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Lauro Filipe Reis, University of Lisbon, Portugal

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Abstract
This essay aims to establish a dialogical framework between Michael Riffaterre´s The Poem as Representation: A Reading of Hugo, and Dionysius of Halicarnassus´s De Compositione Verborum. Both Riffaterre and Dionysius agree that the criterion of correspondence with reality is not the best possible touchstone for evaluating a text. The difference is that Riffaterre arrives at this conclusion through a descriptive critical analysis and Dionysus from a rhetorical and prescriptive position. This essay will focus on a comparative exercise between these two approaches, focusing on canonical questions such as the relationship between theory and the teaching of literature, the adoption of specific methodologies to evaluate certain types of texts, and the existence, or non-existence, of boundaries that separate the literary field from others, such as rhetoric. The intention will be to showcase a type of stance when it comes to literary texts that does not necessarily succumb either to the specific uses of the reader or the "tyranny" of the authority of the author.

Keywords: Literature, Teaching, Theory, Method, Reading

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1. Introduction - Against Realistic Criteria

Michael Riffaterre begins *The Poem as Representation: A Reading of Hugo* by stating that one of the aesthetic criteria of a realist work is the "ability to create the illusion of truth", a truth available to everyone and empirically verifiable (Riffaterre, 1983). This contrasts with poetic aesthetics, which are described as transmutative. The intention is to point out that if a change occurs in the referent that is easier to identify in poetry rather than prose, then poetic aesthetics does not benefit from the use of realistic criteria in its interpretation. This leads Riffaterre to condemn the impulse to "compare poems to reality", as it leads to the tendency to argue about fidelity or infidelity, the similarity or vagueness of poetic description in constant comparison with reality. There is also incongruity in its value judgments about poetry, where at one moment they are celebrated for their fidelity and, at another, condemned for being a sterile copy (Riffaterre, 1983). However, Riffaterre agrees that this realistic approach is one of the "modalities of relationship between the text and the reader"; as such, this modality deserves scrutiny. In order to explain this literary phenomenon, Riffaterre resorts to a poem by Victor Hugo, *Écrit sur la vitre d'une fenêtre flamande*.

Riffaterre declares that all Victor Hugo specialists analyze the poem in relation to reality. They value "the art with which Hugo was able to turn auditory sensations into visual ones" and "the imagination to personify the hourly chimes" (Riffaterre, 1983). Riffaterre cites specifically the interpretation of a critic who argues that Hugo's poem is an exercise in "personification dictated by the poet's fancy, which seizes on a movement, attitude, or formal resemblance in order to create a myth around them" (Riffaterre, 1983). The problem is that all these interpretations take the reader out of the text, by evoking hypothetical events in the poem's genesis. The initial circumstances of the text's composition do not explain the reader's final reactions to the text in its final form. It is this reasoning that leads Riffaterre to conclude that "the poem is not a destination; it is a starting point" (Riffaterre, 1983).

Nothing in this type of realistic analysis informs the reader of the numerous functions present in the text, making it impossible to identify what makes the poem appealing. That is why for Riffaterre the solution involves the "decoding" of a poem. This means paying attention to the text, its words and combinations, and describing the verbal combinations that capture the reader's attention. Hence, the point that Riffaterre makes about the uniqueness of the poem: the lexical combinations are so complex that they are impossible to repeat, either in poems or in any other type of text.

Thus, Riffaterre seeks to invert the traditional direction of poetic analysis: instead of starting from the represented thing to the representation, it should start from the representation as something that creates the represented thing and makes it believable exclusively through the combination of verbal sequences (i.e. semiosis). This means that the reader does not need to evoke his experience of reality; it means that he needs only to refer the poem to "a linguistic code".[1] This is how for Riffaterre the poem stipulates the conditions of its intelligibility. There is no need to appeal to reality, as the starting point is the words, their combinations, and how one word triggers another. The only extra-textual appeal comes from a set of stereotypes, clichés, and commonplaces that the reader already carries with him. This set, named by Riffaterre as "mythology", makes it possible to dispense with empirical experience, or correspondence with reality, in the process of interpreting a poem. It also allows the

[1] "His experience of that code is adequate by definition; if it were not, he would not be a reader" (Riffaterre, 1983).

exclusion of “the author”, “the circumstances of the composition”, “the order in which the poem was written” and any other modifications (Riffaterre, 1983).

2. The Riffaterian Method

Riffaterre's analysis proposal focuses on words, their possible placements, and how they “mutually triggered one after the other” in a text (Riffaterre, 1983). The idea is to analyze lexical sequentiality, where a word or combination of words justifies and relates to the subsequent word. The poetic representation is thus carried out by the pre-established relationship between these lexical structures and the mythological models that the reader carries with him. This means that both the author and the reader never start from scratch, either in terms of composing or interpreting a poem. Although the poem is a closed and tautological unit, this does not mean that other poems do not have to be appealed to. Despite Riffaterre's waiver of realistic criteria, the internal coherence of a poem depends on an external datum: the sociolect (the “mythology” referred to in the previous section). This means that his interpretive enterprise is based not on the discovery of a text, but on the *recognition* of the sociolect reproduced in the text in a complex and unique way.

According to Riffaterre, “carillon” is the word that in Victor Hugo's poem triggers the subsequent chain of words that constitute the text. Riffaterre associates “carillon” with the happy ringing of bells and describes the semantic opposition to “glas” and the melodic contrast between “carillon” and “glas”. He also describes the convergence between musicality, joy, and fantasy that the allegorical representation of “carillon” produces; the metonymic relationship between “carillon” and “heure”, and the transposition of the grammatical feminine into the mythological feminine (Riffaterre, 1983). Riffaterre concludes his analysis by declaring that “what is convincing about this image [...] is, quite simply, the irresistible nature of its verbal “logic”. It is nothing more than a sentence unfolding the semantic potentials of an initial word throughout the entire text” (Riffaterre, 1983). Therefore, the poem is a generative construction because from a word (carillon) a descriptive system of associated words was generated. In this way, the poem is reduced to a linked composition of related words and its interpretation to an exercise in recognizing associations, oppositions, contrasts, convergences, representations, relations, patterns, and transpositions between the lexicon of a poem and the sociolect. That is why, for Riffaterre, the analyst must replace the criterion of truth and similarity with the criterion of “overdetermination”. This criterion occurs when “any possible verbal sequence becomes restricted by the combined rules of three structures: the linguistic code, the thematic structure and the structure of the descriptive system” (Riffaterre, 1983), that is, respectively, the words, the theme, and the subsequent relationships between words narrow the creative and interpretive possibilities and give rise to a unique text. This means that Riffaterre does not necessarily reject the concept of *mimesis* when it comes to literary analysis; he only rejects the mimetic correspondence to reality. Riffaterre's *mimesis* does not fall back on referents, but on verbal forms, “words that we already find in texts” (Riffaterre, 1983) and that are updated and transmuted in the new poem. Each word has had previous uses and is associated with a network of meanings, making the reader appeal to those meanings, and not to reality.

3. The *De Compositione Verborum* and the Teaching of Theory

The *De Compositione Verborum* (dated roughly around the years 20 and 10 B.C.) was written as a birthday present from Dionysus, a professor of rhetoric in Rome, to one of his pupils. This work deals with the art of speech and aims to help young people who aspire to a public

(and political) career, where mastery of oratory is a necessary and fundamental criterion to excel. It also discusses the nature and modes of composition, as well as secrets of "composition not to be found in grammatical rules" (Halicarnassus, 1910). What stands out in this work is the careful interpretation of short passages of texts, resembling a proto-version of what is contemporarily described as *close reading*. Dionysus focuses on the singular and the particular over the general, paying close attention to individual words, their syntax, the order in which sentences unfold ideas, as well as their formal structures. This type of analysis resembles the type of analysis carried out by Riffaterre in his essay on Hugo´s poem since it is also possible to describe that analysis as an example of *close reading*. However, placing them under the same umbrella term does not solve the divergences between them concerning their objectives and results. While Dionysus's concerns are, above all, of an aesthetic nature (or what was considered aesthetic from the 18th century onwards) and have to do with the beauty and rhetorical strength of imitation from other authors, Rifaterre is interested, not in aesthetics, nor in the effect that poems produce in this domain, but in semiosis (the processes through which meaning is produced by the text). In other words, Dionysus is concerned with a *later stage*: with the aesthetic effects on the reader; while Riffaterre is concerned with what happens *before*: how meaning is produced in the text.

In the case of Dionysus, he intended to compose a work that would allow his pupils to learn the art of effective composition. In the case of Riffaterre, it is to expose and instruct the reader (and critic) to obtain a literary analysis that does not deviate from the text or goes beyond it, commenting on all the unique associations that the author produced between the lexicon and the sociolect. Dionysus' position in *De Compositione Verborum* is that readers will reap the rewards of reading it without the need to adopt any particular method of reading *a priori*. At any point in his work does he promote or demonstrate any structural system of closed analysis to justify his teachings or conclusions. Dionysus reads the works of major Greek authors, comparing the use of words and their placement in sentences and verses, to determine which authors should be imitated and what rules and principles govern the composition of those works. Dionysus' use of poems to strengthen his arguments does not presuppose any body of axioms that govern his approach. The conclusions of his *close reading* are not dependent on the application of any particular method. Dionysus is collecting examples of historical, poetic, and rhetorical works, and testing hypotheses in order to share the conclusions acquired with his pupils. The sharing and application of this knowledge is not dependent on the pupils having participated in the investigation itself, although it is dependent on the pupils´ amount of time and attention expended on the study and crafting of texts.

Concerning Riffaterre, there is a slight distinction, since he is not promoting a type of literary analysis *per se*, but *the* literary methodology to be applied to literary works. Paul De Man, in *Hypogram and Inscription: Michael Riffaterre's Poetics of Reading*, raises the issue of compatibility between teaching and theory by asking whether "didactic productivity [is] the reward, so to speak, for the accuracy of theory, or is it the compensation, or the excuse, for certain theoretical foreclosures" (De Man, 1981). Despite the didactic success that De Man recognizes in Riffaterre's method, he does not fail to question what are the criteria that justify the applicability of one theoretical method over another, or no theoretical method at all. Are the conclusions arising from the application of this theory reduced to its self-justification as a valid teaching method, or are they independent of the theory itself, attainable through other methods? De Man believes that Riffaterre solved this problem, stating that "theory and reading sustain each other and are made to dovetail with the skill of a master craftsman" in his work (De Man, 1981). However, this does not seem to be a sufficient answer to the

question posed earlier about didactic productivity, nor to the problem that De Man posed immediately before in his essay, that “it is not at all certain, for instance, that the practical results of the theory, the manner in which it allows one to carry out specific assignments and to read specific texts, can be detached from the theoretical investigation itself and thus made available to those who have not actually taken part in this investigation” (De Man, 1981). This inseparability between the results of a theory and the theoretical investigation itself seems to be one of the reasons that led Riffaterre to declare a distinction between literary and non-literary texts. This distinction also constitutes Riffaterre's response to De Man´s main theoretical difficulty regarding the teaching of literature: “the delimitation of borderlines that circumscribe the literary field by setting it apart from other modes of discourse” (De Man, 1981). If the literary text is distinct from all others, then it requires a specific theory and method, such as Riffaterre's. If there are no borderlines between types of texts, then the application of a theory like Riffaterre's is optional, and Dionysus' approach in *De Compositione Verborum* comes closer to the way readers generally relate to texts (regardless of their concern for aesthetic effects in texts or how meaning is produced in them) - equipped without any kind of theoretical or methodological baggage, although equipped with some specific intention. That intention is what determines the requirements for its teaching: if the aim is rhetoric and aesthetic, it is not necessary any particular method to engage with any type of text; however, if the intent is to analyze the production of meaning, then a methodology and delimitation of borderlines between types of texts becomes a necessity.

4. A Thing or Two About Agrammaticality

In the second chapter, entitled *Composition Defined*, Dionysus declares that “persuasion, charm, or literary power depend” above all on the arrangement of words, as opposed to the choice of words (Halicarnassus, 1910). Unlike Riffaterre, who declares the literary work distinct from other language uses, Dionysus places it under the umbrella of rhetorical composition, both the ability to persuade and captivate and produce literariness. This distances the Riffaterian analysis from the didactic approach that Dionysus applies in his work. If the arrangement of words can be identical, for both persuasive and literary texts, where does Riffaterre's interpretative analysis stand, since it needs to declare the uniqueness of the literary work in order to justify its methodology? Is literariness only to be found in literary texts and persuasiveness only in rhetorical writings? Is it not possible to find persuasiveness in literary writings and literariness in rhetorical texts? Is one of the risks of Riffaterre´s method the removal of several texts that may possess literariness but be not considered literary?

One way of solving the question would be to declare that composing texts of any kind, specifically literary texts, is a vastly different activity from analyzing them. That way, it would be possible to analyze, in a Riffaterian way, all kinds of texts; the delimitation would arise only in the type of text that that analysis would produce. That is the distinction that Paul De Man makes, when referring to Riffaterre's method as containing a “separation [that] extends to the language of literary analysis, which is self-effacing, scrupulous and restricted, and the invention of literary composition: the agrammaticality of the literary text is not tolerated in the commentary” (De Man, 1981). According to De Man, for Riffaterre, the concept of agrammaticality - a kind of potentially subversive lexical free game - is one of the necessary conditions for having literariness. It is also a concept that is not tolerated in any other types of texts, such as literary commentary (one example would be Riffaterre´s reading of Victor Hugo's poem). As such, the analytical text produced automatically generates and implies a fundamental distinction between literary and non-literary texts.

This concept could intersect with Dionysus's teachings on composition, which uses *close reading* of poetic passages to extract rhetorical (and not exclusively literary) teachings, following a model similar to the Riffaterian analysis. They are similar in the sense that both exclude from their analysis any allusions to the "author", to the "circumstances of composition", to the "order in which the poem was written", focusing only on the words, their placement and the relationship between them. Both are throwing away the same allusions, but Riffaterre believes that their removal allows for a particular method of analyzing particular texts and extracting particular knowledge, while Dionysus believes that their removal allows one to look at texts devoid of any theory or method and thus extract practical knowledge. One is striving for specificity, the other for practicality.

However, it is not clear that the concept of agrammaticality itself is a sufficient condition to distinguish a literary text from a non-literary one, since such a concept only arises in a textual analysis that, in order to highlight the agrammaticality of a literary text, needs to use language that is not in itself agrammatical. The circularity of the agrammaticality argument presupposes that there are texts that are distinct from one another, and as such, demand different and particular approaches (i.e. Riffaterre´s method); therefore, self-justifying through its circularity. The question then arises whether agrammaticality is attributed to the poem thanks to Riffaterre's methodology, whether it is an essential constituent of the text, and whether or not it is specific to the literary text and independent of the applied methodological approach.

Dionysus' *close reading* raises the question of whether this agrammaticality can be recognized in other types of non-literary texts and whether a specific analytical methodology is necessary to obtain it. Do we need Riffaterian analysis to recognize agrammaticality in literary texts, or do we need agrammaticality to justify Riffaterian analysis, as well as the subsequent distinction between literary and non-literary texts? The problem lies again with the idea that literary texts are unique and distinct to the point of needing specific methodologies. A possible answer (the Dionysus answer) would be that it depends on the uses the reader gives to the texts and the objectives of those who use them. But more is needed to solve the question of how to judge which methods (and uses) are appropriate to apply, or whether any methods are needed at all. Are the methods that serve the reader's purposes the most appropriate, or the methods most faithful to the work? Or the methods that focus exclusively on the formalist dimension of the work, or those that focus on its content, context, and relationship with other literary and non-literary works? Or the methods that compare literary, historical, and rhetorical texts, as Dionysus does, to teach readers and pupils extra-literary purposes (e.g., civil oratory), or those who focus exclusively on the literariness and have no ambition to go beyond the text? Is it enough to divide between rhetorical readings, aesthetic readings, and semiosis?

5. Grammar and Agrammaticality

The separation between the language of poetry and the "linear language of cognition and mimetic discourse" represents the foundational distinction on which Riffaterre's analytical enterprise is based. He rejects the use of realistic criteria in the interpretation of a text, arguing that comparing poems to reality leads to the tendency to argue about criteria that go beyond the text. Dionysus also came to a similar conclusion but by a different route. When

investigating works by authors on composition and the art of speech, Dionysus, disappointed with the results obtained, decides to turn his attention to nature.[2]

In chapter V of *De Compositione Verborum*, entitled *No grammatical order prescribed by Nature*, Dionysus seeks to demonstrate why he abandoned the investigation line that treated nature as the origin of speech and the best example to imitate. Dionysus initially felt that he should follow "mother nature" to the maximum and link parts of speech according to her promptings: "he should put nouns before verbs, indicating the substance first and then the accident", thus exemplifying the order existing in the nature of things, in which "substance takes precedence of its accidents" (Halicarnassus, 1910). After citing examples from Homer where such an order manifests itself, Dionysus admits that, despite it being an attractive principle, it is not solid enough to ground the teaching of composition on, as any reader would only need to find in Homer's works an equally beautiful sentence ordered in the opposite way to refute this principle. Dionysus also discusses the correct placement of adverbs, whether older things should be inserted in the sentence first, and whether nouns should come before adjectives (Halicarnassus, 1910). For all these cases, Dionysus always found equally beautiful and charming counterexamples in the works of the great authors he analyzed.

At first glance, Dionysus' conclusions bring him closer to Riffaterre's concept of agrammaticality, by showing that there is no fixed order of words and assuming a free game of word placement, with this game being subordinate, for Dionysus, to aesthetic criteria such as beauty. However, the divergence between both authors never fell on the non-identification of agrammaticality in literary texts, but if agrammaticality is strictly found in this type of text. Dionysus, by using poetic, historical, and rhetorical texts to demonstrate certain qualities of high composition, is involuntarily demonstrating that the lexical free play present in poetry is not exclusive to poetry. This means that for Dionysus, the range of influences for a good composition extends beyond literary authors, not dispensing with the criterion of *mimesis*, only directing it towards the imitation of authors considered worthy of such admiration, regardless of the type of composition. The rejection of a grammatical order prescribed by nature means that Dionysus goes beyond Riffaterre's distinction between the language of poetry and the "linear" language of cognition and mimetic discourse: all types of discourse, for Dionysus, involve a lexical game that can be identified, analyzed, learned and applied in different contexts. In Dionysus, there are no disciplinary boundaries as rigid as in Riffaterre: it is possible to identify and imitate ways of ordering words from literary texts and apply them in the composition of rhetorical texts, for example. This could mean that Dionysus' rhetorical approach to texts can be compatible with Riffaterre´s method since he is focusing on prescribing ways of crafting texts, while Riffaterre´s is focused on analyzing them. Even though its compatibility is not in question, the question regarding its utility and relevance in relation to one another remains.

When it comes to rhetoric teachings, it could be claimed there is little that can be gained from adding Riffaterre´s analysis; the same could be said about adding Dionysus´ rhetorical teachings to Riffatere´s analytical approach. However, when the teaching of literature is in

[2] "So I desisted from this inquiry, and falling back upon my own resources proceeded to consider whether I could find some starting-point indicated by nature itself, since nature is generally accepted as the best first principle in every operation and every inquiry. So applying myself to certain lines of investigation, I was beginning to think that the plan was making fair progress, when I became aware that my path of progress was leading me in a quite different direction, and not towards the goal which I sought and which I felt I must attain; and so I gave up the attempt" (Halicarnassus, 1910).

question, and not its composition in specific or its analysis in particular, it could be argued that both approaches combined, but not necessarily mixed, could offer a richer understanding of the universals and particulars regarding literary texts. Reconciling both approaches suggests the possibility of cognitive gain, nonetheless, such an inclusive approach would never manage to dispel the chronic tendency to fall back on subjectivity as a possible criticism. Subjectivity remains a challenge to be overcome when it comes to teaching in the literary world, a result above all of the scientification of the humanities, whose approach requires a universal method for teaching, evaluating, and approaching the greatest number of texts, in the most objective way possible, regardless of the author, the work or even the teacher; the risk, however, is to overlook all the details a text could reveal in the methodless interaction one has with it. Even if the risk is to fall into an interpretation that is as subjective as it is erroneous, it can be argued that one of the purposes of teaching literature is not to necessarily teach a specific method, but to orient students' approaches so as not to fall into the temptation of extreme subjectivity or generic or underdeveloped interpretations.

6. Conclusion - Theory As Reading and Practice

At a certain point in his work, Dionysus rejects most of the existing manuals of rhetoric and dialectics for not having adequately dealt with the selection and order of words;[3] he rejects, too, all self-proclaimed teachers who fail to properly apply the prescriptions advanced in their manuals;[4] and dismisses those who defend the essentiality of what they write to the art of composition but are unable to see what makes composition attractive and beautiful.[5] Dionysus also adds that he invokes dialectic manuals to prevent anyone from considering that these manuals contain anything important, or relevant, to the study of composition.[6] Towards the end of his work, he declares that “no rules contained in rhetorical manuals can suffice to make experts of those who are determined to dispense with study and practice.” (Halicarnassus, 1910). This statement serves to reinforce his original proposition, that even though the ancients (poets, historians, philosophers, and rhetoricians of ancient Greece) had rules and principles governing their composition, for a student to become good at composition, it is not enough to acquire such rules and principles from manuals, but from the close study of the great works themselves. The question here lies in the prescriptive dimension. What makes textbooks on dialectics and rhetoric not worthy of prescription, but *certain* literary and rhetorical works by ancient Greek authors worthy of prescription? The answer seems to lie in the approach applied to the texts used.

When Dionysus claims that rhetoric and dialectic manuals are inadequate, he is arguing that there are no prescriptive shortcuts that can discard the act of careful reading of texts where the best examples of composition are found. The idea that it is enough to read rhetoric and

[3] “The subject has occurred to but few of all the ancients who have composed manuals of rhetoric or dialectic, and by none has it been, to the best of my belief, accurately or adequately treated up to the present time” (Halicarnassus, 1910).
[4] “But why wonder at these, when even those who call themselves professors of philosophy and publish manuals of dialectic fail so wretchedly in the arrangement of their words that I shrink from even mentioning their names?” (Halicarnassus, 1910).
[5] “And yet some of them claimed to make a serious study of this department also, as being absolutely essential to good writing, and wrote some manuals on the grouping of the parts of speech. But they all went far astray from the truth and never even dreamt what it is that makes composition attractive and beautiful” (Halicarnassus, 1910).
[6] “I have cited those manuals on dialectic not because I think it necessary to have them, but in order to prevent anyone from supposing that they contain anything of real service for the present inquiry, and from regarding it as important to study them” (Halicarnassus, 1910).

dialectic manuals (as they contain all the necessary wisdom to know how to compose) is incorrect. If there is nothing in the manuals of rhetoric or dialectics that allows the student to be exempt from study and practice, this means that what is essential is not the prescriptive manuals, theories, and rigorous methodologies, but the kind of practice and study that Dionysus exemplifies in his work. If one follows his reasoning, no manuals of rhetoric or dialectics are necessary because the ancient authors had their own rules and principles manifested in their work: it is only necessary to prescribe to the students the reading and imitation of the ancient authors. This way, through "study and practice", students will incorporate the rules and principles of composition of ancient authors. Rules and principles are not obtained *a priori*, but *a posteriori*, during reading and practice. Dionysus does not need to describe this practice in depth because it is inherent to anyone willing to learn any kind of skill or knowledge proficiently. This practice allows the reader to identify broad characteristics of successful and not-so-successful writers, plus the particulars of each author.

