 2: Generative AI Usage Rates Among Teachers



Experience With Opt-Out Settings. Regarding experience with opt-out settings, 18.0% of students and 18.8% of educators responded that they had used such settings to prevent their input data from being utilized by generative AI systems. These figures indicate that only a minority of both groups had actively taken measures to manage how their data are handled by AI tools.

In contrast, a substantial proportion of respondents indicated a lack of understanding about opt-out settings. Among students, 46.8% reported that they do not fully understand the function or purpose of these settings. Among educators, 25.2% expressed the same uncertainty. These results suggest that awareness and comprehension of opt-out settings remain limited across both groups.

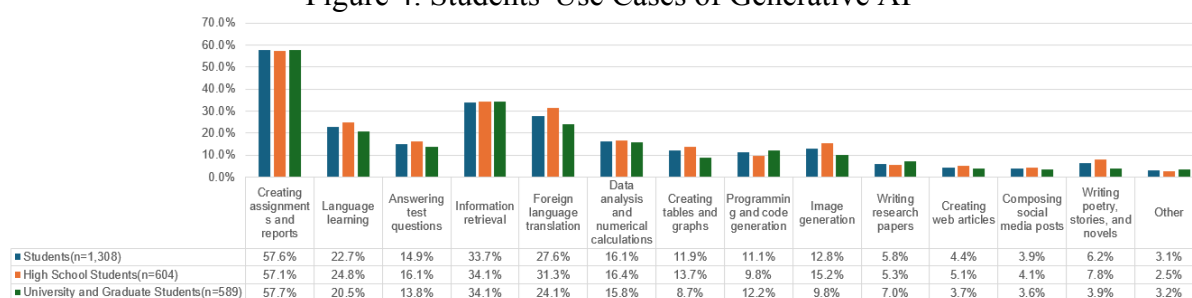
Figure 3: Experience With Opt-Out Settings for Generative AI Input Data



The findings highlight a need for improved information dissemination and educational efforts regarding data control features in generative AI tools. Ensuring that users are informed about such options may support more responsible and informed use of AI technologies in educational contexts.

Students' Use Cases of Generative AI. Students who use generative AI were asked about the purposes for which they utilize the technology. The most common use case among both high school and university/graduate students was "creating assignments and reports," with nearly 60% of students indicating experience in this area. The second most frequently cited purpose was "information retrieval," reported by approximately 35% of students. "Foreign language learning" also emerged as a notable use case, with 31.3% of high school students and 24.1% of university/graduate students indicating usage for this purpose. In relation to "answering test questions," 16.1% of high school students and 13.8% of university/graduate students reported using generative AI in this context.

Figure 4: Students' Use Cases of Generative AI



Educational Challenges of Generative AI for Teachers

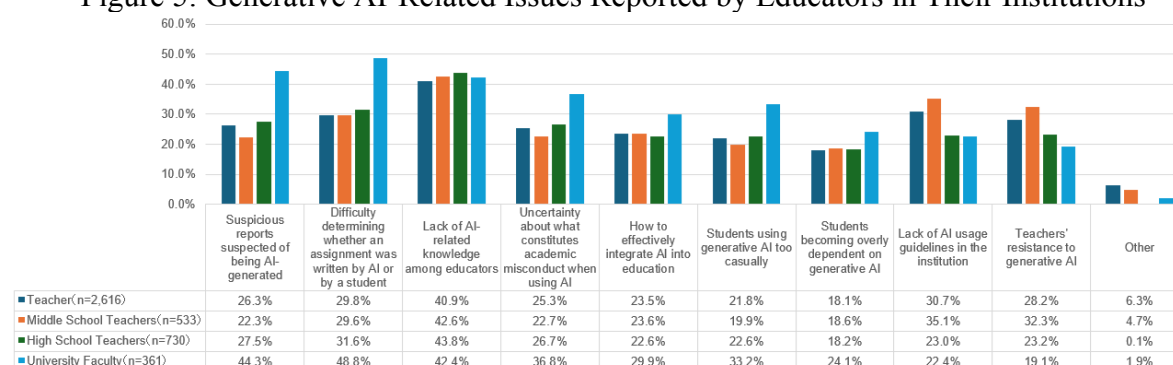
Generative AI-Related Issues in Schools and Universities Where Educators Work. Among the educators surveyed, those working at universities and graduate schools reported a higher frequency of generative AI-related issues compared to those at elementary, junior high, and high schools. The most frequently cited concern was the difficulty in determining whether submitted assignments had been authored by students or generated using AI tools. This was

particularly prominent in higher education institutions, where written reports and essays are common forms of assessment.