The reason that Dionysus identifies the rules and principles of authors that he considers worthy of imitation is so that other readers will abide by those same principles. However, to what extent does prescribing rules and principles applied by specific authors not constitute the perpetuation of a particular style of composition to the detriment of another equally legitimate imitation? To what extent does this prescription for composition not come close to Riffaterre's analytical prescription, which seeks to present the ideal (and specific) method of interpreting and analyzing a text? In both cases, the claim to universality is discarded: Dionysus presents an interpretation based on a limited number of ancient Greek authors, and Riffaterre a methodology that prioritizes certain dimensions of the text to the detriment of others (while also claiming a distinction between literary and non-literary texts). But while Riffaterre governs his analysis by a set of axioms, Dionysus is clear and explicit in declaring that he does not follow any axioms and only draws conclusions from experience:

> And let not anyone be surprised at my assuming that there are two distinct objects in style, and at my separating beauty from charm; nor let him think it strange if I hold that a piece of composition may possess charm but not beauty, or beauty without charm. *Such is the verdict of actual experience; I am introducing no novel axiom*. (Halicarnassus, 1910)

While not claiming universality, Dionysus roots his results in the unfiltered reading experience. The grammar that Dionysus prescribes in *De Compositione Verborum* is supported by the weight of examples, as well as by the strength of direct analysis, not filtered by any particular methodology. By crossing the authors that he considers the best, Dionysus extracts the conclusions and presents them, without any intention of arguing in favor of any method of obtaining them. The task of carefully reading texts, comparing them, and pointing out conclusions can be described as a universal approach that anyone has *a priori* when relating to a set of texts. Dionysus does not need to be equipped with any methodological baggage to be able to analyze and treat texts in the way he did. This is one of the sharp contrasts with the Riffaterian analysis. Their close readings of poems are similar enough to pose the question of the need to apply any theory regarding the texts being analyzed since the main stance applied in analyzing them (*close reading*) is shared between an author that holds a theoretical approach (Riffaterre) and one who does not (Dionysus).

As much as theory and reading are aligned in Riffaterre, they cannot divert Paul De Man's suspicion that "theory is being controlled by this pragmatic aim rather than by the necessities inherent in its object" (De Man, 1981). It could be argued that Riffaterre is seeking a

theoretical approach that goes beyond close reading, therefore justifying its necessity and uniqueness by the results it generates. However, Rifaterre cannot, in practice, detach from close reading as a practice that spreads beyond the literary field. That is where Dionysus´ *De Compositione Verborum* comes into play. Although in Dionysus the aim of his analysis is grammatical prescription, this purpose does not lead him to develop a specific methodology. His goals are the *unfiltered result of an unbiased reading and analysis* of those he considers worthy of imitation. He willingly makes his enterprise completely dependent on his findings, and not his findings dependent on the theoretical method decided to apply *a priori*. This weak approach to texts (weak in terms of *not* holding a predetermined theoretical framework) consists of attentive reading, comparing texts, testing hypotheses, coping with feedback, plus the handling of any setbacks and breakthroughs inherent in the act of interpretation and composition. This approach is methodologically free, requiring "only" as necessary conditions the attentive reading of works of art, the iterative practice of composition, and time.

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Are Lecturers Teaching and Students Learning in a Post-pandemic Environment: A Case Study at a Business School in South Africa

Nelda Mouton, North-West University, South Africa

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Abstract
Lecturers were confronted with so many changes and new technologies during the Covid-era that it was deemed of utmost important to analyse the different perspectives of lecturers within a Business School, in South Africa. The primary objective of the study was to determine to what extent teaching practices needed to change as well as to determine whether learning could be applied effectively in the working environment. It should be noted that Business Schools lecture students on a post-graduate level and the students already have working experience. Therefore, further soft skills development, based on strong ethical and sustainable values, were core when teaching this specific cohort of students. This case study will follow a qualitative approach within the Social-Constructivist paradigm based on the theory of Interpretivism. Interviews were held with experienced lecturers of a post-graduate programme. These interviews were analysed on Atlas TI to determine themes and sub-themes. It was recommended that more real-life simulations within group cohorts should be utilised. A further recommendation was that Quiltbot and other AI (artificial intelligence) devices impacts negatively on the learning process. Also, students' experiences in the work situation should be shared in the classroom as it impacts on a deeper understanding of the different roles of workers in the workplace which in turn enhances active learning. Implementation of the recommendations could introduce a new way of teaching in a more dynamic classroom environment.

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1. Introduction

Lecturers were confronted with so many changes and new technologies during the Covid-era that it was deemed of utmost important to analyse the different perspectives of lecturers within a Business School, in South Africa. With all the ongoing changes, it seems that the teaching and learning environment also changes constantly. This is even more true when you are faced with a post-graduate group of students who comes from different backgrounds, working environments (if any), and worldviews. With all the available knowledge on Google, YouTube, and different Artificial Intelligence (AI) tools, one needs to question not the quality of teaching, but rather if learning is still taking place in the post graduate classroom. Due to my observations, I realised that we need to look at more innovative teaching methods that will contribute to the learning process.

2. Problem Statement

COVID-19 has significantly altered societal norms, affecting communication patterns, teaching methodologies, virtual team management, and resource allocation (Sokolic, 2022:202). This transformation has also extended to the educational sector, with a notable shift towards online learning. This shift is not merely a temporary response to a crisis; instead, it is anticipated to shape the future of education by expanding access to learning opportunities. The transition to an online teaching and learning environment brings both advantages and challenges that impact both students and lecturers. While previous studies, such as those by Aboagye et al. (2020), have primarily focused on identifying challenges and assessing the effectiveness of online learning from the students' perspective, this study aims to delve deeper. Specifically, the focus will be on evaluating whether lecturers are effectively delivering instruction in this new paradigm and if students are genuinely benefiting from the learning experience.

3. Objectives

The study will address two primary objectives:

- Assessing the extent to which teaching practices have changed in response to the shift to a more online education environment.
- Investigating the effectiveness of learning within the modified teaching environment in the post-pandemic context.

This research seeks to provide valuable insights into the impact and dynamics of teaching and learning which will go beyond the traditional emphasis on challenges in order to explore the actual and real-life implementable teaching and learning experiences gained in the post-pandemic classroom.

4. Literature Review

The literature review aims to provide a contextual understanding of the research topic by exploring the impact of the COVID-19 pandemic on post-graduate education. Additionally, it delves into the transformation from a traditional teaching approach to a digital environment, with a focus on assessing its implications for lecturers to ensure that learning took place. The insights gained from this review will contribute to a deeper understanding of the objectives set forth in this study.

4.1 Overview of the Global Shift to Online Education in Response to the Pandemic

The COVID-19 pandemic posed unprecedented challenges for businesses worldwide, compelling various sectors, including business schools, to reevaluate their service delivery methods. The implementation of social distancing protocols rendered traditional classroom teaching obsolete, necessitating a swift adaptation by lecturers to new work methods that leverage technology. Lecturers were tasked with transferring teaching materials to an online context, prompting the redesign of assessments, the recording of lectures, and the facilitation of synchronous online seminars.

To facilitate this transition, lecturers embraced various online learning platforms such as Learning Management Systems (LMS), MS Teams, Zoom, and Google Classroom (Sudirtha et al., as cited by Hashim et al., 2021). However, this shift was not without its challenges. Lecturers faced the complex task of ensuring that the most relevant content was uploaded to the appropriate digital platforms, tailored to carry specific file types for easy student access (Shava, 2022:359).

Even before the pandemic, business schools were actively engaged in digital transformation efforts, seeking innovative ways to enhance teaching and learning experiences to attract top students, teachers, and researchers. Despite these efforts, many developing countries faced significant obstacles in fully implementing online education, including a lack of experience, inadequate training, and limited resources for delivering online curricula (Sintema, as cited by Mbhiza, 2021).

Key barriers to successful online teaching among academics included reluctance to innovate and change teaching approaches, insufficient institutional support, and work overload (Senik & Broad, as cited by Watty et al., 2016). A critical challenge lay in academics' ability to embrace available technology, cultivating the right attitude and skills for effective use and application of online educational technologies to ensure effective learning (Watty et al., 2016:07).

Overcoming these challenges requires attention to organizational strategy, effective leadership, collaboration, and stakeholder involvement, as these factors are considered crucial for successful digital transformation and overcoming natural resistance to change (Robertson & Lapina, 2022:165).

4.2 Challenges Faced by Lecturers in Adapting to Digital Teaching Methods

4.2.1 Lack of Engagement

According to Mishra et al. (2020:06), lecturers noticed a lack of enthusiasm and attention from students during online classes, and most students are unaccustomed to online learning with smartphones and computers, which often creates a significant setback. However, Le et al. (2022:07) argue that many universities did not have a clear and consistent assessment policy during the COVID-19 pandemic. Therefore, online participation was not assessed as part of student learning. Joshi et al. (2022:08) assert that lecturers who were used to relying on students’ verbal and nonverbal clues during face-to-face classes to gauge students' understanding found it challenging. Mishra et al. (2020:06) further add that lecturers could not read students' faces and moods; thus, it is difficult to change the teaching pattern to suit the needs of the students. In addition, a lack of interaction leads to an inability to determine

learners' psychological and emotional needs and to identify learners' doubts (Rahayu and Wirza, cited by Kamal and Illiyan, 2021). Orhan and Beyhan (2020) further argue that students' lack of interaction contributes to teachers' stress and loss of focus during the teaching process.

4.2.2 Assessment and Academic Integrity

Assessment can be considered the most challenging part of the transition to online learning for an institution used to face-to-face oral or written exams, as the lack of control over the students makes it hardly possible to ensure that students are not using any unethical means (Thapaliya, 2023:45). Plagiarism is an issue of concern in online examination as educators are unable to verify the identity of each examination candidate. The most reported types of cheating are plagiarism and ghost-writing, followed by copying and communicating with others during assessments, with impersonation only occasionally observed. The leading causes of cheating are students' unwillingness to work hard, unclear policies, and poor course content or assessment questions (Mellar, 2018:15).

4.2.3 Workload and Poor Work-Life Balance

The COVID-19 quick transition to online teaching forced educators to re-assess learning objectives and rework large portions of their teaching to align it with the different needs of students. Creating pre-recorded materials contributes mainly to a high workload, which is much more complicated than just preparing and teaching slides. Assessments and marking also increased the educator's workload due to the shift to assessing higher-order learning. Also, the limited ability to observe students during synchronous sessions means that educators must develop new ways of gauging engagement and constantly monitor various inputs. Familiarising oneself with many new technologies and potential pedagogics that could be applied also added to academics' workload (Müller, 2021). Ahlers (cited by Cazan, 2020) adds that digitalisation affects the boundaries between working time and private life, as working with the Internet creates a high expectation that requests will be answered promptly.

4.2.4 Inadequate Professional Development

During COVID-19, educators struggled with technological literacy, which led to an inability to create quality videos and operate the online concept (Rasheed et al., cited by Le et al., 2022). Online education demands significant adaptation, support, preparation, and engagement. (Haleem et al., 2022). Lecturers need ongoing training, particularly with examples of best online teaching practices (González et al., 2023:63).

4.3 Technological Constraints

Mishra et al. (2020:06) argue that the major challenge of online teaching is an unstable network connection. Digital mishaps are also the biggest timewasters in the workplace. During the pandemic, poor technical support and technological infrastructure issues such as outdated audio and video systems, frequent disconnections in Wi-Fi communication, and limited bandwidth negatively affected the quality of work. Infrastructure, accessibility, inclusion, and digital resources are among the issues cited under technological constraints. These constraints influence students' access to online materials and impact how they participate in class and interact with the material (Lucas & Vicente 2022:5092).

5. Research Methodology

This case study adopts a qualitative approach within the Social-Constructivist paradigm, grounded in the theory of Interpretivism. This methodological choice allows for an in-depth exploration of the underlying problems and perceptions related to the experiences of lecturers during the transition from traditional classroom teaching to online instruction (Quinlan et al., 2019:127).

Population and Sampling

The study population comprises 13 lecturers actively involved in the program at the Business School. Inclusion criteria required participants to have prior experience with traditional classroom teaching and to have subsequently transitioned to online teaching in response to the COVID-19 pandemic. To ensure a targeted and focused sample, a purposive sampling strategy (non-probability sampling) was employed.

Data Collection and Analysis

Semi-structured interviews were conducted with the selected lecturers, providing the flexibility to probe deeper into discussions for a clearer understanding and emphasis on specific issues (Adhabi & Anozie, 2017:91). Interview invitations were sent via email, and participants accepted the invitation by signing a consent form. Verbal interviews, conducted on Microsoft Teams, lasted between 30-50 minutes each. Data saturation, indicating that additional interviews would yield redundant information, was reached after 8 interviews. To safeguard participant confidentiality, recordings of the interviews were securely stored in a password-protected file. The analysis of these interviews was performed using Atlas.ti software to identify and categorize themes and sub-themes, ensuring a systematic and comprehensive exploration of the collected data.

6. Thematic Analysis

After completing the coding process, three main themes emerged as illustrated in Table 1.

Table 1: Themes and sub-themes

Themes	Sub-Themes
Teaching delivery changes	Facilitation methods Redefined assessments Technology integration
Perception of quality of education	Teaching competencies and skills Interaction dynamics Plagiarism Poor assessment methods
Effective online teaching practices	Periodic scheduled face-to-face classes Practice engaging and diverse activities Self-development Prior class preparation

6.1 Theme 1: Teaching Delivery Changes

The changes that took place during and after Covid-19, could have an effect on teaching and learning. This theme indicated that delivery changes could have an impact on how lecturers teach and an even greater impact on learning. The sub-themes that emerged were the shift in facilitation methods, redefined assessments, and technology integration.

6.1.1 Facilitation Methods

During Covid-19, all education institutions transformed to some extent. Teaching, assessment, feedback to students, group work, etc had to adapt to an online platform (Mishra et al., 2020). The sudden change forced academics to adapt and to convert teaching methods to an online format. They also adapted to utilising various digital tools to maintain teaching content delivery and to promote student interaction, enhancing their knowledge of course designing and assessment (González et al., 2023:55).

> "I explained the PowerPoints using voiceovers, For the teaching design, I brought in some other things like case studies." (Participant P)

> "We were teaching on Zoom then, and we also had to make recordings, narratives of our PowerPoint presentations." (Participant R)

> "I had to learn new methods of uploading lessons, class activities, class assessments, even the exam." (Participant T)

6.1.2 Redefined Assessments

Participants mentioned that the assessment strategy changed to suit the online environment. Informal assessment, portfolio of evidence, online quizzes, and case studies were adopted. Guàrdia et al. (cited by Adama et al., 2023) mentioned various assessment methods, including essay questions, video recording presentations, and real-world scenarios assessments.

However, participants of this study further revealed that it was challenging to ensure that the assessments were fair and effective. They questioned whether it was on the same standard as in in-person assessments. In a study conducted by Almossa and Alzahrani (2022:9), the participants also found it difficult to create reliable alternative assessment tasks due to the limited time available to prepare and conduct the assessment tasks. Participants also indicated that the lack of time to sufficiently prepare for the new method of assessment contributed further to this to this challenge.

> "The assessments changed that went fully online. And that was quite a challenge to get the tests and quizzes under the knee to see what was built in there." (Participant P)

> "The assessments moved from traditional assessment of pen and paper to continuous assessment, and then to short assessments because the online platform was not convenient for assessment of almost two to three hours." (Participant G)

6.1.3 Technology Integration

According to the participants, the move to online platforms was sudden, and there was little time for academics to prepare. Thus, they could not use the full potential of the available online platforms, but as they became familiar with the technology, they discovered new functions that imitated the traditional classroom environment, such as the use of digital whiteboards. Furthermore, Zoom and chat meetings facilitated planning, collaboration and instruction. García-Morales et al. (2021) mentioned that tools such as Skype, Google Hangouts, Google Meet, email, WhatsApp, and Telegram, were used to maintain contact with students. These tools were also used for workgroups, supervising practical activities, evaluating, and tutoring students, recording explanations etc.

> "First of all, it was a quick decision to use technology and to make that transition. I do not think the academic staff were fully prepared for that, but it is a question of adapt or die." (Participant R)

> "We had to look for software that we could use to create clear recordings and prepare smooth presentation." "Now you have to think of innovative ways, and innovative way of asking questions." (Participant G)

> "We had a lot of Zoom meetings, a couple of chat meetings." (Participant J)

6.2 Theme 2: Perception of Quality in Education

Keeping the title in mind, the next set off questions focussed on the perception of students in an online environment. When lecturers were asked to share their perception on their perceptions of effective online teaching practices as compared to traditional classroom teaching, their responses yielded four sub-themes, viz., teaching competencies and skills, interaction dynamics, plagiarism and poor assessment methods.

6.2.1 Teaching Competencies and Skill

Some participants believed that the quality of teaching solely depends on the lecturers' skills and experience rather than the mode of delivery. Oliva-Córdova et al. (2021) ascertain that efficient online practice application depends on educators' pedagogical and technological competencies. The findings of this study further indicate that a key factor is the educators' capacity to adapt to various learning environments. Certain lecturers found the online setting difficult, particularly those who value in-person communication. However, some educators can function well in an online and a face-to-face (traditional) environment. According to the participants, their views were that when lecturers are flexible, the quality of their teaching remains consistent.

> "The quality of teaching is inherent to the lecture. Whether you're doing it online or face-to-face, if you have the skills of engaging the people, facilitating, then it doesn't affect you." (Participant S)

> "I don't think the quality of teaching is compromised at all. I think a person can do it if they are good at what they do at teaching. It doesn't matter whether it's online or face-to-face. I want to think that the quality of teaching is still the same, and

depending on who renders what. And I'll say why, some lectures do have difficulty to adopt to online environment." (Participant B)

"But I think it depends on the approach of the lecturer. If you just share theories with people and they don't apply it and they don't reflect, then it's worthless." (Participant R)

6.2.2 Interaction Dynamics

The participants emphasised that interaction plays a major role on teaching quality. Online teaching has some limitations, as it reduces physical interaction between the students and the lecturer, and these challenges impact negatively on classroom communication, engagement, and assessment. Smaller classroom groups can be considered as an option to mitigate this. However, it is not cost-effective. Jaggars et al. (2013) (cited by Singh and Matthees. 2022) add that interpersonal interaction between students and lecturers may improve students' academic performance on class activities and assignments. Students whose lecturers had little interaction with the class had lower grades when compared to classes where the educators interacted with students regularly (Participant D).

"During contact that discussions and that laughter and stuff that you have inside a classroom bring more, much more. It's an add-on to what we already had." (P2)

"You cannot under value human interaction on face-to-face. It is the most effective communication and knowledge sharing platform." "With online, you can't see whether they are learning." (Participant K)

"I don't think lecturers will compromise on quality at any given time. What is compromised is the quality on the feedback, direct feedback." (Participant N)

6.2.3 Plagiarism

The findings raise concerns regarding the validity of assessments in an online learning environment. There have been claims that students are using consultants to complete assignments on their behalf. Multiple choice questions are also said to compromise the security of assessments. Plagiarism has been made worse by the ease with which information and resources can be accessed online and by technological advancements in AI. No adequate resources are available to track and validate student work efficiently. Selelo (2021) postulates that, in an online learning environment, students are always free to consult any material or resources that could assist them in passing their academic assessments. Plagiarism undermines and compromises the quality of education.

"There is allegation is that some of the students use consultants to do their assignments." (Participant R)

"I think plagiarism it's going to be a bigger problem in future because of the online environment and artificial intelligence." (Participant R)

"Looking at the integrity, whether the student is cheating and all those things, yes, at some point because we haven't got the resources that would monitor to such a level

that we are confident that the students are doing the job by themselves." (Participant G)

6.2.4 Poor Assessment Methods

The participants emphasise that multiple choice assessments may not adequately assess the student's critical thinking, complex, and analytical skills suitable for a postgraduate level. According to Arend (2009), unfamiliar teaching methods and techniques in online environments can cause even more uncertainty about the best methods for encouraging critical thinking.

> "The online assessment, it mostly focuses multiple choice, those types of assessment, they are okay, suitable for first year students. But now when you move to postgrad it becomes a problem." (Participant 9)

Participants were further concerned that students in an online environment won't have enough opportunities to practice and improve the skills such as discussions and debating, which are skills mostly developed through direct or physical interaction with peers and instructors.

> "It's a problem. At the end of the day, they can't even speak. They can't even discuss. They can't even have an argument. They don't even understand what they are doing because with this online thing." (Participant J)

6.3 Theme 3: Effective Online Teaching Practices

In order to ensure that quality teaching takes place, a set of questions dealt with the effectiveness on teaching practices. This theme comprised of sub-themes, viz., periodic scheduled face-to-face classes, engaging in diverse activities, self- development and prior class preparation.

6.3.1 Periodic Scheduled Face-to-Face Classes

The participants mentioned that incorporating scheduled face-to-face sessions into an online model will assist in creating a more engaging, dynamic and effective educational experience and foster a sense of belonging among students. According to the participants, this approach will provide students a platform to meet and share experiences, often lacking in an online setting. This also assists in familiarising students with the digital tools they will be using, which can help mitigate challenges and confusion once the course begins. Heng and Sol (2020) state that lecturers should host welcoming forums to enhance interaction and relationship building for a successful online education.

> "I think we need some specifically scheduled face-to-face sessions. We need some official networking opportunities for the students, where we give them the opportunity to meet other people, to share their experiences. The first recommendation I can think of is you should coach and guide your students very well before you start. They must know what to expect and what not to expect." (Participant D)

> "If there was a way that they could have one contact session, maybe a month or so before lessons begin, where they can be taught how to operate efundi." (Participant T)

> "you've got to have a very, very, very good orientation to sort out the expectations." (Participant K)

6.3.2 Engaging and Diverse Activities

According to the findings, participants emphasised the use of various strategies such as case studies, breakaway rooms, visuals and advertisements, music and marketing techniques, marketing tactics, practical sessions, and hands-on Learning to encourage student engagement and to create a learning experience that is both enjoyable and effective. González (2023) emphasised that video conferencing embedded chat tools, online surveys, and online group breakaway rooms emerged as critical tool for promoting interaction. Orhan and Beyhan (2020) further argued that student feedback can help improve online teaching and participation. Some of the participants responded as follows:

> "I used all means visually to keep the attention on the screen. And I started using visuals, adverts, and then also mimic marketing where I use music. Then I developed a practical session." (Participant R)

> "Implement innovative methods to get the students involved even if you can't see them." (Participant P)

> "I've implemented certain strategies to get more engagement: short case studies, discussions, comprehensive case studies, quizzes in class, breakaway sessions." (Participant R)

6.3.3 Self-Development

The participants highlighted that continuous learning is key for educators to provide an effective and engaging online learning experience. This approach also ensured that online education remains a viable, convenient, and high-quality option for learners.

> "We will need to keep abreast with the latest trainings on how to keep the online audience engaged. from time to time, we must find new ways of improving." (Participant S)

> "Attend Efundi course {this is the LMS used by the business school} so that you can know how to use more of this platform functions, at the end it benefits all of us." (Participant P)

6.3.4 Prior Class Preparation

The participants emphasised the importance of thorough preparation in online teaching, especially when dealing with adult learners. Educators must have the materials and tools ready well before class commences, along with a strong orientation program. This will assist in setting clear expectations and avoiding potential issues.

> "You must be so much better prepared." (Participant K)

> "You've got to have your tools and your processes available before the classes start, at least a month before the classes start. because we've got adult students they can work through the material." (Participant K)

7. Recommendations

After analysing the themes and sub-themes the following recommendations are made:

Theme 1

- The hybrid method of teaching and learning is to the benefit of both the student and the lecturer. The main focus should be on continuous commitment on both sides and ensuring that the LMS is continually accessed by especially the lecturer. This proves vital in keeping the students motivated and providing them with constructive feedback.
- Assessments should not only focus on multiple choice. Some lecturers state that higher order thinking is also challenged. The crux is that assessment must address various skills and use various methods to tests skills.
- Technology is core. Therefore, students should be provided with in-depth training of the LMS prior the first class. This can be done during the block session and providing short video-clips for guidance on specific areas.

Theme 2

- It is advised that there should be sessions prior and after a semester where lecturers can reflect on their own competencies and skills. This will provide excellent opportunities for lecturers to learn from one another and also be trained in new technologies.
- Interaction, whether online or contact, will act as motivation for both students and lecturers. It is crucial that communication should not be one-sided and that various strategies should be utlised to get students involved in interaction.
- Plagiarism remains an ongoing problem and will increase with the use of AI. Therefore assessment must be structured in such a way that active learning is tested.
- As to avoid poor assessment methods, lecturers should be trained and encouraged to use different methods.

Theme 3

- Hybrid classes are recommended. Real-life contact sessions are highly recommended as students need time to familiarise them with the lecturers, peers and the surroundings. It will alleviate the stress factor in students and make them more comfortable to interact with the lecturer and each other.
- As said, diverse activities are keys to keep students motivated and engaged throughout the semester. This will also indicate their progress in a specific module which will act as a further motivator to engage throughout.
- Students feel motivated if they can achieve goals that were not possible when they started. Their self-development will be enhanced in their own personal lives and in the workplace.
- Therefore, a good structured LMS and class preparation are the key to success.
- It was recommended that more real-life simulations within group cohorts should be utilised. A further recommendation was that Quiltbot and other AI (artificial intelligence) devices impacts negatively on the learning process. Also, students'

experiences in the work situation should be shared in the classroom as it impacts on a deeper understanding of the different roles of workers in the workplace which in turn enhances active learning.

8. Limitations

This study only focussed on a specific cohort of students within a business school. Furthermore, the students are post-graduates and they are expected to function on a higher level than undergraduate students. Therefore, the outcomes of the study can be used by other business schools but it may not be applicable to undergraduate studies.

9. Conclusion

In this article it was demonstrated that teaching practices need to be revised regularly and technology and needs of students change more often than in the past. An online education and hybrid environment can add value to the teaching and learning process and has many advantages for institutions and students. It is an area that should be explored annually as institutions need to stay cost-effective, offer quality education and offer lecturers who are committed to the changing environment within higher education.

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Gender-Responsive Library Using Classical Music: An Intervention Tool to Improve Students' Reading Comprehension

Sittie Wanifah C. Dangcogan, Mindanao State University-Iligan Institute of Technology, Philippines
Adelfa C. Silor, Mindanao State University-Iligan Institute of Technology, Philippines
Jamil S. Molia, Mindanao State University-Iligan Institute of Technology, Philippines

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Abstract
The purpose of this research study is to determine and analyze if classical music can help make the library be gender-responsive place and can help improve the reading comprehension of the students. Due to covid-19 pandemic, the research team was not allowed to travel to gather data. So, qualitative design was used in this study through interviews using Google Meet, and open-ended questions through messenger and emails. Thus, qualitative was used because qualitative research targets conveying meaning and comprehension via detailed description. Since this study was using qualitative design, so there were only twenty (20) participants who answered the six (6) open-ended questions. So, purposive random sampling was used in choosing the participants. They were chosen as music participants. Content and thematic analysis were used in analyzing the data. Findings reveal that classical music inside the library has benefits to human psychology such as increased physical performance, getting the quality sleep the body needs, easing chronic pain naturally, improved mood and lower stress, and boosting brainpower. Thus, listening to classical music is also a therapy. Then if the body and soul of the readers become healthy, this leads to effective reading comprehension for all library users. Hence, the library using classical music becomes gender-responsive and inclusive.

Keywords: Classical Music, Gender-Responsive Library, Human Psychology, Inclusive, Reading Comprehension

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Introduction

Gender dynamics permeate every facet of human activity, and libraries, as repositories of knowledge catering to a diverse clientele, are key sites where attitudes toward information utilization are shaped. According to Danbabale (2015), studies reveal intriguing patterns: Young women frequent libraries more than their male counterparts, and single women surpass married women in library visits. These trends suggest that the library environment may contribute to gender disparities among students. Moreover, factors like library anxiety, as noted by Smith (2015), further complicate this correlation. Library anxiety, characterized by negative emotions towards library spaces, can impede library usage for both genders (Onwuegbuzie, Jiao, & Bostick, 2004), potentially deterring students from utilizing library resources effectively. Consequently, disinterest in spending time in libraries exacerbates challenges like poor reading comprehension among learners, underscoring the multifaceted nature of gender inequality in educational environments.

Recent research suggests that students exhibit a favorable inclination toward incorporating music into their study routines. This revelation aligns with the prevailing trend among students who frequently enjoy listening to music (Kumar, Wajidi, Chian, Vishroothi, Ravindra, & Aithal, 2019). It's well-established that students' emotional states significantly influence their ability to comprehend texts, and employing tools like music to cultivate a tranquil atmosphere can profoundly bolster their learning outcomes (Bird, 2017). Thus, integrating music into study environments emerges as a promising strategy to optimize students' cognitive processes and foster a conducive atmosphere for effective learning.

The proposed research study finds support in existing literature, as noted by Wadania (2017), who highlights the positive impact of classical music on students' motivation for reading comprehension. This endorsement underscores the potential for educators to leverage classical music as a tool to enhance student engagement and enthusiasm toward reading. Furthermore, Khaghaninejad, Motlagh, & Chamacham (2016) contribute to this discourse by emphasizing the beneficial effects of exposing students to music, particularly Mozart's compositions, in improving reading comprehension and aiding in the interpretation of textual meaning during silent reading sessions.

Moreover, integrating music into the classroom environment holds promise for enhancing student productivity, as elucidated by White (2007). This enhanced productivity manifests in various advantageous outcomes, including heightened focus, increased retention of material, improved academic performance, elevated concentration levels, and expedited learning processes. Thus, the incorporation of music as an instructional tool not only enriches the learning experience but also cultivates a conducive atmosphere for academic growth and achievement.

Music serves as a versatile tool in educational settings, capable of eliciting desired emotional states, enhancing physical movements, boosting energy levels, evoking nostalgia, and facilitating relaxation and focus. As Dinsmore (2003) highlights, students often articulate that soft music engenders feelings of comfort, concentration, and relaxation. This sentiment underscores the potential of music to create a conducive learning environment conducive to improved academic performance.

When students are relaxed and focused, they exhibit better task retention and completion rates. Music not only helps drown out distracting background noises but also establishes a

continuous supportive atmosphere. Consequently, it mitigates student frustration levels, enabling them to execute tasks with efficacy and efficiency, thereby enhancing overall academic achievement (White, 2007).

The utilization of music has consistently demonstrated its efficacy in increasing students' comfort levels, and concentration, minimizing distractions, and fostering a sense of calmness, all of which contribute to improved academic performance (White, 2007). Hence, integrating music into educational practices holds promise for optimizing learning environments and promoting the academic success of diverse student populations.

The effectiveness of utilizing classical music to enhance students' motivation in reading comprehension is underscored by Wahdania (2017), who advocates for its integration into teaching practices as a means to bolster student engagement and enthusiasm. Similarly, Bird's (2017) study provides empirical support for the positive effects of music on reading comprehension.

The proposed research title, "Gender Responsive Library Using Classical Music: An Intervention Tool to Improve Students' Reading Comprehension," addresses a significant gap in the existing literature. While there is extensive research on the impact of music on learning outcomes and the role of libraries in education, there is a notable lack of studies specifically examining the intersection of gender dynamics, classical music usage, and reading comprehension within library settings. This gap is particularly relevant given the growing understanding of how gender influences students' educational experiences and outcomes.

Existing studies have highlighted the importance of considering gender differences in library usage patterns and the impact of environmental factors, such as music, on students' learning experiences. For example, research by Danbabale (2015) and Smith (2015) has demonstrated gender disparities in library attendance and the potential influence of library environments on students' attitudes and behaviors. Additionally, studies by Wadania (2017), Bird (2017), and White (2007) have shown the positive effects of classical music on motivation, reading comprehension, and overall academic performance.

However, despite these insights, there is a lack of research specifically examining how the use of classical music in library settings may differently affect male and female students' reading comprehension and motivation. This gap is significant because it overlooks potential gender-specific responses to music and its impact on learning outcomes. By focusing on this gap, the proposed research aims to provide valuable insights into how libraries can be more responsive to gender differences in students' learning needs and preferences.

Theoretical Framework of the Study

This research study is grounded in educational policies such as CHED Memo 01 s. 2015 Part V, which emphasizes the development of gender-responsive curricular programs. By aligning with this directive, the study aims to contribute to creating an inclusive and supportive environment within libraries, particularly by utilizing classical music to enhance students' motivation for studying and reading. It recognizes the importance of catering to the diverse needs of male and female students and acknowledges that a gender-responsive approach is essential for optimizing the effectiveness of library resources and services.

Furthermore, the study draws upon the concept of "The Mozart Effect," a psychological theory suggesting that children may experience enhanced cognitive functions when exposed to the music of Wolfgang Amadeus Mozart. While early studies indicated short-term improvements in cognitive functions among children, the broader implications of this theory remain significant. By exploring the potential cognitive benefits of classical music, particularly within the context of library environments, the research aims to contribute to the ongoing discourse on effective educational interventions and strategies.

In the context of this study, the principles of situated learning theory underscore the significance of creating learning environments within libraries that mirror the real-world contexts in which students will utilize their reading comprehension skills. By integrating classical music into the library environment, which serves as a common space for collaborative learning and scholarly pursuits, educators can enhance the authenticity of the learning experience and promote deeper engagement among students.

Literature Review

The library, often regarded as a repository of knowledge, plays a pivotal role in facilitating the acquisition of information across various domains. As Danbabale (2015) highlighted, gender dynamics permeate every facet of human endeavor, and libraries serve as critical spaces where these dynamics intersect. Catering to a diverse clientele that includes individuals of different genders, libraries function as custodians not only of information resources but also of the attitudes and behaviors of their users.

Classical music has garnered attention for its potential to positively impact students' motivation and comprehension abilities. Kumar et al. (2016) underscore the widespread preference among students for studying music, reflecting a broader trend of music enjoyment within student populations. Moreover, Wadania (2017) emphasizes the beneficial effects of classical music specifically, highlighting its ability to enhance students' motivation for reading comprehension. This endorsement suggests that incorporating classical music into educational practices could serve as a valuable tool for educators seeking to inspire and engage their students.

Further insights into the physiological effects of music come from Gagner-Tjellesen et al. (2001) as cited by Osmanogluo & Yilmazy (2019). Their research suggests that listening to music may stimulate alpha waves in the brain, promoting relaxation and potentially reducing pain. Moreover, music can trigger the secretion of endorphins, leading to physiological responses such as lowered blood pressure and pulse rates (Yıldırım & Gürkan, 2007; cited in Sezer, 2011 as cited by Osmanogluo & Yilmazy, 2019). These findings highlight the intricate relationship between music, cognitive processes, and physiological well-being, further supporting the notion that classical music can serve as a potent motivator for students' comprehension and learning endeavors.

Recent research findings suggest that the incorporation of music into learning environments can significantly enhance students' reading comprehension skills. Bird (2017) demonstrates that exposure to instrumental versions of contemporary music led to notable improvements in students' reading comprehension. Furthermore, these instrumental pieces proved to be particularly beneficial for students experiencing anxiety, indicating that music can be a powerful tool for mitigating negative emotions and creating a conducive learning atmosphere.

The impact of music on reading comprehension extends beyond contemporary compositions.

Therefore, integrating music into educational practices emerges as a promising strategy for fostering a conducive learning environment and optimizing students' learning outcomes.

The relationship between music and other academic disciplines has long been recognized and explored within educational contexts. Former President Bill Clinton once remarked that comprehensive music and arts programs in schools enhance learning across various domains, including mathematics and reading (Mark, 2002, as cited in Bergee & Weingarten, 2020). This sentiment is echoed by a substantial body of research, which has consistently identified correlations between music education and academic achievement.

Numerous studies have highlighted these connections across different age groups, from young children to high school students. For instance, research by Crncec et al. (2006), Lessard & Bolduc (2010), and McDonel (2015) has demonstrated the positive impact of music education on academic performance among young learners. Similarly, studies involving middle school students (dos Santos-Luiz et al., 2016) and high school students (Cox & Stephens, 2006) have yielded consistent findings, further corroborating the beneficial effects of music engagement on academic outcomes.

Moreover, scholars such as Bamberger and diSessa (2003) argue that music, when approached as a response to coherent musical structures, can serve as a rich context for eliciting and perceiving mathematical concepts. In the realm of reading, research suggests that exposure to music helps students from low socioeconomic backgrounds maintain age-appropriate levels of reading performance, surpassing matched groups who did not receive similar experiences (Slater et al., 2014).

The impact of active engagement with music on academic achievement has garnered increasing attention globally. Hallam and Rogers (2016) highlight a growing body of international evidence supporting the notion that involvement in music can positively influence academic attainment. One possible explanation for this effect lies in the multifaceted nature of active music-making, which provides students with opportunities to develop various aspects of their learning.

Burton, Horowitz, and Abeles (1999, as cited in Hallam & Rogers, 2016) proposed a taxonomy of eight general areas wherein active music-making can facilitate learning. These areas encompass a broad spectrum of cognitive and emotional processes, including the expression of ideas and emotions, heightened perception and focus, the establishment of connections between diverse forms of knowledge, and the construction of new meanings. Additionally, active music-making fosters the ability to understand multiple perspectives, envision new possibilities, and engage in sensory learning experiences.

Listening to music as a strategy to alleviate stress has become increasingly prevalent among students engaged in demanding cognitive tasks such as studying, completing assignments, or reading and writing (Dolegui, 2013). This widespread practice underscores the potential role of music in modulating emotional states and enhancing cognitive performance. However, while the effects of music on cognitive function have been extensively studied, the findings have yielded mixed results.

On one hand, research such as that conducted by Cockerton, Moore, & Norman (1997) as cited by Dolegui (2013) has suggested that music can indeed improve cognitive performance by potentially enhancing focus and reducing anxiety. Conversely, studies such as those by Furnham & Bradley (1997) as cited in by Dolegui (2013) have presented conflicting evidence, suggesting that music may act as a distracting factor during cognitive tasks.

Music therapy, as defined by the World Federation of Music Therapy (WFMT), entails the professional use of music and musical elements to enhance the quality of life and well-being of individuals, groups, families, or communities across various domains, including physical, social, emotional, spiritual, and intellectual health (WFMT, 2011, as cited by Osmanogluo & Yilmazy, 2019). This holistic approach to therapy recognizes the profound impact that music can have on individuals' lives and underscores its potential as a therapeutic intervention in both educational and medical settings.

Indeed, music has been shown to yield positive therapeutic effects for individuals facing various challenges, including autism, stress, depression, and physical disabilities. Studies, such as that cited by Çan & Altınköprü (2013), indicate that music therapy can evoke emotional responses, facilitate movement, and promote overall well-being among individuals with diverse needs.

The music we immerse ourselves in has a profound impact on our inner world, shaping our emotions and influencing our psychological state. It has the power to evoke feelings of happiness, creativity, and enthusiasm, fostering positive thinking and even serving as a therapeutic remedy for mental illnesses stemming from anxiety and stress. Certain modes, styles, and rhythms of music, spanning classical, jazz, pop, and mysticism, among others, have been observed to possess spiritual and physical healing properties for both humans and other living organisms (Osmanogluo & Yilmazy, 2019).

An extensive review of relevant literature reveals a consensus regarding the positive effects of classical music on human psychology, particularly in reducing anxiety and stress and promoting overall well-being (Osmanogluo & Yilmazy, 2019). Classical music, originating from Europe, is characterized by its polyphonic nature and association with high cultural sophistication, distinct from Eastern and western folk traditions (Osmanogluo & Yilmazy, 2019). Despite its historical origins, classical music transcends cultural boundaries and remains a cherished genre appreciated by music enthusiasts worldwide.

Within the realm of psychology, the effects of music on the human organism have been a subject of keen interest (Osmanogluo & Yilmazy, 2019). Classical music, in particular, has emerged as a focal point in research investigating the relationship between music and psychology, surpassing other genres in its prevalence as a variable in relational surveys (Osmanogluo & Yilmazy, 2019). Scientists have explored the effects of classical music across various species, spanning humans, animals, and even plants, underscoring its universal appeal and potential impact on diverse forms of life (Campbell, 2002, as cited by Osmanogluo & Yilmazy, 2019).

Moreover, while listening to lyrical music during study sessions may hinder cognitive encoding, empirical research suggests that instrumental classical music poses no such impediment. Studies by Jäncke et al. (2014) and Harmat et al. (2008, as cited in Gao, Fillmore, & Scullin, 2020) have shown that instrumental classical music neither interferes with encoding processes nor disrupts nighttime sleep. Therefore, instrumental music emerges

as a promising tool for facilitating Targeted Memory Reactivation (TMR) without compromising cognitive performance.

Considering the potential effectiveness of instrumental music as a TMR tool, it presents an ideal candidate for widespread implementation in educational settings (Gao, Fillmore, & Scullin, 2020). Recent meta-analyses on TMR have revealed varying trends in its effects across genders, suggesting that individual differences may play a role in its efficacy (Hu et al., 2020, as cited in Gao, Fillmore, & Scullin, 2020). Moreover, research at the intersection of music, arts, and brain sciences has indicated gender-specific differences in music processing, with females demonstrating more efficient processing and better association and recognition of familiar music compared to males (Cheever et al., 2018; Koelsch et al., 2003; Feizpour et al., 2018; Fancourt et al., 2016; Miles et al., 2016, as cited in Gao, Fillmore, & Scullin, 2020). This finding suggests that musical cues may serve as particularly strong retrieval cues for females, further underscoring the potential utility of instrumental music in educational contexts.

Gender differences in music processing offer valuable insights into the observed robust effects of classical music TMR in females (Gao, Fillmore, & Scullin, 2020). Two distinct mechanisms shed light on why classical music TMR effects appear particularly pronounced in females.

Firstly, females demonstrate superior multitasking abilities compared to males, allowing them to maintain cognitive performance levels even while listening to music (Fancourt et al., 2016; Feizpour et al., 2018, as cited in Gao, Fillmore, & Scullin, 2020). This suggests that females may be more adept at studying effectively in the presence of music, a crucial prerequisite for the success of TMR interventions (Creery et al., 2015, as cited in Gao, Fillmore, & Scullin, 2020). The ability to engage in cognitive tasks while listening to music enhances the likelihood of successful memory reactivation during sleep, thus amplifying the efficacy of TMR in females.

Secondly, females exhibit superior proficiency in recognizing familiar music compared to males (Miles et al., 2016, as cited in Gao, Fillmore, & Scullin, 2020). This implies that when familiar classical music is played during slow-wave sleep (SWS), females' enhanced ability to efficiently recognize the music facilitates the reactivation of associated educational content (Gao, Fillmore, & Scullin, 2020). The robust recognition of familiar musical cues serves as a potent trigger for memory reactivation, consolidating learning material and augmenting the effectiveness of TMR interventions in females.

The incorporation of classical music TMR (Targeted Memory Reactivation) has shown promising results in enhancing performance on knowledge-transfer questions in subsequent day tests. While some studies have suggested that females may derive particular benefits from classical music TMR, definitive conclusions regarding gender-specific effects necessitate further investigation through additional testing. Moving forward, it is imperative to embark on future research endeavors that converge at the intersection of music, memory theory, and neuroscience. Such interdisciplinary studies hold the potential to not only optimize educational outcomes but also bridge existing achievement gaps in STEM (Science, Technology, Engineering, and Mathematics) learning (Gao, Fillmore, & Scullin, 2020).

Historically, research by Hall (1952, as cited in Harmon, Troester, Pickwick & Pelosi, 2008, p.41) suggested that music could enhance cognitive abilities. Conversely, Fogelson (1973, as

cited in Harmon, Troester, Pickwick & Pelosi, 2008, p.41) proposed that music might interfere with complex cognitive processes, albeit not with simpler ones. However, a significant study in 2004 by Jackson and Tluaka (as cited in Harmon, Troester, Pickwick & Pelosi, 2008, p. 41) highlighted the potential relationship between specific music genres, such as classical music, and learning.

Moreover, research involving college students, as illustrated by Jones, West, & Estell (2006, as cited in Harmon, Troester, Pickwick & Pelosi, 2008, p. 41), revealed a correlation between individuals' alertness levels and their preference for music or silence. Notably, listening to Mozart's music was associated with heightened alertness, a phenomenon coined as the Mozart Effect. This effect postulates that exposure to Mozart's compositions can enhance spatial abilities (Harmon, Troester, Pickwick & Pelosi, 2008, p. 41), potentially attributed to an increase in alpha wave activity, which is conducive to improved learning (Harmon, Troester, Pickwick & Pelosi, 2008, p. 41).

Despite these findings, studies on the Mozart Effect have yielded inconsistent results, with some failing to demonstrate a significant increase in cognitive abilities (Harmon, Troester, Pickwick & Pelosi, 2008, p. 41). Nevertheless, the relationship between music and learning remains a topic of ongoing interest among researchers, particularly within the educational community.

Methodology

As a result of the COVID-19 pandemic and the associated restrictions on travel, the research team faced logistical challenges in gathering data using traditional methods. Consequently, a qualitative research design was adopted for this study, employing remote methods such as interviews conducted via Google Meet and open-ended questions delivered through messenger platforms and emails.

Qualitative research was deemed appropriate for this study due to its emphasis on capturing nuanced meanings and deep comprehension through detailed descriptions. Unlike quantitative approaches that primarily focus on numerical data and statistical analysis, qualitative research delves into the richness of human experiences, providing insights into complex social phenomena. In educational research, in particular, qualitative methods are invaluable for exploring multifaceted issues and gaining a deeper understanding of the intricate dynamics within educational settings.