In contrast, educators at the elementary and secondary levels more frequently identified a lack of knowledge about generative AI and the absence of institutional guidelines as key challenges. These responses suggest that generative AI is creating distinct types of issues depending on the educational context. While higher education institutions face concerns related to academic integrity and evaluation, primary and secondary schools are encountering foundational challenges related to awareness and policy development.

These findings indicate that generative AI is impacting schools and universities in varied ways, with differences emerging not only in usage rates but also in the types of institutional issues reported by educators across educational levels.

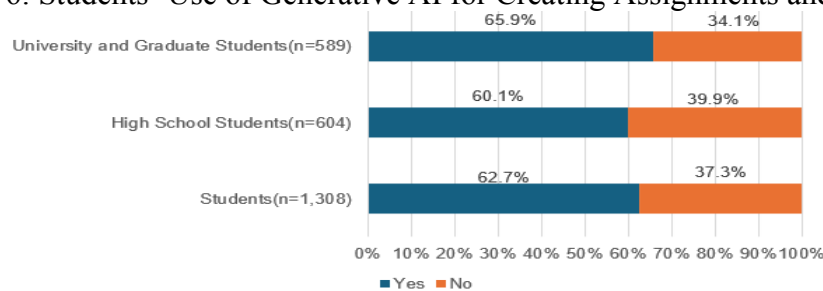
Figure 5: Generative AI-Related Issues Reported by Educators in Their Institutions



Problematic Behaviors and Challenges in Learning With Generative AI Among Students

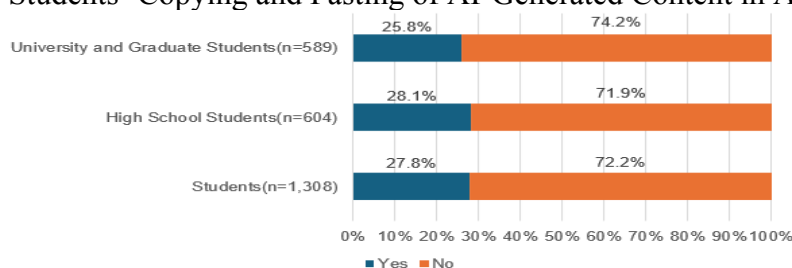
Students' Assignment Creation Using Generative AI and Copy-Pasting. Students who use generative AI were asked whether they had ever used it to create assignments or reports. Among them, 60.1% of high school students and 65.9% of university and graduate students indicated that they had done so. Additionally, respondents were asked whether they had copied and pasted AI-generated content directly into their assignments or reports for submission. Overall, 27.8% of students acknowledged engaging in this behavior. When examined by educational level, 28.1% of high school students and 25.8% of university and graduate students reported submitting assignments that contained copied content generated by AI tools.

Figure 6: Students' Use of Generative AI for Creating Assignments and Reports



($\chi^2 = 4.02$, $df = 1$, $p < 0.05$)

Figure 7: Students' Copying and Pasting of AI-Generated Content in Assignments

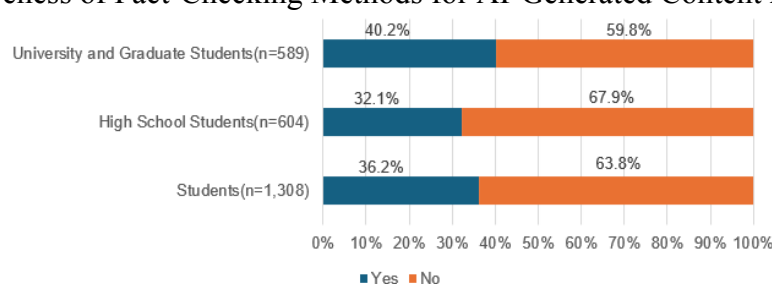


($\chi^2 = 0.71$, $df = 1$, $p = n.s.$)

Students' Knowledge of Fact-Checking. Regarding knowledge of fact-checking, 63.8% of students who use generative AI indicated that they do not know how to verify the accuracy of AI-generated content. A breakdown by educational level shows that 67.9% of high school students and 59.8% of university and graduate students reported a lack of fact-checking knowledge. These figures suggest that a majority of student users are engaging with generative AI without the skills necessary to critically assess the reliability of the output.

The relatively higher percentage of high school students lacking fact-checking skills points to a potential gap in information literacy education at the secondary level. In both high school and university settings, the findings underscore the need for targeted instructional efforts aimed at equipping students with competencies for evaluating AI-generated information. Without such skills, students may rely on content that is inaccurate or biased, which could hinder the development of sound academic judgment.

Figure 8: Awareness of Fact-Checking Methods for AI-Generated Content Among Students



($\chi^2 = 8.17$, $df = 1$, $p < 0.001$)

Discussion

Based on these findings, it is essential to consider specific measures that support both educators and students in adapting to the educational challenges and opportunities brought

about by generative AI. This section discusses recommended support for each group, beginning with support for teachers.

Support for Teachers

The survey revealed that 19.3% of educators reported using generative AI, a figure approximately 11 percentage points lower than that of students. University and graduate school faculty demonstrated higher usage (36.8%) compared to educators at elementary, junior high, and high schools. Additionally, 25.2% of educators indicated a lack of understanding regarding opt-out settings, and some cited challenges related to the absence of institutional guidelines.

These findings highlight the need to strengthen support for educators through comprehensive professional development. Rather than merely restricting the use of generative AI, it is important for educators to acquire the instructional skills necessary to guide students in leveraging AI as a tool for deepening and expanding learning, while also preventing academic misconduct. Effective support should include training programs that address fundamental knowledge of generative AI, its pedagogical applications, and strategies for revising assessment practices.

In parallel, educational institutions should establish clear operational policies for the use of generative AI and provide technical assistance, particularly for educators less familiar with ICT. Such institutional measures would not only mitigate risks related to academic integrity but also contribute to the constructive and responsible integration of generative AI into teaching and learning.

Support for Students

Among students, 30.3% of high school students and 34.9% of university and graduate students reported using generative AI. The most common purpose was creating assignments and reports, followed by information retrieval and foreign language learning. At the same time, 27.8% of student users acknowledged copying and pasting AI-generated content into assignments. Furthermore, 63.8% of student users indicated they did not know how to fact-check AI-generated outputs, with the lack of fact-checking literacy more prominent among high school students (67.9%).

These findings point to the necessity of targeted student support focusing on academic integrity, fact-checking skills, and ethical AI usage. Educational institutions should provide guidance that clearly defines academic misconduct in the context of AI use, alongside instruction on proper citation practices and data privacy controls, such as opt-out settings. Particular attention should be given to high school students, where understanding of both technical and ethical dimensions of AI remains limited.

Establishing Educational Readiness for the Integration of Generative AI

The integration of generative AI into education is already underway and is producing observable impacts on both teaching and learning practices. Survey results show variability in AI usage across educational levels, gaps in ethical understanding, and limited awareness of technical features like opt-out settings.

In anticipation of broader adoption, it is essential that educational institutions proactively establish comprehensive guidelines and implement them systematically. These guidelines should address not only usage policies but also pedagogical strategies, digital literacy development, and ethical considerations. Preparing both educators and students to engage with generative AI critically and constructively will be crucial for realizing its potential to enhance educational outcomes.

Acknowledgements

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While this manuscript incorporates certain elements from a previously published project report, those sections have been substantially revised and recontextualized to develop a more in-depth academic discussion. Moreover, the paper includes significant additions of original findings and interpretations. Accordingly, the content constitutes a distinct and expanded contribution and does not duplicate the prior report.

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