By embracing qualitative methodologies, this study aimed to unravel the intricacies of educational issues, shedding light on the perspectives and experiences of individuals within their real-life contexts. Through qualitative inquiry, researchers can unearth the underlying meanings and interpretations that individuals attribute to their lived experiences, offering valuable insights that quantitative methods alone may not capture.

Overall, qualitative research serves as a powerful tool for navigating the complexities of educational landscapes, allowing researchers to uncover rich insights and generate meaningful interpretations that contribute to the advancement of knowledge and practice in the field of education.

Given the qualitative nature of this study, a total of twenty participants were selected to respond to a series of six open-ended questions. Purposive random sampling was employed in

the selection process, targeting individuals with a keen interest in music. Specifically, participants were recruited from various music-oriented groups, including church choirs, bands, and related singing organizations.

Before participating in the study, all potential participants were provided with detailed explanations of the research objectives and procedures. Informed consent forms were presented, outlining the purpose of the study and the rights of the participants. Only those who willingly consented to take part in the research and affixed their signatures on the consent forms were included as participants.

To analyze the responses gathered from the music-minded participants, content and thematic analysis methodologies were employed. This involved systematically examining and interpreting the content of the participant's responses to identify recurring themes and patterns. By employing rigorous qualitative analysis techniques, the study aimed to provide comprehensive insights into the perspectives and experiences of individuals with a passion for music.

Results and Discussions

Theme 1: The Dominance of Female Presence in Libraries: Motivation, Environment, and Stereotypes

This theme means that female students are more likely to stay in the library due to their intrinsic motivation, preference for a conducive environment, and gender stereotypes regarding their academic diligence, despite potential disparities in enrollment and usage.

Theme 2: The Impact of Learning Styles and Motivation on Millennial Library Engagement

This theme highlights how the diverse learning styles and varying levels of motivation among millennials influence their engagement with libraries, emphasizing the importance of understanding these factors to effectively promote library use among this demographic.

Theme 3: The Influence of Classical Music on Library Study Motivation: Insights From Music-Minded Participants

This theme explores how classical music influences study motivation in the library, as perceived by music-minded individuals, suggesting that classical music can enhance concentration, relaxation, and overall motivation for studying.

Theme 4: The Impact of Classical Music on Reading Comprehension: Balancing Perceived Benefits With Differing Perspectives

Classical music is perceived as enhancing students' reading comprehension by promoting relaxation, mood improvement, and clarity of thought among participants, despite differing opinions on its effectiveness.

Theme 5 Fostering Gender-Responsive Libraries: Implementing Inclusive Practices and Equal Access

This theme emphasizes the importance of implementing inclusive practices and ensuring equal access in libraries to foster gender responsiveness. Suggestions from participants include gender equality seminars, providing gender-inclusive spaces, offering 24/7 access to all genders, and creating sections for LGBTQ+ literature. Such measures aim to create a

welcoming and supportive environment for individuals of all gender identities, reflecting a commitment to respect, equality, and inclusivity within library settings.

Conclusions

This study unveils significant findings across various critical areas. Firstly, it sheds light on gender imbalances in student enrollment, emphasizing the necessity of equal representation to attain gender equality in education. Secondly, participants attribute changes in study habits to increased internet access, prompting calls for efforts to enhance library appeal and cater to diverse learning styles. Additionally, participants acknowledge the positive impact of classical music on comprehension and well-being, advocating for its integration into library environments to benefit all users. Moreover, the study underscores the importance of gender sensitivity training and the creation of inclusive spaces within libraries to meet diverse user needs. Lastly, views vary on how classical music influences reading comprehension, suggesting the influence of individual preferences, learning styles, and cultural factors. In conclusion, addressing gender disparities, promoting inclusivity, and leveraging the benefits of classical music can enhance library environments, rendering them more responsive and inclusive for all stakeholders.

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Visual Literacy Ability of Design Students in Virtual Class Settings

R.A. Dita Saraswati, Bandung Institute of Technology, Indonesia

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Abstract
The condition of design education in Indonesia today has changed with the presence of ICT in the learning process and the popularity of implementing online learning. With the government's policy to implement Hybrid Learning successfully, studio based-learning in design students, which usually uses face-to-face learning processes, has partially moved into a virtual space. Visual literacy is everything about understanding, using, thinking, and expressing through images. Visual literacy is vital in understanding basic design in the Visual Communication Design study program. This research seeks to examine visual literacy in virtual learning spaces, in the phenomenon of online learning in higher education in the field of visual communication design, which primarily uses studio-based learning, namely methods that prioritize design stages with direct experience, lecturer directions, and collaboration between individuals in a studio room. By conducting qualitative research using survey methods, interviews, and discussions with students participating in studio classes and reviewing the latest visual literacy theories, the conditions in the virtual studio room changed visual understanding, which was limited to computer screens. This preliminary research can contribute to the design of instructional media, understanding the concept of virtuality in the studio space, and applying hybrid learning to design education in the future.

Keywords: Higher Education, Studio Based Learning, Virtual Classroom, Visual Communication Design, Visual Language, Visual Thinking

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Introduction

Since 2016, through the Creative Economy Ministry, the Indonesian government has launched a creative economy policy as the backbone of the country's economy. The Ministry is encouraging all its creative sub-sectors to accelerate. With 16 sub-sectors, Visual Communication Design (VCD) is one of the fields designated by the government (Kemenparekraf, 2016). With government instruction, the education sector also continues to strive to develop higher education, provide an intake of workers in creative fields (Kemenparekraf, 2020), and to produce tens of thousands of graduates every year; the government is also encouraging progress in education sector based on technological advances.

There are around one hundred VCD study programs spread across all universities in Indonesia; the field of visual communication design is growing at the university level, with an average of 14,000 graduates per year (PDDikti, 2024). But the development of learning models, such as online and hybrid, driven by the integration of information and technology is often a challenge for higher education, both before and after the COVID-19 phenomenon (Rahmawati, 2018). These issues include the field of visual communication design courses; unlike general theory courses, art and design courses employ many studio practice-based learning strategies. Studio-based learning is a technique that emphasizes hands-on learning in studio sessions where teachers must supervise students directly in person or amongst classmates. The field of creative studies has long used this technique and many have also utilized the latest technology over the last ten years even though conditions are not yet ideal. Naturally, advancements in learning technologies impact the process from a physical to a virtual studio (Agrawal, 2009).

Despite challenges, such as the need for updated resources and infrastructure, design education in Indonesia is adapting to meet the demands of the modern creative industry. The connection between changes in digital culture and visual literacy is profound and multifaceted. In a digital culture where the consumption and creation of visual content are ubiquitous, the importance of visual literacy becomes paramount. Visual literacy, or the ability to interpret, create, and communicate through visual means, is a critical skill set that allows individuals to effectively navigate the digital landscape. This shift necessitates an enhancement of visual literacy skills so individuals can discern the credibility, context, and implications of visual messages.

The ability to decipher, negotiate, and assign meaning to information that is presented visually is known as visual literacy (Duchak, 2014). Visual literacy enables designers to create meaningful and powerful visual communications that can inform, persuade, and educate users, bridging the gap between the message and the audience. With the shift to learning methods through technological means, everything that appears on the screen or technological media used for learning is now very crucial. So it is important for the VCD field to understand aspects of visual literacy skills in the dynamics of today's visual culture. The primary objective of this research si to examine visual literacy in virtual spaces within the context of online learning in higher education, specifically focusing on studio-based learning in VCD.

The problem statement is that visual literacy is vital in learning practices. An individual’s level of understanding can increase with good visual literacy. Visual literacy encompasses visual perception, visual language, and visual thinking. The problem is that in modern learning practices, instructions and materials have transitioned into visual displays in virtual spaces, not in physical form. Thus, it is necessary to understand how these concepts of visual literacy apply. The research question is: How is visual literacy, which encompasses visual perception,

visual language, and visual thinking, understood by students and lecturers in learning within virtual studio spaces?

Literature Review

Visual Literacy Theories

Visual Literacy was introduced by John Debes in 1969, which is defined as the ability to understand an image. According to Debes, visual literacy refers to a group of skills that people can develop by seeing, and having and integrating other sensory experiences. When developed, it enables a person with intuitive knowledge to distinguish and interpret visible actions, objects and symbols, whether natural or man-made, that he encounters in his environment. Through the creative use of these skills, he is able to communicate with others. Through good use of these skills, they can understand and appreciate visual communication (Kelly et al., 2020).

A more modern definition was presented by Avgerinou (2011) that visual literacy means an ability obtained by understanding and utilizing images, as well as thinking and studying images (Avgerinou & Pettersson, 2011). From the development of this modern definition, it can be seen that the understanding of visual literacy places more emphasis on the same competencies or abilities as reading and writing. In addition to the pillars expressed by Avgerinau, Seels (1994) presented visual communication, visual learning, and visual thinking as contributing equally to the concept of visual literacy. However, a distinction between the three constructs can be drawn based on their capacity to focus internally or externally. More specifically, visual thinking is considered an internal mental process; visual learning is related to internal cognitive processes and external factors that influence its performance; and visual communication is external, concentrating on the creation and transmission of visual messages directed to the individual's environment (Seels, 1994).

Another understanding of this comes from Messaris (1994) which he challenges the assumption that interpreting images is a straightforward process akin to reading text, arguing that visual comprehension is less about a set of learned skills (as traditional literacy might imply) and more about innate human capabilities for recognizing and making sense of visual cues. He delves into the psychological aspects of visual perception and cognition, considering how individuals mentally process images and the extent to which this processing is culturally dependent. Messaris also investigates the role of visual communication in media, the persuasive power of images in advertising, and the construction of reality through visual means. His work critically discusses how images influence our perception of the world and our mental representations of reality, thus contributing to the broader understanding of visual literacy's impact on individual and societal levels (Messaris, 1994). From the review of several theories put forward by the experts above, the following explains each of the pillars which are sliced and also divided based on internal and external mental processes. These pillars are visual perception, visual language and visual thinking.

Evolution of Design Study Education

The historical development of design study education has been marked by a continuous interplay between pedagogical philosophies and technological advancements. In its early stages, design education was largely apprenticeship-based, with learners working closely under the tutelage of master craftsmen. This method of learning by doing and observing allowed for the transmission of practical skills and tacit knowledge, crucial for the trades of the time. The

Industrial Revolution introduced the need for formal design education to address the challenges of mass production, leading to the establishment of specialized institutions such as the Bauhaus in Germany, which emphasized the unity of arts, crafts, and technology. The Bauhaus and similar institutions became pivotal in setting the foundation for modern design education by fostering an interdisciplinary approach and advocating for the combination of aesthetics with function (Green & Bonollo, 2003; Marshalsey, 2021). This strategy has not altogether changed from its verifiable roots in models such as the Ecole Des Beaux Arts and the Bauhaus in 18th century (Broadfoot & Bennett, 2003). It is considered comparative to studio-based Learning instructional method (SBL) is an educational method with a particular student-centered approach. Within the 21st century, the studio space is still at the center of educating and learning in art and design programs (Boling et al., 2016). Teachers regularly utilize studio-based learning in creative fields such as architecture, design, and performing arts. A studio is more often than not a committed classroom or space (Agrawal, 2009). While other suggest that SBL centers on learning through activity and "Studio" is as a rule a devoted classroom or execution space, but it can moreover be a social setting inside a community (Park, 2011). The studio may be a space for student and instructors to associated based on each other's conventional standards of supervision and discussion.

The advent of the digital age brought about a seismic shift in design education. The proliferation of personal computers in the late 20th century and the emergence of the internet revolutionized the way design was taught and practiced. Computer Software allowing for more rapid prototyping and experimentation. Online resources and digital libraries made design history and theory more accessible, expanding the scope of self-education. The late 20th and early 21st centuries have seen a democratization of design tools and knowledge, with open-source software and online tutorials lowering the barriers to entry. Design education today is not just about teaching the use of tools or techniques; it's also about cultivating a design-thinking mindset that embraces collaboration, innovation, and adaptability to prepare students for a rapidly evolving technological landscape (Broadfoot & Bennett, 2003).

Donald Schön's "Educating the Reflective Practitioner" offers profound insights into the evolution of design education through the lens of reflective practice. Schön challenged the traditional technical rationality that dominated professional education, advocating instead for a model of learning that embraces the complexity of real-world practice. According to Schön, design education should not merely focus on imparting technical knowledge and skills but should also foster the ability to reflect-in-action. This means that students are encouraged to think critically and reflectively during the design process, allowing them to adapt to unique problems and situations dynamically. Schön's philosophy emphasizes the importance of context and the unpredictable nature of design challenges, suggesting that the ability to reflect on one's work while engaged in it is a hallmark of expertise in design professions (Schon, 2003).

Building on these ideas, Schön proposed that design education should be structured around studio-based learning, where students engage in the continuous creation and recreation of their work while reflecting on their design processes and decisions. This studio model simulates the iterative nature of professional design work, where learning is an active, hands-on process. Schön's approach underlines the idea that knowledge is not only applied but also generated through practice. In the design studio, students learn to negotiate between the often-conflicting demands of aesthetics, functionality, and client needs, honing their skills in a setting that mirrors professional practice. Schön's work has had a lasting impact on design education, emphasizing the importance of preparing students not just as technicians but as agile thinkers

capable of reflective and responsive practice in the face of the ever-changing demands of the design profession (Schon, 2003).

Concept of Virtuality in Studio Space

There is previous research whose focus is on restructuring design studio education in an online paradigm. This study explores the integration of online educational tools and practices into an undergraduate design studio course. It investigates how digital technology can be used to replicate the collaborative, hands-on learning experiences traditionally associated with live design studios. This research examines the challenges and opportunities of transitioning to an online format and identifies effective strategies for engaging students, developing creativity, and supporting the design process remotely. By introducing online educational tools and practices to design studio education, Ioannou's research contributes to ongoing efforts to adapt design pedagogy to the digital landscape and provides insights for educators navigating the online paradigm (Ioannou, 2017).

Meanwhile, another study proposes a shift in traditional approaches to designing studio pedagogy by embracing innovative strategies and technologies. It explores how emerging technologies, such as virtual reality, augmented reality, and digital simulation, can be integrated into the design studio to enhance the learning experience and expand creative possibilities. This research emphasizes the importance of interdisciplinary collaboration, critical thinking, and experiential learning in the context of design studio education. By advocating a new paradigm, Wang's research encourages educators to embrace technological advances and explore alternative methods for teaching design, ultimately fostering a dynamic and future-oriented design education environment (Wang, 2010).

Overall, these two research studies collectively highlight the transformative potential of online educational tools and practices in design studio education. They explore the integration of digital technology, collaboration, and experiential learning in an online paradigm. Ioannou's research focuses on specific applications of online tools and practices in undergraduate design studio courses, while Wang's research supports a broader shift in the paradigm of design studio education, embracing new technologies and interdisciplinary collaboration. Together, these studies contribute to ongoing discussions about adapting design education to the digital age and reimagining the pedagogical possibilities of design studios. These studies illustrate how the virtuality of studio spaces can revolutionize design education by providing a flexible, accessible, and technologically enriched environment that prepares students for the future of design practice.

Method

In the current landscape of higher education, particularly within the field of Visual Communication Design (VCD), there has been a significant shift toward virtual platforms. A detailed qualitative study was conducted to investigate the dynamics of VCD studio classes that are being held online at a private university's faculty of arts and design at city of Bandung, Indonesia. This study was designed as a case study that methodically examined the transition from physical to digital learning environments, capturing the experiences and challenges faced by both students and lecturers.

Utilizing a descriptive qualitative approach, the research utilized a combination of surveys, virtual ethnographic methods, and direct observation within virtual classroom settings.

Ethnographic methods, traditionally employed in physical settings to gain in-depth insights into cultural practices and experiences, were adapted to the virtual context (Hine, 2015). This involved real-time participation and observation in online classes, along with conducting interviews and focus group discussions. The virtual ethnographic approach embraced modern communication tools to engage with participants, collecting qualitative data that revealed the nuances of student-lecturer interactions and pedagogical effectiveness in the virtual studio space.

Moreover, the study sought to understand the transformation of teaching methods and learning experiences in the transition from a tangible to a virtual learning environment. It examined how the digital tools and platforms facilitated or hindered the processes inherent in VCD practices. The insights gained from this research are instrumental for educators and academic institutions as they refine their strategies to enhance the effectiveness of design education in a virtual landscape. By documenting the intricate details of these online interactions and learning experiences, the study contributes to the broader discourse on the potential and limitations of virtual learning spaces in nurturing the next generation of visual communication designers.

A comprehensive survey has been launched to examine the intricate aspects of visual literacy within the online studio classes of a Visual Communication Design (VCD) program. The survey deployed a Likert scale questionnaire to 57 student participants, probing into three primary components of visual literacy—namely, visual perception, visual language, and visual thinking—as well as their sub-components. This methodology enabled the evaluation of student responses on a gradient, from strong agreement to strong disagreement, thereby generating a nuanced profile of students' alignment with the facets of visual literacy.

To complement the data from the survey, extensive online observations were conducted across four studio classes involving the same cohort of 57 students, spanning a full semester of 14 sessions. The purpose of these observations was to glean insights into the actual conditions and dynamics of the learning environment as students engaged with the material (Uzun & Aydin, 2012). Parallel to the observations, in-depth interviews were conducted with a diverse group of 10 students—equally representing male and female perspectives—and two lecturers responsible for delivering the studio classes. These conversations aimed to triangulate and deepen the understanding of the survey findings, bringing a qualitative depth to the research.

Further elucidating the collected data, an online Focus Group Discussion (FGD) was organized, dividing the students into four distinct groups based on their respective studio classes and project topics. Each group comprised seven individuals, engaging in a structured dialogue designed to delve deeper into the practical implications of the survey outcomes. This discursive process not only provided a platform for collective reflection but also facilitated peer learning and the exchange of ideas. Lastly, the virtual ethnographic method employed by the researchers provided a window into the authentic contexts in which participants interact with digital media, reflecting the actual conditions and ambiance encountered during media engagement.

Discussion

The three primary components of visual literacy that will be analyzed, the first is visual perception (VP). VP refers to the process by which we interpret and understand visual information from the surrounding environment. It involves the brain's ability to receive and process visual stimuli such as shape, color, texture, and motion, and form meaningful representations of the visual world. From these primary components, researchers sorted them

into several sub-components related to learning in virtual classrooms, such as attention and focus, understanding, memory and recall, organization & structure, and instructional media.

The second component is Visual Language (VL). VL refers to the use of visual elements, such as images, symbols, colors, shapes, and typography, to communicate ideas, concepts, and messages. It is a form of nonverbal communication that relies on visual cues to convey meaning. then from this understanding, the researcher relates the non-verbal forms that appear in the class or studio, such as icons and symbols, infographics & charts, visual timeline, diagram, visual mnemonics, colors & typography.

The third is Visual Thinking (VT). VT is cognitive processes use visual representations, mental imagery, and spatial reasoning to understand and solve problems, generate ideas, and communicate information. It involves mental manipulation and manipulation of visual elements to organize thoughts, make connections, and express concepts. From this explanation, the researcher created sub-components related to the learning process and also the tasks given, such as dual coding theory, spatial reasoning, visual-spatial working memory, visual metaphors and analogies, mind mapping, visual problem solving.

From the three primary components and their sub-components, a statement is designed in the form of a Likert survey from which the score will then be calculated. From the score, it shows that the three derivatives in the component with the highest scores are things that become obstacles in the learning process. These three results were then confirmed through interviews with students and lecturers, then explored more deeply with FGD sessions.

VP		**VL**		**VT**	
Variable	**Score**	**Variable**	**Score**	**Variable**	**Score**
LMS Organization & Structure	19,21%	Diagram	19,28%	Spatial Working Memory	16,99%
Understanding	18,23%	Visual Timeline	16,99%	Dual Coding	12,90%
Memory Recall	17,73%	Icon & Symbol	16,99%	Visual Problem Solving	12,47%
Attention and Focus	17,24%	Visual Mnemonik	16,67%	Mind Mapping	11,83%
Instructional Media	14,29%	Infographics and Charts	15,36%	Visual Metaphors & Analogies	11,61%
General Application Organization & Structure	13,30%	Colors and Typography	14,71%	Visual-Digital Working Memory	11,61%
				Visual-Graphic Memory	11,40%
				Graphical Reasoning	11,18%

Table 1. Score result on primary component

From the VP score results, it was found that the largest score of 19.21% was found in the organizational and LMS structure variables provided by the campus. This means that using the campus LMS in the organization and structure of the application is very difficult to find topics, materials and links in the application. Respondents were then given statements related to visual language skills. In the survey language is divided into 6 related variables which refer to the use of visual elements, such as images, symbols, colors, shapes and typography, to communicate ideas, concepts and messages. It is a form of nonverbal communication that relies on visual cues to convey meaning.

From the results of the VL scores, it was found that the largest score of 19.28% was found in the diagram variable. This means that depicting information in diagram form is considered less

helpful for understanding concepts in online studio learning. Meanwhile, the color & typography variables in the material displayed on the screen are very helpful for communicating ideas, concepts and messages.

From the results of the VT scores, it was found that the largest score of 16.99% was found in the spatial working memory variable. This means that students have difficulty understanding things such as digital and real/physical size comparisons (for example the comparison of the size on the screen and the original size) in online studio learning. Meanwhile, the graphic reasoning variable, namely visual representations, such as infographics or sketch images, which appear on screen material is considered very helpful for communicating ideas, concepts and messages.

From the results of data collection and the first stage of analysis, there are several things that are important points in the research notes. the first thing is from the three components studied (Visual Perception, Visual language, & Visual Thinking) have the same role in literacy abilities. These three things can influence the visual process for understanding the purpose of the task given in lectures. The second is because virtual learning conditions are more screen-based, everything displayed on the screen is very important for these three components. Non-verbal material is the key to effectiveness in this type. The third is in online learning conditions, communication in the form of conversations and discussions tends to be less. Discussions cannot be held simultaneously. There is a tendency for some students to play a more passive role, this can be seen in observations, many of the students actually cover the camera and not speaking from the beginning to the end of the lecture. This is not good if the goal of studio-based VCD practice is collaboration, discussion and peer criticism. And lastly, one crucial thing is the spatial memory ability. Many outputs from design in the VCD field are finished products that are printed or physically produced. If this reduces the student's ability to estimate finished sizes, then this condition is not ideal for such a task.

Findings

In the VCD studio practice class which was conducted online and linked to visual literacy theory, it was found that using the campus LMS in the organization and structure of the application makes it very difficult to find topics, materials and links in the application. This makes it difficult for students to understand the assignments given and for lecturers to develop teaching. They prefer learning supplements in the form of videos and animations obtained from YouTube or other websites.

The second is depicting information in diagram form is considered less helpful for understanding concepts in online studio learning. even though we know that diagrams are a form of infographics. Meanwhile, the color & typography variables in the material displayed on the screen are very helpful for communicating ideas, concepts and messages.

And lastly, students have difficulty understanding things such as digital and real/physical size comparisons (for example, comparisons of the size on the screen and the original size). Meanwhile, visual representations, such as infographics or sketches, which appear on screen material are considered to be very helpful in communicating ideas, concepts and messages.

This study has several limitations, namely this research only uses a small sample with case studies at universities in big cities, so samples with other social status backgrounds & technical capabilities are not covered. The visual literacy theory used is a component that is internal to a

person, does not include external ones such as communication between student & learning experience. Each component described is not analyzed as variables that influence each other, so that this could be the next research step. And, this study did not analyze the differences produced by samples based on gender, so this can be input for further research.

Conclusion

In the evolving landscape of design education, the Visual Communication Design (VCD) practice studio class has traditionally thrived on the tangible and interpersonal interactions intrinsic to studio-based learning. However, with the necessity to pivot to fully online formats, there is a growing recognition that such an approach may not align seamlessly with the development of students' visual literacy skills and the objectives central to studio-based learning. Consequently, a hybrid model of education is increasingly being advocated, one which strategically combines online learning with opportunities for direct interaction amongst students, lecturers, and their tangible work, hence preserving the essence of the studio environment.

The transition to a hybrid model in design education addresses the evolving needs of Visual Communication Design (VCD) practice studio classes, which have historically relied on direct, tactile, and interpersonal interactions. As online formats become increasingly necessary, a careful blend of digital and traditional learning experiences is advocated to maintain the integrity of studio-based learning outcomes. The successful implementation of this model is contingent upon integrating engaging visual content and robust technological infrastructures that support collaborative learning while fostering independent and autonomous learning, critical for a designer's growth. This ensures that virtual studios replicate the interactive dynamics of their physical counterparts, enabling a learning environment where students can actively participate, create, and refine their design skills.

This study's exploration of visual literacy in the virtual studio space reveals that while essential components like visual perception, visual language, and visual thinking are crucial for navigating the online VCD studio environment, adapting these elements to a virtual context poses significant challenges. The research points to issues with the functionality of learning management systems and the effectiveness of visual aids such as diagrams, underscoring the importance of design education platforms that cater to the digital medium's unique demands. The findings emphasize the significance of color and typography in engaging students online, reinforcing theories of visual literacy that recognize the natural human capacity for visual interpretation. These insights advocate for an educational paradigm that promotes a reflective, practice-based approach, as suggested by Schön, blending advanced digital tools with the core principles of studio-based learning to prepare students for the contemporary demands of the creative sector. Furthermore, the data suggest that are sub-components influential in online engagement, aligning with Messaris’s (1994) understanding of visual literacy as an innate human capability that extends beyond learned skills. By adapting the educational paradigms proposed by Schön (2003), which emphasize reflective practice and hands-on engagement, the research suggests a move towards hybrid models that blend digital technology with the essential elements of traditional studio-based learning. This approach seeks to retain the essence of the studio's collaborative spirit while leveraging the digital tools that have become integral to the design profession, thereby preparing students for the evolving demands of the creative industry.

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Contact email: dita.saraswati@art.maranatha.edu

Change of Student Attitudes in Secondary Education Extracurricular Activities Promoting Interactive Learning

Haruka Tsangwatanabe, Japan Advanced Institute of Science and Technology, Japan
Mitsuru Ikeda, Japan Advanced Institute of Science and Technology, Japan

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Abstract
This study aimed to examine the attitude changes and the factors contributing to the changes in students who participated in extracurricular activities that involved external personnel. We aimed to comprehensively discuss the possibilities and challenges of collaboration between external personnel and schools and to provide suggestions for improving and developing future initiatives. The participants were 13 middle and high schools in Japan that participated in an educational program to review school regulations through dialogue with facilitators dispatched by external party. Interviews were conducted with students and teachers from various schools, and the contents of the interviews were qualitatively analyzed (using the Steps for Coding and Theorization [SCAT] method). By analyzing the results of multiple interviews, we attempted to distinguish the effects of the educational program based on school and individual conditions and characteristics. From the analysis of the interviews with 6 students, 42 propositions (theoretical claims in SCAT terminology) were presented regarding changes in student attitudes. The analysis showed that students who participated in the activities acquired diverse perspectives and empathy through dialogues with others. Their self-esteem, self-efficacy, and motivation were nurtured in the context of their relationships with others and their personal growth experiences.

Keywords: Learning Through Dialogue, Learning Through Reflection, Extracurricular Activities, External Personnel, SCAT

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1. Introduction

Children living in the modern era, where predicting future changes is challenging, must develop the ability to identify problems on their own, collaborate with others to solve them, and create new knowledge and values within a rapidly changing society. To nurture these abilities, educational settings have recently advanced the introduction and practice of interactive learning and collaboration with the local community and external personnel. In the new learning guidelines announced by Japan's Ministry of Education, Culture, Sports, Science and Technology in 2017, the importance of addressing the needs of today's children while envisioning a society of 2030 and beyond, in line with societal changes, is reaffirmed. Learning through dialogue is an interactive learning approach and is crucial for children living in future societies. There are models of classroom practice for learning through dialogue, such as Sato's (2018) learning community model, and studies on the introduction and practice of learning through dialogue for each class unit. For example, research on classroom practices in elementary school Japanese language classes focusing on discussion activities revealed a process in which students deepened their thoughts by borrowing words from other students during listening activities, highlighting the impact of diversity (Sakamoto, 2020). Furthermore, the new learning guidelines call for understanding the significance of political participation and the social security system and for collaboration with societal and educational organizations outside the curriculum, in response to contemporary issues, in cooperation with society. Specifically, collaboration with external personnel with diverse expertise is recommended as a means of cooperation between society and schools. Hayasaka (2008) showed that the participation of external personnel in primary and secondary education enhances students' ability to relate knowledge and skills to social life, thereby raising their interest in society and learning motivation. Inoue (2021) reported that activities involving interactions between students and external personnel, in which external personnel provide feedback, can boost students' self-esteem and reduce their resistance to expressing opinions. Although interacting with external personnel can clearly lead to high-quality education, its adoption in schools remains limited because of the burden on teachers regarding coordination tasks, such as meetings for classroom collaboration with external personnel and the difficulty in finding external personnel who can understand the objectives and progress of lessons, which usually occur multiple times (Fujikawa, 2004, Sasagawa, 2015). Therefore, this study focuses on extracurricular activities that, unlike regular classes, do not have a curriculum or indicators of achievement. We examine the transformation of the attitudes of students and teachers involved in extracurricular activities, focusing on interactive learning and collaboration with external personnel in secondary education.

2. Extracurricular Activities Promoting Learning Through Dialogue

2.1 Project Overview

This study targets extracurricular activities in secondary education that are part of a project called "Rulemaking for Everyone," organized by the Certified Non-Profit Organization KATARIBA (hereinafter referred to as NPO KATARIBA). This project is an educational program in which schools nationwide collaborate with NPO KATARIBA, with students taking the lead in working together with teachers, parents, and other stakeholders to review and revise school rules and regulations. Through this activity, students are expected to cultivate a sense of agency toward issues around them, take action for improvement, and foster a consciousness for social participation by forming what NPO KATARIBA calls a "consensual solution" through dialogues with people of differing positions and opinions

(NPO KATARIBA, 2022). The revision of school rules affects not only the participating students but also school life in general, which involves other students, teachers, and parents who do not participate in the activity (Figure 1). External personnel were dispatched to the school to support students and teachers throughout the activity period, which lasted approximately a year. The annual activity schedule starts with the school recruiting participating students, followed by the students leading the selection of school rules to be revised and investigating their validity. According to the activity stages, students engaged in dialogue with various stakeholders to advance their activities (Table 1). This process is designed to involve these stakeholders in the activities and, through exchange of opinions, for the students to experience learning through dialogue.

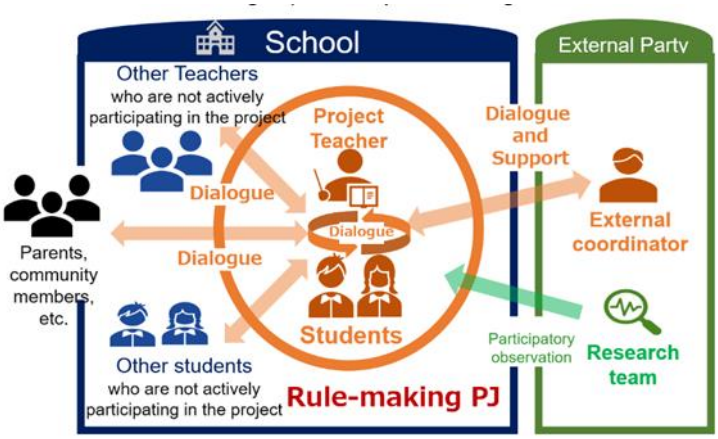

Figure 1: Stakeholder Diagram Created

April	The school decides to participate in the project. Preparation by project teachers ・Recruitment of participating students ・Team-building activities: Creating relationships between students, teachers, and external coordinators ・Formulation of an annual plan
May	
June	
July	Step 1: Form a basic understanding of the rules
Aug	Step 2: Form a basic understanding of dialogue
Sep	Step 3: Find and list rules and school regulations to review
Oct	Step 4: Decide on the rules to review
Nov	Step 5: Create a research plan regarding the rules Step 6: Conduct research and compile data ・Interviews ・Surveys for students and teachers ・Collection of opinions through open doors, etc.
Dec	Step 7: Create a draft for rule revision
Jan	Step 8: Propose the rule revision draft to the school management
Feb	Step 9: Prepare for the implementation of the new rules, publicize within the school
Mar	Approval and commencement of new rule operation
April	
May	Step 10: Reflect on the project

Table 1: Annual Activity Schedule
(Quoted from NPO KATARIBA " Rulemaking for Everyone " Teachers's guideline)

2.2 Dispatch of External Personnel to Schools

In the "Rulemaking for Everyone" project for the 2021 fiscal year, which this study targeted, coordinators and researchers were dispatched to 13 schools that expressed interest (Figure 1).

The coordinators employed by the NPO KATARIBA are external personnel who participate as accompanying partners in a series of processes aimed at revising the school rules and regulations. The purpose of the coordinators is to reconstruct typical vertical relationships between evaluators and those being evaluated within schools by introducing an external third party to bridge the gap between students and teachers. This aims to build a horizontal relationship in which students and teachers can engage in candid dialogues.

2.3 Positioning of Learning Through Dialogue in the Project

In " Rulemaking for Everyone," "dialogue" is defined as a discussion conducted in a free and open atmosphere aimed at deepening understanding of others and generating new ideas. Teaching materials and training sessions focus on preparing the grounds for dialogue by emphasizing the importance of respecting each individual's voice, ensuring the right to propose ideas, and organizing points for consensus building when opinions differ. Participants were encouraged to progress through the project by engaging in dialogue (NPO KATARIBA, 2022). Such materials and the dispatch of coordinators are intended to facilitate the horizontalization of relationships among project participants and foster a mindset geared toward engaging in dialogue not as a mere conversation but as interactive learning within an educational program. Considering the project's duration of approximately one year, it is anticipated that various dialogues may be repeated among stakeholders, centered on the participating students according to the stages of the activity (Figure 2). After joining the project, students receive an explanation of how to proceed with the project from coordinators and teachers. Subsequently, they (1) deliberate on the rules to review among themselves. During this phase, consensus building among participants can be advanced through repeated dialogue with fellow participants, teachers, and coordinators. Next, they (2) investigate the actual state of the rules to be reviewed; dialogues are conducted through questionnaires, opinion exchange meetings with the entire student body and teachers not participating in the activity, and hearings with parents and community members to form a common understanding of the direction and current state of the rules to be reviewed among participating students, responsible teachers, and external personnel. Then, by (3) selecting school rules for revision, the opinions of participating students on the rules to be reviewed are refined, leading to (4) a proposal for revision to the school administration at the final stage of the activity. Here, participating students engage in dialogue with school management, including principals and vice principals. As these discussions are positioned not as presentations of results but as opportunities for dialogue, they may involve multiple sessions of negotiations in response to critical opinions from school management.

Figure 2: Transition of Dialogue Activities with Stakeholders

3. Research Methods

3.1 Survey

After completing approximately a year of activities, semi-structured interviews were conducted with participating students and teachers. The main topics of the questions were their feelings about participating in the activity, self-perceptions, and changes within the school. The interview data were not collected for this study, but were obtained with the consent and cooperation of NPO KATARIBA, as they were originally gathered by NPO KATARIBA for evaluating their project. As an ethical consideration, explanations and consent regarding the use of the data for research purposes were obtained from NPO KATARIBA, the interviewees' affiliated schools, and participants. To ensure anonymity, identifiable information, such as names, affiliations, and school locations, was replaced with codes or symbols.

3.2 Research Subjects

This study targeted 4 high school students, 2 middle school students, 10 high school teachers, and 2 middle school teachers (Table 2). Among the teacher interviews, those related to changes in student attitudes were included in the analysis of student interviews to simultaneously analyze the students' and teachers' perspectives.

■ Student

Participant	School	Grade Level	Text Provided	Number of Theoretical Descriptions
Student A	High School Student	11th	66	6
Student B	High School Student	10th	80	6
Student C	High School Student	10th	12	5
Student D	High School Student	10th	14	7
Student E	Middle School Student	7th	51	11
Student F	Middle School Student	8th	31	7
Total			254	42

■ Teachers

Participant	School	Text Provided	Number of Theoretical Descriptions
Teacher A	X High School	121	35
Teacher B			
Teacher C			
Teacher D			
Teacher E			
Teacher F			
Teacher G			
Teacher H	Y High School	132	39
Teacher I			
Teacher J			
Teacher K	Z Middle School	35	20
Teacher L			
Total		288	94

Note: The interviews with teachers were conducted as group interviews, and the analysis was carried out for each school.

Table 2: Interview Participants

3.3 SCAT

The Steps for Coding and Theorization (SCAT), developed by Otani (2008, 2011), was used for analysis. SCAT is a qualitative data analysis method that is effective for small-scale data analysis, characterized by its explicit demonstration of the analytical process and its ability to derive storylines and theoretical descriptions. SCAT involves describing textualized data in a table and coding them through four steps: (1) phrases in the data that should be noted, (2) phrases outside the data to rephrase them, (3) phrases to explain (2), and (4) emerging themes and conceptual constructs. This process entails coding the themes and conceptual constructs in a table, weaving them into a storyline, and generating theoretical descriptions. Here, "theoretical descriptions" refer not to universally applicable principles but to insights specific to the analyzed data (Otani, 2008, 2011). In this study, similar theoretical descriptions were categorized to capture changes attributed to personal characteristics and experiences, as well as changes occurring owing to the activity, and for analyzing the transformation in students' attitudes and the factors behind them. The analysis was primarily conducted by the first author, and the validity of the findings was reviewed multiple times with co-authors based on the SCAT tables.

4. Results

4.1 Results of SCAT for Students

The SCAT of the student interviews generated 42 theoretical descriptions. These were grouped into similar categories, as listed in Table 3.

Category	Subcategory	
1. Participation in activities fosters the development of self-esteem, self-efficacy, and motivation	1-①. Self-esteem, self-efficacy, and motivation are cultivated through relationships with others	1-①-1. Altruistic activities promote the development of self-esteem
		1-①-2. Attention and support from others cultivate self-efficacy and motivation
	1-②. The realization of personal growth fosters the development of self-esteem	
2. Interactions with others promote cognitive deepening and expansion	2-①. Interactions with others enhance tolerance for diversity and empathy	
	2-②. Listening to the opinions of others acquires an alternative perspective	
	2-③. Introspection during interactions with others deepens self-understanding	
3. Explicitly stated rules of activities and dialogues, and the intervention of external personnel, create psychological safety	3-①. The intervention of external personnel and the clarification of activity purposes generate psychological safety	
	3-②. Providing psychological safety through dialogue-driven activities and environment creation	
	3-③. Teacher-led environment creation and monitoring ensure psychological safety	

Table 3: Categories of SCAT result of Students

4.1.1 Categories and Subcategories of Theoretical Descriptions From Student SCAT

Theoretical descriptions related to changes in students' attitudes were organized into three categories: (1) Participation in activities fosters the development of self-esteem, self-efficacy, and motivation; (2) Interactions with others promote cognitive deepening and expansion; and (3) Explicitly stated rules of activities and dialogues and the intervention of external personnel, creates psychological safety. They were further divided into ten subcategories.

4.1.2 Cultivation of Self-Esteem, Self-Efficacy, and Motivation

In this category, that is, [1. Participation in activities fosters the development of self-esteem, self-efficacy, and motivation], there are two subcategories: [1-①. Self-esteem, self-efficacy, and motivation are cultivated through relationships with others] and [1-②. Realization of personal growth fosters self-esteem]. [1-①] concerns changes in students' self-perception, such as the cultivation of self-esteem, self-efficacy, and motivation, attributed to their relationships with others. By contrast, [1-②] is concerned with changes in self-perception due to personal growth. Changes in students' self-perception due to their relationships with others were further divided into two parts: [1-①-1. Altruistic activities promote the development of self-esteem] and [1-①-2. Attention and support from others cultivate self-efficacy and motivation] (Table 3). Not only does subjective praise from teachers to students have a positive effect on the cultivation of students' self-efficacy (Iijima et al., 2020), but receiving attention within student–student relationships also impacts students' self-esteem, self-efficacy, and motivation. Additionally, in activities, the five antecedents of self-esteem: 1) Mastery experiences (experiences of achieving goals on one's own), 2) Vicarious experiences (observing someone else achieve their goals), 3) Verbal persuasion (being told about one's skills or capabilities), 4) Physiological and emotional arousal (experiencing a motivational boost), and 5) Imaginal experiences (imagining oneself achieving goals) (Bandura, 1995). These suggest that dialogues between teachers and students or among students enhance mastery experiences and verbal persuasion through repeated experiences, improve vicarious experiences by observing other students' achievements, thereby increasing

physiological and emotional arousal, and improve imaginal experiences, suggesting a boost in self-esteem.

4.1.3 Interaction With Others and the Deepening and Expansion of Cognition

The category [2. Interactions with others promote cognitive deepening and expansion] refers to the changes in cognitive skills attributed to interactions with others during activity. There are three subcategories: [2-①. Interactions with others enhance tolerance for diversity and empathy]; [2-②. Listening to the opinions of others acquires an alternative perspective]; and [2-③. Introspection during interactions with others deepens self-understanding]. They were organized to separate the content and causes of transformation (Table 3). Tsuneoka and Takano (2012) suggested that the process of attitude transformation through interactions with others tends to lead to increased self-esteem and greater tolerance toward others through the acquisition of other perspectives. Similarly, we found that participating students experienced attitude transformations through a similar process, acquiring other perspectives and enhancing tolerance and empathy, followed by promoting introspection within their interactions with others.

4.1.4 Psychological Safety Provided by the Structure of Activities

The category [3. Explicitly stated rules of activities and dialogues, and the intervention of external personnel, create psychological safety] consists of three subcategories: [3-①. Intervention of external personnel and the clarification of activity purposes generate psychological safety], [3-②. Providing psychological safety through dialogue-driven activities and environment creation], and [3-③. Teacher-led environmental creation and monitoring ensure psychological safety] (Table 3). These are organized based on students' theoretical descriptions that identify the clarification of the activity's rules and the intervention of external personnel as factors that bring about psychological safety, which is a trigger for attitude change. Psychological safety is classified from three perspectives: the project's structure, such as the intervention of external personnel and the clarification of the activity's purpose; the process of dialogue-based activities; and teacher-led space creation and supervision. These mechanisms encourage attitude transformation by providing psychological safety to students. The process of learning through dialogue, intervention, and accompaniment by external personnel was intended as a part of the project and functioned well. However, teacher-led space creation and supervision, although not explicitly intended as part of the project's structure, were observed to be crucial in building psychological safety among participating students and in fostering motivation and self-esteem during activities through encouraging engagement.

4.2 Results of SCAT for Teachers

The SCAT of the teacher interviews generated 93 theoretical descriptions (Table 4).

The SCAT of teachers was classified into five categories and thirteen subcategories: [1. Construction of psychological safety by project teachers], [2. Students' sense of growth promotes the development of self-esteem and motivation in teachers], [3. Reconstructing values through the broadening perspective of project teachers], [4. Challenges in expanding activities], and [5. Teachers' conflicts]. Each of the five categories and thirteen subcategories is described below.

Category	Subcategory	
1. Construction of psychological safety by project teachers	1-① Building psychological safety through involvement with external personnel and structuring of activities	
	1-② Building psychological safety through attention and support from within the school	
2. Students' sense of growth promotes the development of self-esteem and motivation in teachers	—	
3. Reconstructing values through the broadening perspective of project teachers	3-① Changes in educational views and between students due to the broadening perspective of project teachers	
	3-② Promotion of introspection due to the broadening perspective of core teach	
	3-③ Recognition of authority due to the broadening perspective of core teachers	
4. Challenges in expanding activities	4-① Challenges in expanding to all students	
	4-② Inhibiting factors from other teachers	4-②-① Cultural and organizational challenges
		4-②-② Challenges in differences in values among teachers and in cultivating a sense of ownership
		4-②-③ Challenges in teachers' experience with dialogic communication
5. Teachers' conflicts	5-① Anxiety and doubt about one's own values	
	5-② Anxiety about personalization	
	5-③ Anxiety about loss of authority	

Table 4: Categories of SCAT result of teachers

4.2.1 Building Psychological Safety Among Project Teachers

The category [1. Construction of psychological safety by project teachers] consists of two subcategories: [1-① Building psychological safety through involvement with external personnel and structuring of activities] and [1-② Building psychological safety through attention and support from within the school]. These were classified based on descriptions of the construction of psychological safety as one of the factors that triggered attitude transformation among project teachers who participated in the activity. The aspects of psychological safety are organized from two perspectives: interaction with external personnel and attention and support from within school. In the activities, external personnel, known as coordinators, were deeply involved, facilitating activities through dialogue between students and teachers and providing expertise as advisors to teachers. The coordinators supported student activities and individual meetings with teachers on how to proceed with activities, supported reporting at training sessions and meetings for teachers not participating in the activities, and provided advisory support to teachers. From the theoretical descriptions in teacher interviews, teachers perceived the presence of coordinators as a close source of inquiry and consultation, thereby gaining psychological safety from this structure.

Additionally, as this activity was application-based at the school level, it was officially recognized as a public activity by the school at the start, with certain support and recognition from within the school. Attention and encouragement from school administrators and fellow teachers regarding the progress of the activities seemed to contribute to the psychological safety of the teachers involved.

4.2.2 Students' Sense of Growth Fosters Teachers' Self-Esteem and Motivation

The category [2. Students' sense of growth promotes the development of self-esteem and motivation in teachers] uses theoretical descriptions, suggesting that teachers who participated in the activity cultivated self-esteem and motivation upon recognizing students' sense of growth. Teachers involved in the activities observed students actively participating in and receiving positive feedback on students' changes from other teachers, which in turn fostered their motivation for the activity.

4.2.3 Value Reconstruction Through the Expansion of Project Teachers' Perspectives

The category [3. Reconstructing values through the broadening perspective of project teachers] reflects how teachers participating in the activities deepened their understanding of students through dialogue, transformed students' attitudes through the activities, and changed their views on education and students through interactions with external personnel. These theoretical descriptions have been divided into the following three subcategories based on the content of the transformation: [3-① Changes in educational views and between students due to the broadening perspective of project teachers]; [3-② Promotion of introspection due to the broadening perspective of core teach]; and [3-③ Recognition of authority due to the broadening perspective of core teachers], teachers involved in the activities have been observed to become aware of their authority and the impact of their words on students through interactions and dialogues with students.

4.2.4 Challenges in Expanding Activities

The category [4. Challenges in expanding activities] discusses the inhibiting factors experienced by teachers attempting to expand their activities within schools. These factors are categorized into [4-① Challenges in expanding to all students] and [4-② Inhibiting factors from other teachers], further dividing the challenges related to teachers' involvement in the expansion of activities into [4-②-① Cultural and organizational challenges], [4-②-② Challenges in differences in values among teachers and in cultivating a sense of ownership], and [4-②-③ Challenges in teachers' experience with dialogic communication]. For clarity, these subcategories organize the challenges into three perspectives.

4.2.5 Teachers' Conflicts

The category [5. Teachers' conflicts] address the conflicts felt by teachers who participated in the activity regarding themselves and those perceived by teachers who did not participate. These conflicts are categorized into three perspectives: [5-① Anxiety and doubt about one's own values], [5-② Anxiety about personalization], and [5-③ Anxiety about the loss of authority].

Teachers’ introspection was influenced by the expression of differences in opinions and values through activities that facilitated dialogue between teachers who participated and those who did not. In the school administration context, teachers rarely have the opportunity to discuss and showcase their educational views and values. However, through the status reports of the activity and proposal meetings with students involving teachers who did not participate, the differences in educational views and values between the participating teachers became clear; this served as an opportunity for self-reflection. Furthermore, continuous engagement with the participating students as individuals and observation of their autonomous actions within the activity led to a positive change in the participating teachers' perceptions of the students. These introspective factors, overlapping in complexity, led participating teachers to reevaluate the concept of teacher authority.

5. Discussion and Conclusions

5.1 Changes in Students and Teachers in Extracurricular Activities Promoting Learning Through Dialogue Collaboration Between External Personnel and Schools

By categorizing the results of the SCAT for both students and teachers, this study analyzed the changes in students and teachers in extracurricular activities that promote learning through dialogue and collaboration between external personnel and schools. The results are summarized as follows.

Changes in students include the cultivation of self-esteem, self-efficacy, motivation, acquisition of diverse perspectives, and empathy toward diversity. Changes in teachers are characterized by a positive shift in their perceptions of students and the reconstruction and broadening of educational views and values.

The main factors common to changes in both students and teachers include psychological safety facilitated by the structuring of activity rules, interactions with others, setting open-ended tasks, and the establishment of horizontal relationships through the intervention of external personnel. Dialogue-based activities and the collaborative effort between external personnel and schools positively influenced these changes. While changes were observed in both students and teachers, the elements of the educational program that fostered student autonomy are discussed in detail in the following section.

5.2 Elements of the Educational Program That Promoted Student Dialogue

Three key elements of the educational program facilitated autonomous dialogue among the participating students. The first is the establishment of horizontal relationships through the intervention of external personnel. From the outset, the project anticipated dialogue activities not only among students but also between students and teachers, and between students and external personnel, foreseeing interactions with individuals perceived as diverse by students. Overcoming the traditional hierarchical relationships between students and teachers within a school is particularly necessary. To this end, the project explicitly aimed to ease tensions among stakeholders through the intervention and accompaniment of external personnel and by implementing projects through dialogue-based activities. This enabled participating students to engage in dialogue while constructing horizontal relationships with project stakeholders.

The second element was teacher participation and oversight. At the start of the project, as a run-up to building a trusting relationship between participating students and external personnel, teachers provided psychological safety to students through their presence and oversight.

The third element is setting relatable tasks. The project focused on the revision of school rules, a subject matter that directly involves both students and teachers as stakeholders in school life, making it comparatively easy to express opinions and empathize with and accept the views of others. Activities such as hearings could be conducted within the immediate context of the school, involving other students and teachers, fostering ongoing dialogue among stakeholders, and providing learning opportunities for participating students over the course of approximately one year. Thus, the project was designed around relatable issues and incorporated numerous mechanisms for building psychological safety among participating

students. These mechanisms functioned effectively to encourage the practice of activities through autonomous dialogue among participating students.

5.3 Future Prospects

Education has made progress in introducing and practicing learning through dialogue and collaboration with external personnel in classrooms. However, the introduction of these practices into extracurricular activities has been limited. This study focused on schools participating in " Rulemaking for Everyone," an extracurricular activity aimed at revisiting school rules, as a case study, to examine the transformation in attitudes and factors influencing both students and teachers. The interviews analyzed in this study were conducted after the activities (and decisions on school rule revisions) were completed, with some or all proposed changes being accepted in all schools involved. This suggests that the activities may have been perceived as having positive outcomes by both students and teachers.

Further research through long-term participatory observations and mid-activity interviews could clarify the factors influencing changes in attitudes more precisely. Although the analysis focused on changes in both students and teachers, the discussion centered primarily on students as learners. The analysis did not detail the impact of non-participating students' attention and interest in participating students, or the conflicts and introspections experienced by teachers through dialogues with their colleagues. Focusing on these aspects for further analysis and considering the impact of interactions with external personnel on school management and organization could contribute to the realization of schools that are open to society.

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Contact email: haruwa@jaist.ac.jp

The Impact of English Songs to Enhance Learning Achievement for Students With Unequal Cognitive

Xiyin Deng, Rajamangala University of Technology Thanyaburi, Thailand
M. Pigultong, University of Technology Thanyaburi, Thailand

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Abstract
The objectives of this study were to: 1) compare the learning achievement of students between pre-test and post-test scores using English songs 2) Identify effectiveness after using English songs. The population in this study were 200 students in Sichuan Yibin Vocational Technical School in semester 2/2023. The sample of this research were 54 students selected by Chung TeFan's 27% calculation technique. The research instruments included:1) Three English songs' materials 2) An achievement test paper. The statistics to use in this research included: 1) Dependent t-test 2) Effectiveness index. The results found that 1) the post-test scores were higher than the pre-test scores with statistically significant difference at the .05 level. (t=80.45, p=0.00). 2) The effectiveness of using English songs was 0.7363, in other words, students had higher post-test scores of 73.63 percent of cognitive score improvement.

Keywords: English Songs, Learning Achievement, SDGs, Unequal Cognitive

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Introduction

Background of Statement

According to the state of global education, Sustainable Development Goals (SDGs)proposed by the United Nations. The goal 4 is Quality Education. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. Ferguson and Roofe, C.G. (2020) There is growing international recognition of Education for Sustainable Development (ESD) as an integral element of quality education and a key enabler for sustainable development. Both the Muscat Agreement adopted at the Global Education for All Meeting (GEM) in 2014 and the proposal for Sustainable Development Goals (SDGs) developed by the Open Working Group of the UN General Assembly on SDGs (OWG) include ESD in the proposed targets for the post- 2015 agenda. The proposed Sustainable Development Goal 4 reads "Ensure inclusive and equitable quality education and promote life-long learning opportunities for all" and includes a set of associated targets.

Every people need to equally access to education. This is the goal of China's educational efforts, but the reality is unequal. Among the problems of unbalanced regional education development, the educational resources in eastern and western China are extremely unbalanced. Feng yan (2019) In terms of schools, schools are divided into national focus, and ordinary schools, as well as vocational secondary schools, while in good schools, they are divided into important classes and ordinary classes according to their academic progression or admission results. Teachers in the same class will also treat students with different grades differently. Such behavior can cause low score students to lose confidence and interest in learning. Zhu yumin (2022) Looking at the teaching process in our country, we can see that although the independent learning method has been promoted for many years, but the traditional education model, that is, the cramming teaching model more or less restricts the innovative development thinking of young students, most students are limited to the dogmatic development of traditional thinking, do not know how to draw inferences, cannot be used flexibly, this lag makes our education present a complete institutionalization, modeling, less vitality and motivation, this problem, It can be said that it is a stubborn stumbling block on the road of education in our country. Wang lei (2020) In the process of basic education in China, we are always pursuing the quality of education and teaching, and through centralized teaching, the use of examinations to evaluate students' learning and the quality of education and education, which greatly limits the characteristics of students themselves and ignores the problem of quality education. Liu Jie (2019).

Purpose

Because language and music have many commonalities, the role of English songs in English teaching has been valued by more and more English educators. Many educators and linguists at home and abroad have devoted themselves to this topic, and nowadays, English songs are gradually entering English teaching classrooms and have achieved some results. Wangi, W., Khotimah, A. N., & Pradana, R. (2017) However, it has not been promoted in the whole English teaching. Therefore, in the research, combined with the main characteristics of vocational school students, this paper adopts the method of combining theory and practice to explore the feasibility and effectiveness of English songs in teaching. Based on the United Nations' SDGs 4 on equitable education, taking students from Yibin Vocational Technical School as an example, in this paper, this research uses an edutainment teaching technique by

use English songs to improve the English scores of the low achievement students. The researcher would like to focus on the following research questions:

1) *Have validity of the songs for using to English teaching?*
2) *How is the difference in achievement scores before and after using English songs?*
3) *How about the effectiveness of achievement scores after using English songs?*

Research Objectives

1) To study about the validity of the songs for using to English teaching.
2) To compare learning achievement between pre-test and post-test scores.
3) To study the effectiveness.

Research Hypothesis

The students studying through English songs for improving achievement scores will have higher Post-Test Learning Achievement Score than the Pre-Test.

Conceptual Framework

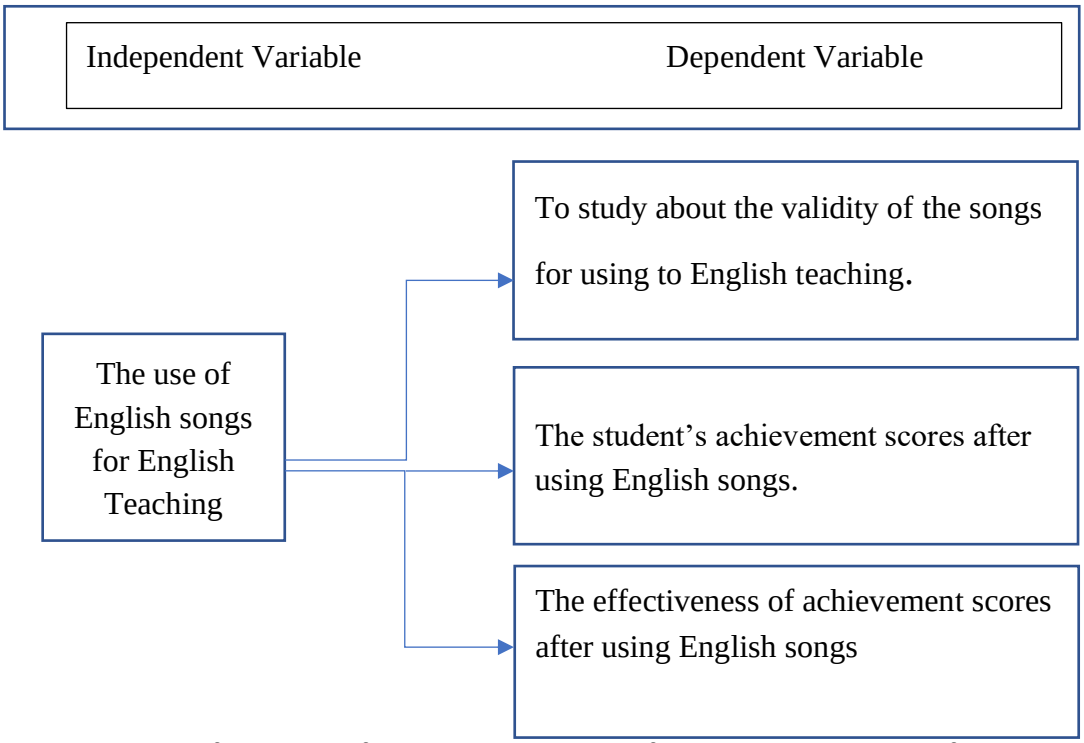

Figure 1- Research framework for the improvement of Achievement scores of students.

Definition and Scope of the Study

The study of teaching English songs to improve the English performance of low score students can be defined as an educational study to explore the methods and effects of improving the academic performance of students with relatively low English academic performance by using English songs as an educational tool. The scope of the study includes the following aspects:

Teaching Methods: The research will focus on different teaching met using English songs, such as lyrics analysis, song creation, song singing, etc., to determine which method is the most effective for poor students' learning.

Student Groups: The study will target students with poor score English learning, including differences in age, language ability and subject ability.

Academic Performance: The study will measure the improvement of students' performance in English subjects, including improvements in listening, speaking, reading, and writing.

In short, this study aims to explore the methods and effects of improving poor score students' English learning performance through music education methods to help improve their performance in English subjects.

Definition of Keywords

1. English Songs

The three instructional songs used in the study were: Modern Pop Music. It originated in the 19th century and developed rapidly in the 20th century. The popular music of the West, especially the developed countries of Europe and the United States, occupies an important position in the world, and the United States is the most developed country in the world for popular music, and it is also the main birthplace of popular music. Nowadays, the form of popular music in various countries around the world is basically developed based on American popular music. Pop music has a charm that appeals to a wide audience and is a music for everyone of all ages.

2. Learning Achievement

In modern society, education is a crucial issue, which involves the inheritance and continuation of wisdom and knowledge accumulated by mankind over thousands of years. Students' academic achievement is one of the important indicators to evaluate the quality of education, and its level is not only related to the development and future of individuals, but also involves the prosperity and development of the country. Therefore, the analysis and evaluation of students' learning achievement is a crucial issue. The analysis and assessment of student learning achievement needs to consider many factors. First, it is necessary to comprehensively evaluate students' performance in the learning process, including students' grades, classroom performance, experimental operations, and other aspects. Secondly, it is also necessary to consider the comprehensive quality assessment of students, such as moral character, health status, learning attitude and personality characteristics. Finally, the evaluation should be made based on factors such as the resource environment and family background of the student to accurately understand the student's learning achievement.

3. SDGs

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go together with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests. SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities

for all. Access to quality education is fundamental to improving people's lives and achieving sustainable development. Countries have made significant progress in increasing access to education at all levels and in increasing enrolment, especially for girls. Basic literacy and numeracy skills have improved considerably, but more effort and greater progress are needed to achieve the goal of education for all. For example, the world has achieved gender parity at the primary level, but few countries have achieved this goal at all levels of education.

4. Unequal Cognitive

Typically refers to differences or disparities in cognitive abilities among individuals or groups. Cognitive abilities encompass various mental processes such as perception, attention, memory, reasoning, problem-solving, and decision-making. When we say there are "unequal cognitive" aspects, it implies that some individuals or groups may have strengths or weaknesses in certain cognitive domains compared to others. These differences can arise from various factors including genetics, upbringing, education, environment, health, and socio-economic status. Recognizing and understanding these differences is important in various fields such as education, psychology, and healthcare, as it can inform interventions and policies aimed at addressing disparities and promoting equal opportunities for all individuals to reach their cognitive potential.

Significance of the Study

This paper mainly conducts an in-depth exploration and analysis of the ways and means of applying English songs in English classroom teaching in vocational school and selects 54 students with the lowest English scores as research objects. Its main purpose is to analyze the teaching results of using English songs in the classroom through empirical research, and at the same time, to improve the interest of poor scores English students in learning English, and to effectively find better ways and ways to apply English songs, so as to improve the performance of poor scores English students, promote the educational equity policy of the United Nations SDGs, and achieve better results in the process of development. The main implications of the study of this topic are as follows: 1. Stimulate the interest of lowest scores students in learning English. The greatest motivation for learning is interest, and interest is the best teacher, which can make students actively understand different things, and at the same time actively participate in them. When we use more direct and visual teaching, we can fully attract their attention. If they are taught in a mechanical way, such as reciting words that need to be mastered, they will not produce better learning results. English Song Teaching uses the English song teaching mode of listening and singing, effectively integrates language and situation, presents a vivid and lively classroom learning atmosphere, allows them to learn in a more pleasant state, and can fully activate the psychological internal drive of their learning, which allows students' brains to show an active state and can fully devote themselves to learning and exploration, so as to obtain twice the learning effect with half the effort. Once students have a strong interest in English, they will be willing to engage with it.2. Reduce the pressure of lowest scores students' English learning and improve the learning effect. The way to perfectly display the language of the human soul is music. Appreciation of music can effectively prevent boredom and boredom caused by repeated exercises and can also reduce students' tension and anxiety when learning English, it can also reduce students' fear, which can help students relax in learning English knowledge, and it is not easy to develop fear. In the process of implementing the English curriculum, teachers use music and songs to comprehensively train students' listening, speaking, reading, and writing skills, to improve their ability to use English.

Research Methodology

Research Design

The research design was conducted according to the following structure in the objective of the research; it has been moving with steps as flowing:

The researcher used a quantitative approach in experimental design for conducting this study. The data was collected in a quantitative or numerical form derived from the test, and the researcher used a pre-test-post-test design. An illustration of the design is as follows:

Group: O1 x O2

O1 = Measurement of the pre-test score

X = English songs to enhance learning achievement

O2 = Measurement of the achievement of the post-test score

The population in this study was the students in Sichuan Yibin Vocational Technical School in semester 2/2023 about 200 students. The sample of this research was 54 students. They were the worst-sores of the 200 students. They were selected by Chung TeFan' technique. The ability to classify tests (value r) with 27% technique or Chung TeFan's method.

Research Materials

The classroom English songs used in this experiment selected 3 English songs about occupation, which are suitable for vocational school students in industrial vocational and technical schools. These 3 English songs, the language difficulty is moderate, the tune is bright and smooth, the repetition rate of the lyrics is relatively high, which is convenient for students to master, learning these songs can not only consolidate the knowledge points, but also expand because of the original knowledge.

In the current study, the researcher created the lesson plans for three weeks to plan what and how to teach the students each week.

According to the course description, the study was divided into two parts, the survey test phase and the song teaching experimental phase, for a total of 3 weeks, with two lessons per week, lasting one month The details of each week are provided below:

Week 1:

The pre-test test is the first English song, then the first English song teaching, and finally the first English song after the test.

Week 2:

The pre-test test is the second English song, then the second English song teaching, and finally the second English song after the test.

Week 3:

The pre-test test is the third English song, then the third English song teaching, and finally the third English song after the test.

Teaching Process:

Step 1:

The researcher studied theories of English conversation and attitude measurement to develop the questions in the pre-test, post-test.

Step 2:
The pre-test, post-test was reviewed by the researcher's advisor and other experts in the field.
Step 3:
The pre-test, post-test was piloted with 54 students.
Step 4:
54 students were selected from the 200 students, in school of Yibin Industrial Vocational and Technical School in Sichuan Province., China, were assigned to complete the pre-test. The test time was approximately half an hour.
Step 5:
The researcher created the lesson plan using English songs improve the low scores students. This lesson plan was designed for four weeks and approved by the researcher's advisor and experts in the field.
Step 6:
The researcher ran the class based on the lesson plan. The students were taught English songs for four weeks. After that, they were assigned to complete both the post-test. The test time was approximately half an hour.

Research Results

1. Evaluation of English songs teaching to enhance learning achievement of low score students, China from three content experts.

The 10 items of evaluation consist of the form issued by three contents experts. A 5-point rating scale is utilized in this section to represent the content experts' opinion. Each criterion rating is identified as illustrated in Table below:

Table 1 - Evaluation of English songs teaching to enhance learning achievement of low score students, China from three content experts.

Evaluation Items	$\bar{X}$	**S.D.**	**Result Interpretation**
1. Consistency between content and learning objectives.	5.00	0.00	Excellent
2. The content is interesting.	4.67	0.58	Excellent
3. Content and activities are appropriate for learners.	5.00	0.00	Excellent
4. The amount of content in each activity is appropriate.	5.00	0.00	Excellent
5. Content sorting is appropriate.	4.67	0.58	Excellent
6. Content accuracy.	4.67	0.58	Excellent

7. The language used in the content is appropriate for the learners.	5.00	0.00	Excellent
8. Activities are consistent with the content.	5.00	0.00	Excellent
9. There is a presentation format to stimulate the learners' interest.	5.00	0.00	Excellent
10. The overview of the content is complete.	5.00	0.00	Excellent
Total	4.87	0.23	Excellent

From Table 1, Results of evaluation of using English songs to enhance learning achievement, China by three content experts. The overall quality was excellent level ($\bar{X}$=4.87, S.D. = 0.23). When considering each item, it was found that consistency between content and learning objectives, the language used in the content is appropriate for the learners, the amount of content in each activity is appropriate. There is a presentation format to stimulate the learners' interest. Activities are consistent with the content and the overview of the content is complete were excellent level ($\bar{X}$=5.00, S.D. =0.00), respectively.

2. The efficiency of using English songs to enhance learning achievement of vocational scores lowest students.

Table 2 - The efficiency of using English songs to enhance learning achievement of vocational scores lowest students.

Number of questions	60
Number of students	54
P1 (Summation score of pre-tests)	10668
P2 (Summation score of post-tests)	14547
Total (Full scores multiplied x Number of students)	5400
Effectiveness Index (E.I.)	0.7363
Cognitive improvement (%)	73.63

From Table 2, the score of pre-tests was 10668, and the score of post-tests was 14547, which indicated a substantial improvement upon the English songs to enhance learning achievement on the low scores' vocational students. The result revealed that the value of Effectiveness Index (E.I.). as 0.73 or calculated as 73 percentage. To summarize, English songs can enhance learning achievement of vocational scores lowest students.

3. Compare the learning achievement of students between pre-test and post-test scores using English songs.

Table 3 - Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	ost - Pre	71.8333	6.56103	.89284	70.0425	73.6241	80.455	53	.000

*The mean difference is significant at the 0.05 level.

The table 3 shows the result of the comparison between the pre-test and the post-test found that after using English songs improving, the post-test achievement score was higher than the pre-test score level at a statistically significant level of 0.05 (t=80.455, p=.000).

Summary of the Results

Results of evaluation efficiency of using an edutainment teaching technique by use English songs to improve the English scores of the low achievement students. The P1 score of the pre-test was 10668 points, and the P2 score of the post-test was 14547 points, indicating that use English songs has a great improvement in improving to improve the English scores of the low achievement students. The results show that the effective index (E.I.) is 73.63%. To sum up, using an edutainment teaching technique by use English songs to improve the English scores of the low achievement students' concept is formulated in accordance with Chinese standard 0.5 for the learning performance of vocational school.

Results of evaluation of using an edutainment teaching technique by use English songs to improve the English scores of the low achievement students by three content experts. The overall quality was excellent level ($\bar{X}$=4.87, S.D. = 0.23). When considering each item, it was found that consistency between content and learning objectives, the language used in the content is appropriate for the learners, the amount of content in each activity is appropriate. There is a presentation format to stimulate the learners' interest. Activities are consistent with the content and the overview of the content is complete were excellent level ($\bar{X}$=5.00, S.D. =0.00), respectively.

Compare the learning achievement of students between pre-test and post-test scores using an edutainment teaching technique by use English songs to improve the English scores of the low achievement students. The conclusion is that using an edutainment teaching technique by use English songs to improve the English scores of the low achievement students. The mean score was 71.8333, and the standard deviation (SD) score was 6.56. and the T is 80.455, and the sig.(2-tailed) is .000 and the difference was statistically significant at .05 level.

Conclusion

In my study use an edutainment teaching technique by use English songs to improve the English scores of the low achievement students., The research benefits are that English songs

could improve achievement scores after using the songs with statistical significance, learning motivation, and making Educational Quality in China through the 4-element goal of Sustainable Development Goal (SDGs).

Discussion and Recommendation

This paper first demonstrates the importance and feasibility of the application of English songs in the field of English teaching through many theoretical analyses, combined with the theoretical basis of psychology, pedagogy, music, and other fields. Finally, through the teaching case analysis, the feasibility and importance of the application of English songs to improve the performance of low scores English students are demonstrated. Through the analysis and discussion of the importance, feasibility, and application forms of English songs in the field of English teaching, combined with previous exploration and practice, as well as my own teaching cases, this paper proves that music can be highly possible to form a specialized research field in different language teaching, especially the feasibility and importance of improving English teaching.

Based on summarizing previous studies and combining with its own teaching characteristics, this paper classifies the application of English songs in the English teaching process of junior high school from the perspective of language knowledge (such as vocabulary, pronunciation, grammar, etc.) and language skills (listening, speaking, reading, writing, translating, etc.). In addition, it demonstrates the importance and feasibility of the application of English songs in the field of English teaching and learning from the perspective of case analysis.

This paper involves a wide range of knowledge and cross-combination, not only to make use of linguistics, pedagogy, music, psychology, physiology and other disciplines of theory and practice, but also need to collect and study a lot of different subjects of data. Due to the limitation of capacity, there are certain limitations in the collection and analysis of relevant data.

Based on the summary and discussion of the study, the researcher has several suggestions for further study as follows:

Language Skills Dimension Study: Investigate the specific impact of English songs on different language skills, such as listening, speaking, reading, and writing, to comprehensively assess their role in improving student achievement.

Educational Technology Integration: Explore how educational technology, such as virtual reality (VR) or augmented reality (AR), can be combined with English songs to improve student achievement in English subjects.

Innovative Teaching Methods: Explore innovative teaching methods, such as the use of social media or online collaboration tools, to promote student learning using English songs, and assess the impact of these methods on student achievement.

Independent Learning Ability: To study the effect of English songs on students' independent learning ability, including their role in extracurricular learning and independent practice.

These recommendations are intended to promote more in-depth, comprehensive research to understand how English songs can most effectively improve students' English achievement.

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Contact emails: deng_x@mail.rmutt.ac.th
metee_p@rmutt.ac.th

The Impact of Picture Book to Enhance Learning Achievement on the Chinese Traditional Culture Course

Lan Lan, Rajamangala University of Technology Thanyaburi, Thailand
Metee Pigultong, University of Technology Thanyaburi, Thailand

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Abstract
In recent years, with the advancement of globalization and the rapid development of information technology, China's education industry has shown a rapid development trend, but it is still faced with new opportunities and challenges, and educational content and teaching methods need to be reformed. This paper discusses the difficulties encountered by students in learning Chinese traditional culture course. In order to solve these problems, this study puts forward the application of picture books in teaching. The purpose of this study were: 1) Comparison of achievements before and after using picture books to learn Chinese traditional culture, 2) Study the effectiveness index after learning Chinese traditional culture from picture books, 3) Study students' satisfaction after learning Chinese traditional culture. This study took 5 classes of Sichuan Vocational College of Health and Rehabilitation as the research populations. Only 1 class with the lowest pretest score was selected by the purposive sampling method. The research instruments include1) picture books,2) Achievement papers, and 3) Students Satisfaction evaluation form. The statistics used in this study include: 1) Mean ($\bar{X}$), 2) Standard Deviation (SD), 3) Dependent t-test, 4) Effectiveness index. The research results found that, 1) The achievement scores between before and after use the picture book were different at a statistically significant level of .05. (t=-23.85,p=.000). 2) The effectiveness index was .3652; in other words, students had higher post-test scores of 36.52 percent of cognitive score improvement. 3) The satisfaction of students is Strongly Satisfaction ($\bar{X}$=4.58, S.D=0.67).

Keywords: Picture Book, Chinese Traditional Culture, Learning Achievement, Effectiveness Index

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Introduction

Background of Statement

In recent years, with the advancement of globalization and the rapid development of information technology, China's education industry has shown a rapid development trend, but it is still faced with new opportunities and challenges, and educational content and teaching methods need to be reformed. The traditional teaching method emphasizes the inculcation of knowledge and rote memorization, but lacks the link of cultivating students' innovation ability and practical application ability. Students lack opportunities for interaction and participation in the classroom, and lack the development of critical thinking and problem solving skills.At the same time, with the development of science and technology, the way of information dissemination and people's access to information have been expanded, and the visual culture of easier and faster access to information has risen, and the "era of picture reading" has come, and beauty has become an important way for people to perceive the world. However, we should not simply put pictures and words in opposition, excessive contempt or excessive favor of pictures, pictures and words should be complementary symbiosis in order to co instantly optimize the dissemination of information. Picture book -- a visual form of organic combination of text and text, with the aesthetic characteristics of utilitarianism, intuition, creativity, transcendence and pleasure, can show the beauty of words and pictures (LI Shijuan, LI Donglai, 2017). On September 15, 2015, The General Office of the State Council issued Opinions on Comprehensively Strengthening and Improving aesthetic education in Schools (Document No. 71 issued by the State Office of the People's Republic of China [2015]), pointing out that the construction of aesthetic education course should be "mutually permeated and integrated by various disciplines", and aesthetic education and teaching should be greatly improved. General Secretary Xi Jinping emphasized in his speech at the 2018 National Education Conference that "promoting comprehensive human development and social progress has put forward new and higher requirements for education and learning", and that "we must adhere to educating people with aesthetics and culture, and improve the aesthetic and cultural literacy of higher vocational education students"(Wu Jing, Hu Hao, 2018). In order to further strengthen the function of aesthetic education in traditional culture course, the General Office of the CPC Central Committee and The General Office of the State Council issued Opinions on Comprehensively Strengthening and Improving Aesthetic Education in Schools in the New Era in October 2020(China Moral Education, 2015),which added that aesthetic education is also "education that enriches imagination and cultivates innovative consciousness" (Yu Kailiang,2019) and emphasized the need to "establish the concept of disciplinary integration". Fully excavate and apply aesthetic education resources in disciplines, "the stage of higher vocational education enriches aesthetic experience, broadens humanistic vision, and guides higher vocational education students to establish correct aesthetic and cultural views" (Li Peng, 2016). It can be seen that the rapid development of today's society has put forward new requirements for the education in the new era. It is necessary to effectively stimulate the observation and appreciation of higher vocational education students (Hereinafter referred to as vocational students) on things, and then stimulate the aesthetic interest of higher vocational students, promote the development of students' aesthetic ability, and enrich students' aesthetic feelings (People's Daily,2020). In the face of such new opportunities and challenges, picture book education plays an important role in national education.

Through talking with vocational students, it is found that some vocational students think that the existing course of Chinese traditional culture are boring and boring, and the course

learning is not interesting. They mainly focus on rote memorization and so on. They cannot really understand the connotation and are difficult to apply. Even don't like to read Chinese traditional culture course study books, don't like to learn traditional culture course, thus forming a vicious circle. Compared with textbooks, vocational college students prefer to read anime, comics, picture books, and so on. Visual media has penetrated into almost every aspect of vocational college students' life. Vocational college students not only read picture books, comics, etc., but also hand-draw some pictures in textbooks and notes (Flood J,1995). Why is that? It turns out that processing highly condensed words requires more brain power than processing simple images. Therefore, if picture books are combined with the teaching of Chinese traditional culture, is it helpful to enhance the interest of vocational students in learning Chinese traditional culture course? Based on this, the researcher conducted a large number of literature surveys and found that picture books are widely used in teaching and rarely used in higher vocational education, which has great research space.Based on this, the researcher has carried out preliminary investigations, the results showed that 92.0% people of higher vocational students believe in learning tired when using picture books teaching effect may be the best, hope students in the course of Chinese traditional culture, the use of picture books teaching 64.0% people of higher vocational students in Chinese traditional culture in the inset picture books teaching the use of this painting expectations are high, In particular, I have the highest expectation for funny picture books. (Flack J,1995)However, there are no picture books in the market that are fully compatible with Chinese traditional culture course, so it is urgent to independently develop picture picture books suitable for Chinese traditional culture course.

Research Objectives

1. To compare of achievement scores before and after using a picture book for Chinese traditional culture learning.
2. To study the effectiveness index after using a picture book for Chinese traditional culture learning.
3. To study of the student's satisfaction after using a picture book for Chinese traditional culture learning.

Conceptual Framework

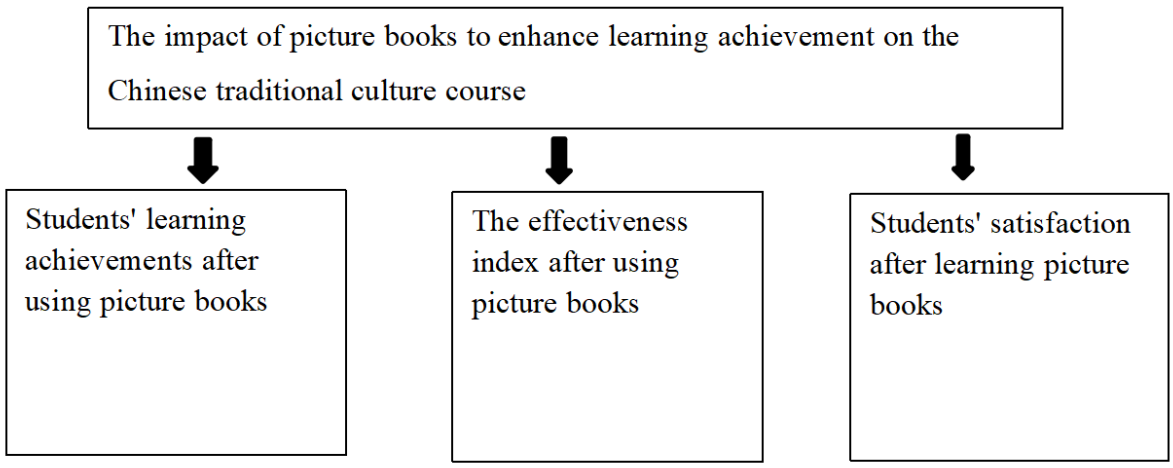

Figure 1: Conceptual framework

Definition of Keywords

The researcher has limited Keywords as follows:

1. Picture Book

A picture book is a book that focuses on drawings, usually with a small amount of text attached. Its definition can be understood as a special kind of picture storybook in which words and pictures complement each other and work together to tell a story or convey specific emotions and themes. Picture books do not simply place pictures on paper, but tell stories by interweaving and interacting in different dimensions through the two mediums of painting and text. This form of books is not limited to children's books, but also includes readers of all ages, such as educational books and popular science content. The purpose of picture books is to inspire children's imagination and interest through the combination of pictures and images, while cultivating their language skills and taste for beautiful things. Although picture books are considered "books with pictures" in many cases, as an independent book form, they emphasize the internal relationship between pictures and texts, and both play an important role in storytelling, and sometimes pictures may play a leading role.

2. Chinese Traditional Culture

Chinese traditional culture includes philosophy, literature, folklore, Chinese traditional art (calligraphy, painting, music, dance, architecture, etc.), tea ceremony, food culture, etc., which refers to the unique Chinese culture that has evolved and developed on the basis of the Central Plains culture. After more than a thousand years of historical evolution of Chinese culture, it is said that there were Chao, Cheren, Fuxi, Shennong (Yan Emperor), Huang Emperor (Xuanyuan), Yao, Shun, Yu and other eras, to the establishment and development of the first country in China, Xia Dynasty, a China with a splendid culture, with rich and colorful cultural elements standing in the East of the world. At present,Chinese traditional culture is spreading to all parts of the world through the Internet and other ways.

3. Learning Achievement

Learning achievement refers to the learner's outcome after the learning process by using relevant test tools to measure factors such as cognitive, emotional and practical ability.

4. Effectiveness Index

Effectiveness index is the degree to which the information obtained in the assessment can effectively represent the assessment object. The degree to which the Effectiveness index, content, evaluation criteria and evaluation methods of the index reflect the accuracy and stability of the evaluation results. That is, the degree to which the information obtained in the assessment can effectively represent the assessment object.

Research Methodology

The research objects of this study include about 200 students from 5 classes of Sichuan Vocational College of Health and Rehabilitation in the first semester of 2023. The sample of this study is 40 students in one of 5 classes. They were students of researchers working at the Sichuan Health Rehabilitation Vocational College in China. Secondly, they learn Chinese, history and politics in middle school, especially those who are liberal arts students. They have a certain traditional cultural foundation and can learn and read traditional cultural

courses, which is conducive to the development of picture book teaching and independent reading.

The procedures of this study are:

Step 1: The researchers formulated the questions in the pre-test, post-test and questionnaire according to the content of the picture book.

Step 2: The researcher's advisor and other experts in the field conducted a review of the pre-test, post-test and questionnaire.

Step 3: The pre-test was conducted on 40 selected students, and the test time was about one hour.

Step 4: The researchers used picture book teaching in the course of Chinese traditional culture to develop a course plan. This course plan was designed over a period of six weeks and was approved by the advisors of the researchers and experts in the field.

Step 5: The researcher arranges the class according to the teaching plan. A six-week traditional Chinese culture course was taught to students through picture book teaching to understand their learning outcomes. After that, they were assigned to complete post-test and questionnaire surveys. The test lasts about one hour.

The research instruments consisted of:

(1) Picture Books

Select the content related to calligraphy, painting, architecture and sculpture from the textbook of Traditional Chinese Culture, find out the corresponding pictures from the Internet, and put the corresponding text introduction.

(2) Pre-test and Post-test as Performance Assessment

Pre-test and post-test questions are the same. The test includes traditional Chinese arts, including calligraphy, painting, music, dance, architecture and so on. Students were asked to take a pre-test before learning through the picture book and a post-test after learning through the picture book.

Step 1: Three measurement and evaluation specialists working in the field of measurement and evaluation or education were asked to check for consistency between goals and items in the test. The resulting data were used to calculate the project Objective conformance Index (IOC).

Step 2: 40 students in the first grade of Sichuan Vocational College of Health and Rehabilitation were tested by the method of pre-test and post-test. A tested attempt to find the difficulty index, the discrimination index, and the reliability index of the achievement test. Using Kuder Richardson's K-R#20 formula, we found that the difficulty index should be between 0.2 and 0.8, the discrimination index should be 0.2 or higher, and the reliability should be 0.8 or higher.

Step 3: Through the application of picture books in the teaching of Chinese traditional culture course, we will use pre-test and post-test together with participants to explore their knowledge reserve before and after learning picture books.

(3) The Evaluation Form Regarding the Quality of Contents

Evaluation of the application of picture books to Chinese traditional culture course by three content experts to improve students' academic performance. Content experts working in the field of traditional Chinese culture are asked to check whether the content used in picture books is suitable for teaching Chinese traditional culture course.

The researcher has completed the following steps:

Step 1: The assessments in this study were developed to conform to the research hypothesis. It is therefore developed on the basis of the two theories used in this study. Studies have shown that using picture books in Chinese traditional culture course can improve students' academic performance. The questionnaire aims to measure experts' opinions on the teaching of Chinese traditional culture course through the use of picture books, so as to improve students' academic performance. This part is a closed questionnaire based on a five (5) point Likert type scale. Participants were asked to rate how much they agreed with each statement on a scale of numbers 1-5. The explanation for each number is as follows:

5 = Excellent
4 = Good
3 = Average
2 = Poor
1 = Very Poor

Step 2: Before attempting the assessment, three measurement and evaluation experts working in the field of measurement and evaluation or education were asked to check the appropriateness of the language used in the questionnaire. The resulting data were used to calculate the project Objective conformance Index (IOC).

Step 3: The assessment will be used by experts. Evaluate the content quality of picture books used in Chinese traditional culture course for content experts to improve students' academic performance.

(4) Questionnaire

This study adopts the method of questionnaire survey to understand students' learning situation through the application of picture books in Chinese traditional culture course, so as to improve students' academic performance. The researchers completed the following steps:

Step 1: The questionnaires in this study were prepared to conform to the research hypothesis. It is therefore developed on the basis of the two theories used in this study. Studies have shown that applying picture books to Chinese traditional culture course can improve students' academic performance.The questionnaire was designed to measure students' satisfaction with picture books. This part is a closed questionnaire based on a five (5) point Likert type scale.

Step 2: Before trying out the questionnaire, three measurement and evaluation experts working in the field of measurement and evaluation or education were asked to check the appropriateness of the language used in the questionnaire. The resulting data were used to calculate the project Objective conformance Index (IOC).

Step 3: Participants will use a questionnaire survey to explore their satisfaction with the learning of Chinese traditional culture course through the use of picture books.

Research Results:

The results of the implementation of the action are presented as the following:

1. The use of picture books by students of Sichuan Vocational College of Health and Rehabilitation is conducive to improving the t-test of individual differences in students' academic performance, and comparing students' academic performance before and after the test.

Table 1: Comparison of average scores before and after individual differences of students in Sichuan Vocational College of Health and Rehabilitation using picture books to learn Chinese traditional culture course

	n	$\overline{X}$	S.D	T-test	Df	Sig. (2-tailed)
Pre-test	40	62.63	6.44	-23.85	39	.000
Post-test	40	76.28	8.02			

*p<.05

As can be seen from Table 1, the average score of students who did not use picture books for teaching traditional culture course was 62.63 points, and the average score of the post-test was 76.28 points, The average scores of the two groups were different (t=-23.85,p=.000), indicating that the use of picture books for teaching Chinese traditional culture course in Sichuan Vocational College of Health and Rehabilitation had substantial optimization and improvement in improving students' academic performance.

2. To study the effectiveness of learning picture books in Sichuan Vocational College of Health and Rehabilitation to improve students' performance in learning Chinese traditional culture course as shown as Table 2.

Table 2: The effectiveness of learning picture books in Sichuan Vocational College of Health and Rehabilitation

Number of questions	100
Number of students	40
P1 (Summation score of pre-tests)	2505
P2 (Summation score of posttests)	3051
Total (Number of questions x Number of students)	4000
Effectiveness of cognitive score	0.3652
Cognitive improvement (%)	36.52

Table 2 shows that, the students had a 36.52 percent of cognitive score improvement.

3. Evaluation by three content experts on the effectiveness of learning results in the use of picture books in Chinese traditional culture course.

Table 3: Evaluation results of three content experts on the learning performance of picture books in Chinese traditional culture course

Assessment	$\bar{X}$	S.D	Result
1.Picture book is good for stimulating interest in learning	4.83	0.59	Excellent
2.Using picture book is easy to understand	4.73	0.59	Excellent
3.Picture book has clear pictures	4.73	0.58	Excellent
4.The content of the picture book is suitable for the cultural curriculum	4.68	0.58	Excellent
5.The picture content of the picture book is consistent with the course	4.57	0.58	Good
6.Picture book looks good, not complicated	4.53	0.58	Good
7.Picture book enable everyone to understand the cultural content more deeply	4.53	0.57	Good
8.The picture book is clear and easy to understand	4.53	0.57	Good
9.Use picture book teaching to promote development and innovation	4.37	0.58	Good
10.Picture book is related to the course content	3.02	1.73	Normal
Total	4.33	0.66	Good

As can be seen from Table 3, three content experts evaluated the learning performance of using picture books in Chinese traditional culture course. Overall quality is good ($\bar{X}$=4.33, S.D=0.66). The use of picture books in Chinese traditional culture course is conducive to the output of cultural course, easy to understand, and stimulate students' interest in learning. At the same time, the pictures are clear and beautiful, and the experience is good. ($\bar{X}$=4.33, S.D=0.66).

4. To study the satisfaction of students in Sichuan Vocational College of Health and Rehabilitation in learning Chinese traditional culture course through picture books.

The researchers conducted a questionnaire survey on 40 first-year college students in Sichuan Vocational College of Health and Rehabilitation to explore the students' satisfaction in learning Chinese traditional culture course through picture books.

Table 4: Students' satisfaction with the use of picture books in Sichuan Vocational College of Health and Rehabilitation

Assessment	$\bar{X}$	S.D	Result
1.Overall satisfaction of learning cultural course through picture book is improved.	4.86	0.51	Highest
2.Picture book length is appropriate, will not make people's concentration of learning fatigue.	4.69	0.63	Highest
3.Picture book experience is good, deep memory.	4.66	0.63	Highest
4.Picture book can be easily applied after learning the course.	4.62	0.81	Highest
5.Picture book use improves academic performance.	4.61	0.80	Highest
6.The combination of picture book and traditional classroom teaching can achieve the most valuable learning effect.	4.55	0.62	Highest
7.The content of the picture book is clear and easy to understand, which helps to better understand the course knowledge.	4.43	0.77	High
8.The picture quality and technical level of picture book need to be improved.	4.43	0.72	High
9.The interspersed form of picture book in the cultural course arouses interest.	4.43	0.72	High
10.Picture book can stimulate the demand for learning resources of Chinese traditional culture course.	4.33	0.71	High
Total	4.58	0.67	Highest

As can be seen from Table 4, the evaluation results of students' satisfaction with the use of picture books in Chinese traditional culture course show that the study on the use of picture books in Chinese traditional culture course in Sichuan Vocational College of Health and Rehabilitation is conducive to students' learning, and the overall satisfaction of students is very consistent. When considering each project, it is found that learning Chinese traditional culture course through picture books can stimulate students' creativity and learning interest, which is very consistent. Learning Chinese traditional culture course through picture books creates a good atmosphere ($\bar{X}$=4.58, S.D=0.67).

Conclusion

1. Taking Sichuan Vocational College of Health and Rehabilitation as an example, the average score of students who did not use picture books to teach Chinese traditional culture course in this study was 62.63 points, and the average score of the post-test was 76.28 points, and the average score of the two groups was compared by P<.05. It can be concluded that the use of picture books in teaching Chinese traditional culture course in Sichuan Vocational College of Health and Rehabilitation is conducive to improving students' academic performance.This may be because the use of picture books to teach Chinese traditional culture course has substantial improvements in improving students' academic performance.

2. The effectiveness of learning picture book in Sichuan Vocational College of Health and Rehabilitation to improve students' performance in learning Chinese traditional culture course was studied. The results show that the students had a 36.52 percent of cognitive score improvement.The difficulty coefficient of the examination paper is 0.76, which indicates that the students' answers can truly reflect the students' mastery of traditional culture course under the condition of using picture book.

3. The study performance of picture book application in Chinese traditional culture course of Sichuan Vocational College of Health and Rehabilitation was evaluated. The results show that the mean value of the overall score is $\bar{X}$=4.33, and the standard deviation is 0.66, indicating that the application of picture books in Chinese traditional culture course is conducive to promoting students' understanding of curriculum knowledge and the output of cultural course content.

4. This paper studied the satisfaction of 40 first-year college students in Sichuan Vocational College of Health and Rehabilitation in learning Chinese traditional culture course through picture books. The results show that the mean value of the test score is $\bar{X}$=4.58, and the standard deviation is 0.67, which indicates that students are more satisfied with the use of drawing to learn Chinese traditional culture course, and can stimulate students' interest in learning to a certain extent.

Discussion

Although this study has made some preliminary findings through empirical research, there are still some shortcomings that need to be improved in future research:

1. In terms of sample, due to the influence of funds, manpower and other factors, this study could not strictly follow the stratified sampling method when conducting questionnaire survey, resulting in unbalanced distribution of some demographic variables in the sample, which may affect the representativeness of the sample to some extent. The next step is to expand the sample size and draw more general conclusions.

2. This study only conducted a horizontal study without longitudinal follow-up investigation, and the cross-sectional data cannot be used to explain the causal inference relationship. In the future research, the relationship between variables can be clarified through longitudinal investigation, and the reasons for students' differences in using drawing books to learn Chinese traditional culture course can be discussed and analyzed in detail and depth.

3. The study performance before and after the test was conducted to understand the influence of picture book learning on improving students' performance in Chinese traditional culture course. The results show that the application of picture books to

Chinese traditional culture courses can improve students' performance in learning Chinese traditional culture courses. The mean pretest score was 62.63 and the standard deviation (S.D.) score was 6.44. After using picture books to improve students' learning of Chinese traditional culture course to improve their academic performance, students' academic performance was significantly improved, which was translated into an average score of 76.28 and a standard deviation (S.D.) of 8.02 in the post-test, as well as a T-test analysis of 23.85 before and after treatment, indicating that the use of picture books in teaching can help stimulate students' learning interest in Chinese traditional culture course. And improve academic performance. The questionnaire was used to analyze and compare the students' satisfaction in learning Chinese traditional culture course with picture books. The results of this experiment are consistent with those of Song Yu (2023). This study believes that illustration is an important part of books, and illustrated books are conducive to improving the quality of books. Therefore, we should pay attention to the role and value of illustrations, explore the generation mechanism of illustrations and the relationship between illustrations and texts, and further promote the high-quality development of illustrations. This study is consistent with the results of Liu Dan et al. (2023). The study holds that illustration is an easy way for students to accept, and the operation of illustration in teaching materials can make the course more interesting and friendly, and also help students improve the understanding of teaching materials, which carries the interest and beauty of knowledge, and has important value and significance.

Suggestions

1. Create Good Conditions for Teachers to Use Picture Books for Teaching

First, schools should provide excellent teaching environment for teachers. First of all, schools should provide teachers with a broad sense of space and encourage college teachers to actively innovate teaching methods and use various course and teaching resources. Secondly, schools should be able to put consciousness into action, effectively reduce the burden for teachers, so that teachers can apply more energy to teaching. On the one hand, the division of duties and responsibilities of the school should be clarified, and the administrative affairs should be undertaken by full-time personnel, reducing the task levels and the transactional work of teachers, so that teachers can have more sufficient time to study teaching. On the other hand, teachers can devote more time and energy to their own lesson preparation. With sufficient time, teachers are more able to work hard in their own work, and then implement the use of teaching resources in every place.

Second, we will deepen the teaching and training of teachers. Teacher training is a kind of continuing education for in-service teachers, which mainly includes collective observation and mutual discussion. First of all, schools can form a support group of "promoting the new with the old", select teachers with senior teaching age and rich teaching experience, let them become teaching models, learn how the old teachers make use of explicit teaching resources such as picture books, and then transfer them to their own teaching. Secondly, experienced teachers lead new young teachers to carry out "collective lesson preparation" activities. Study the syllabus, textbooks, teachers' guidebooks together, analyze the learning situation, make teaching plans, etc.

2. Teachers Reshape the Cognitive Concept of Textbook Picture Book

(1) Establish the awareness of giving priority to using textbook picture book

Teachers' awareness of giving priority to the use of picture book in textbooks means that the relationship between pictures in textbooks and pictures outside textbooks must be dominated by pictures in textbooks and supplemented by pictures outside textbooks. In the teaching of Chinese traditional culture course, teachers should give priority to using pictures in textbooks as teaching resources to teach students new knowledge and arouse students' learning consciousness. It is worth noting that teachers should first read the explanation and hints of the pictures in the teacher reference book when preparing the lesson. If they can meet the needs of teachers, they can directly learn from and use them; If you can't meet the needs of teachers, you can also search for more information about the pictures in this lesson according to the prompts on the teaching staff, and then internalize them into your own products, and then deliver the language to students.

(2) Correctly grasp the relationship between pictures and text

Teachers need to correctly grasp the relationship between pictures and words. On the whole, especially for college students, teachers need to teach students how to read, have an overall grasp of the center of the article, and understand the deeper meaning behind the article, etc. However, teachers should not completely ignore the existence of pictures in textbooks, making them lose their teaching function, and use picture books for the purpose of using picture books. The specific use situation should also be analyzed by teachers according to the actual situation. When the understanding of students is not very good or the learning difficulty is a little bit, the teacher can use the picture book to consider how to use the picture book according to the text content and the actual needs of students.

(3) Improve teaching skills using textbook pictures

In order to obtain teaching resources with high quality and suitable for teaching content, teachers can browse more websites with high evaluation, avoid making arbitrary selection for saving time and effort, and select the courseware that is most appropriate for the teaching content of the unified compilation edition from multiple courseware resources. They should also pay attention to whether pictures in textbooks are used and whether the links and methods of use are appropriate. Finally choose one or two best quality courseware as teaching resources. At the same time, teachers should improve the technology of software operation such as PowerPoint and Shiwo whiteboard APP, watch more videos, and use spare time for practical operation training. If the pictures in the multimedia courseware coincide with those in the textbook, the teacher only needs to make appropriate additions and deletions; if the picture in the textbook is not used in the courseware, the teacher must search, insert and edit the picture again.

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Contact emails: lan_l@mail.rmutt.ac.th
metee_p@rmutt.ac.th

Developing of E-Assessment for Microteaching Using ADDIE

Nyoman Sugihartini, Universitas Negeri Malang, Indonesia
Hakkun Elmunsyah, Universitas Negeri Malang, Indonesia
Didik Nurhadi, Universitas Negeri Malang, Indonesia
Yuni Rahmawati, Universitas Negeri Malang, Indonesia

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Abstract
This study aimed to develop a digital assessment system. The system was developed with the ADDIE model. Based on the results of the research, it shows that at the Analysis stage a curriculum mapping is carried out which includes fourteen learning outcomes that students must master. At the design stage, the system interface design, database design and system user design are carried out. In the Development stage, the rubric integration and assessment grids that have been developed in the analysis and design stages are carried out. At the implementation stage, activities are carried out using the e-assessment system for students who are taking microteaching courses. At the Evaluation stage an analysis of learning outcomes and student responses is carried out. The results of the response analysis stated that e-assessment was very effective in microteaching courses.

Keywords: E-Assessment, Microteaching Course, ADDIE

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1 Introduction

ADDIE is one of the development models used in instructional development research. The advantages of the ADDIE model are: structured, easy to use, each stage is evaluated. In software development, ADDIE has good planning so that errors in planning can be overcome properly because there is an evaluation at the end of each process.

As the name suggests, ADDIE has five stages including: Analysis, design, development, implementation and evaluation. The analysis stage is to carry out the initial analysis required for each process carried out. The design stage is the stage of creating a framework from the results of the analysis that has been carried out. The development stage is a derivative of the framework obtained from the design stage. The implementation stage is to carry out trials of the resulting framework. Meanwhile, the evaluation stage is conducting field trials to see the effectiveness of the product produced.

In developing E-assessment, the ADDIE model is very effectively used. E-assessment is an assessment system packaged in the form of web-based digital technology.

1.1 E-Assessment in Learning

Assessment is the process of determining the value of data collection carried out (Sugihartini & Agustini, 2017). Assessment is also said to be the final decision on the overall assessment process of a person (Munazar & Qomarudin, n.d.). In the world of education, assessment is a very important activity process carried out by teachers because it will provide an overview related to the effectiveness or absence of a learning process [10], the level of achievement of learning objectives, the effectiveness of a learning method applied, and information about the learning progress of students (Adnyana et al., 2019).

In the independent curriculum that applies in Indonesia, under the supervision of the Ministry of Education and Culture, student assessment began to be encouraged to support learning based on student development. This learning trend is known as Teaching at the Right Level (Tarl). The process of learning progress should look at the abilities of each individual (learner). Thus, this is in accordance with the concept of assessment where not only information on learning outcomes is obtained, but also: information related to learning ability [12], the learning progress of each student, and things that need to be improved and strengthened by students can also be described in detail through the assessment process in learning with the type of peer assessment.

Peer assessment is an assessment involving peers that are classmates (Misiejuk & Wasson, 2021). In peer assessment, student performance is assessed by fellow learners (Iglesias Pérez et al., 2022). This assessment strategy involves more than just using key criteria in assessment (Yu, 2011). This strategy also provides opportunities for students to explore the basics of the assessment process, provide specific and descriptive educative feedback, and can maximize self-directed learning to improve student performance (Lai & Hwang, 2015). Peer assessment allows students to give each other valuable feedback, so they can learn and support each other. This provides another dimension to learn, including opportunities to speak, discuss, explain, and challenge, so that they can achieve higher than what they learn (De Brún et al., 2022).

If most teachers conduct assessment by positioning students more than mere assessment objects, then by applying peer assessment students have different positions in learning. In peer assessment, assessment is carried out by asking students to express the strengths and weaknesses of their friends with various things. Thus, peer assessment use a friend as an appraiser. In more detail, the benefits of peer assessment for students include: the development of metacognitive skills so that students can know their strengths and weaknesses, and what must be done to improve the quality of their performance; development of critical thinking skills; learn more about things learned through the approach when learners see their peers assigned tasks; practice and development of communication and social skills when learners provide useful and meaningful feedback to their peers; Instilling good character such as self-confidence and fostering honesty in assessing the performance or work of others.

The main objectives of using peer assessment in classroom learning are to increase student responsibility and autonomy; provide a deeper understanding of subject, skills and processes; improve the role and status of students from passive learners to active learners as well as assessors; engage students in critical reflection; develop a better understanding of learners based on their own subjectivity and judgment. Currently is an era of student-centered learning, so it is better for assessments to be carried out that are also student-centered by involving these students in the assessment process (Xiao & Lucking, 2008).

The advantages of peer assessment are: it helps expose misconceptions; provide direct support to learning activities in the classroom; often learners will respond more positively to their friends than to their teachers; assessments are more individual, interactive and contextual; social and communication skills can be improved; teachers can focus more on observing and intervening in the learning process; learners are egaged in reflection on their own learning and know what to improve and how to iprove it; learners take more responsibility for their own learning; help develop skills needed in their environment; Learners can gain a clearer understanding of the purpose and need for assessment thereby maximizing the efficiency of time use for teachers and learners (Ng & Yu, 2023).

Peer assessment is very well used in applicative and practical learning (Double et al., 2020). Morever, the goal to be achieved in learning is skills, such as microteaching courses (Ristapawa Indra Antomi Saregar, 2018). Microteaching courses are courses that teach concepts, theories, simulations [22] (Sugihartini et al., 2021)[23] (Zhou et al., 2017). The teaching ability provided includes eight teaching skills and one individual comprehension technique (Sugihartini, Hadi, Wahyuni, & Agustini, 2023). The eight teaching skills include: lesson opening skills; skills of closing lessons; questioning skills; classroom management skills; skills of using variations; skills in managing small and large groups; discussion guiding skills; and the ability to explain lessons [25] [26] (Bak, 2014).

1.2 Microteaching Course

Microteaching is a course that provides theoretical concepts of teaching skills and trains prospective teacher students to simulate teaching on a small (micro) scale (Altuk et al., 2012). There are several teaching skills provided in microteaching courses including (Sugihartini & Agustini, 2017):

1) Questioning skills
   Questioning skills are skills that must be mastered by a teacher in conducting questioning activities. There are 2 questioning skills, including: basic questioning

skills and advanced questioning skills. Basic questioning skills are questioning skills that are usually carried out at the beginning of learning such as conducting apperception activities or providing trigger questions for students. Meanwhile, advanced questioning skills are questioning skills that are carried out according to the cognitive level of students' learning. Advanced questioning skills are usually carried out in the middle of the learning process and at the end of learning.

2) Reinforcement skills
   Reinforcement skills are skills that must be possessed by a teacher in providing emphasis to emphasize the material presented. Reinforcement skills can be done verbally or non-verbally.
3) Skills using variations
   The skill of using variation is a skill that must be mastered by a teacher in using various variations. Variations can be in the form of using variations in learning media, variations in learning models, variations in learning approaches, variations in learning methods, and so on.
4) Explaining skills
   Explaining is the core activity of the learning process. Explaining skills are essential skills that must be mastered by a teacher. Explaining skills reflect the teacher's mastery of the material presented.
5) Lesson opening skills
   Lesson opening skills are skills that are carried out when starting the learning process, for example: saying greetings (good morning, good afternoon), asking how you are, and conveying learning objectives. Opening the lesson is important because it will lead to a more meaningful learning process.
6) Lesson closing skills
   Closing skills are skills that must be mastered by the teacher in ending the learning process, such as saying closing greetings, conveying subject matter for the next meeting, giving assignments, or conducting learning evaluations.
7) Classroom management skills
   Classroom management skills are skills that must be possessed by a teacher in maintaining classroom conditions during the learning process.
8) Small group and individual teaching skills
   Small group teaching skills are the skills of a teacher in managing small group discussions. While individual teaching skills are the skills of a teacher in personally guiding students, for example for students who have very high abilities or vice versa.

2 Method

This research is a research and development (R & D) study. The development model used adapts from the ADDIE model (Fig. 1). However, the model of the innovation process that occurs in this development research is in accordance with Systematic model of Education innovation (fig. 5) which is described in detail in the result and discussion section. The ADDIE model has a focus or emphasis on iteration and reflection, so that continuous improvement can be made focusing on feedback (Zhou et al., 2017). The ADDIE model (Yao et al., 2022) is a development model popularized by Reiser and Molenda (1990). The ADDIE model is a guide in building effective and dynamic tools and infrastructure. The ADDIE model was chosen because it is often used to describe a systematic approach to instructional development. The ADDIE process is sequential but interactive, where the results of the evaluation of each stage can lead to development at the next stage.

Figure 1. The concept of ADDIE model

a. The analysis stage is the initial stage carried out in the research, including analyzing system requirements, analyzing table requirements in the database and analyzing the curriculum used in microteaching courses.
b. The design stage is the second stage carried out after the analysis stage. The activities carried out in the design stage are designing a database, designing instruments that will be used by teachers and students.
c. The development stage is the third stage carried out after the design stage. The activities carried out are developing a web system, integrating microteaching instruments into the web system. Before the microteaching instrument is integrated into the web system, expert testing is first carried out on the instrument that has been developed. if the expert test has been fulfilled, then the microteaching instrument is integrated into the web-based system.
d. The implementation stage is the stage of using peer assessment performance to students and lecturers. The implementation of this web-based peer assessment is only carried out a limited trial, namely testing on students who are taking microteaching courses and then analyzing learning outcomes and responses.

3 Results and Discussion

The results and discussion are described in accordance with the stages of ADDIE which include: Analysis, Design, Development, Implementation, and Evaluation and supported by Systematic model of Education innovation that is in accordance with the innovation management process in this study.

1. Analysis

In the system, there are three levels of users, namely admin, lecturer and student. Admin is a user with full rights which means that the admin can do all tasks in the system such as managing users (can add lecturers and students), managing assessment rubrics (assessment indicators, assessment item items, scoring), and logging in and out on the system. While the next user level is Lecturer. Lecturers can manage student names (delete, edit, add student mana), can manage assessment rubrics (assessment indicators, assessment items, scores), assess student assignments / performance when bringing teaching skills, can log in and log out on the system. Then the last one is the student user level. Students are the lowest user level. As for what students do, namely providing grades and comments on other students'

assignments / performances. The visualization of the user level of the Web-based peer assessment system can be seen in figure 2. The differences between the three user levels can be seen in table 1.

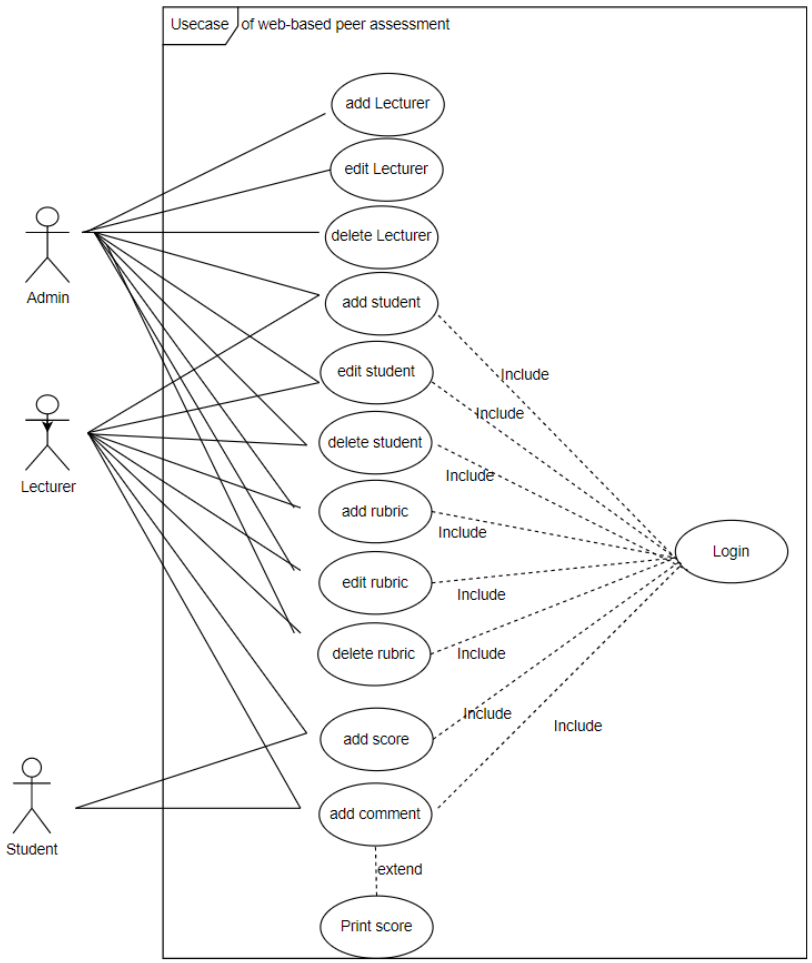

Figure 2. usecase system Web-based peer assessment

Table 1. Web-based peer assessment system user-level access rights

No	User Level	Access Right
1	Admin	Manage users (can add lecturers and students), can manage assessment rubrics (assessment indicators, assessment items, scoring), and can log in and log out on the system.
2	Lecturer	manage student names (delete, edit, add student where), can manage assessment rubrics (assessment indicators, assessment items, scoring), assess student assignments / performance when bringing teaching skills, can log in and log out on the system.
3	Students	Provide grades and comments on assignments / performance of other students, see grades and comments given by lecturers and other students.

Based on the results of the analysis stage, an instrument mapping was obtained based on 14 (fourteen) learning outcomes from the microteaching course curriculum. The learning outcomes include:

1) Students are able to analyze the differences between microteaching and ordinary learning,
2) Students are able to analyze the components of questioning skills and reinforcement skills and their implementation,
3) Students are able to apply questioning skills in the learning process,
4) Students are able to apply reinforcement skills in the learning process,
5) Students are able to analyze the skills of using variations and the skills of giving explanations and their implementation,
6) Students are able to apply the skills of using variations in the learning process,
7) Students are able to apply explaining skills in the learning process,
8) Students are able to analyze the skills of opening and closing lessons and classroom management skills and their implementation,
9) Students are able to apply the skills of opening and closing lessons in the learning process,
10) Students are able to apply classroom management skills in the learning process,
11) Students are able to analyze small group and individual teaching skills and small group guidance skills and their implementation,
12) Students are able to apply small group and individual teaching skills in the learning process,
13) Students are able to apply small group guiding skills in the learning process,
14) Students are able to analyze basic integrated teaching skills.

Microteaching courses study how to teach prospective teachers and then train prospective teachers how to teach. The microteaching lecture process is carried out on a small scale with a total of 8-10 students. Microteaching is a very effective course used to train prospective teachers' teaching skills (Zahraini et al., 2021) (Kartal et al., 2012) (Cubukcu, 2010).

2. Design

At the design stage, the results of the draft instrument used in the assessment and the design of the web system were obtained. The instrument was developed based on the 14 learning outcomes, developed an instrument that has gone through expert testing obtained a Gregory coefficient of 1.00. The instrument that was declared valid in the expert test was 26 items. Henceforth, these 26 items are used as a reference in giving quantitative scores through the web system. In addition, the system also provides an open assessment that is used to provide feedback on the developed product. For the web system design, there are three levels of users in the system, including: admin, lecturers and students. Admin is the highest level of system users (Suni Astini, 2020). Admin has full access rights to the system such as user management, rubric management, grade management, and product management. Meanwhile, the lecturer is the highest level after the admin. Lecturers cannot do user management. Lecturers are only able to do rubric management, grade management, and product management. Meanwhile, students are the lowest level of system users. Students are only able to do product management and assess other students' products.

3. Development

At the development stage, the integration of assessment instruments that have been developed at the analysis and design stages is carried out (Fig 3). At the development stage, system testing activities are also carried out which aim to find out errors (bugs) in the system. The system test includes white box test and black box test.

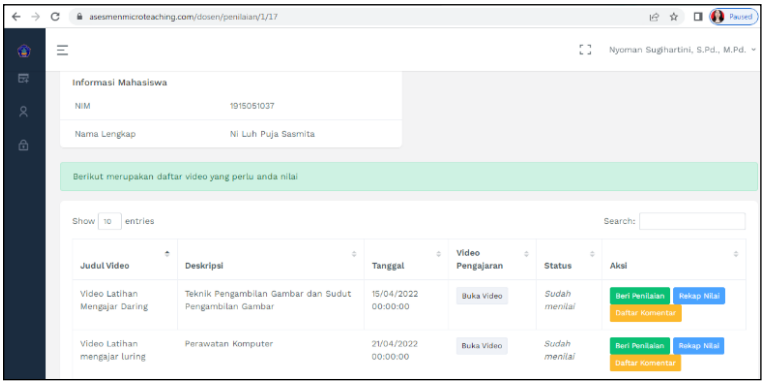

Figure 3. System Peer Assesment in microteaching course

4. Implementation

In the implementation stage, a limited trial was conducted. The limited trial is the implementation of the use of a digital peer assessment system to students who are taking microteaching courses, namely a total of 53 students. The activities carried out are students recording teaching practice activities online and offline then the two videos are uploaded to the web system. The first video result is an offline teaching practice video (fig.4) and the second video is an online teaching practice video (fig.5).

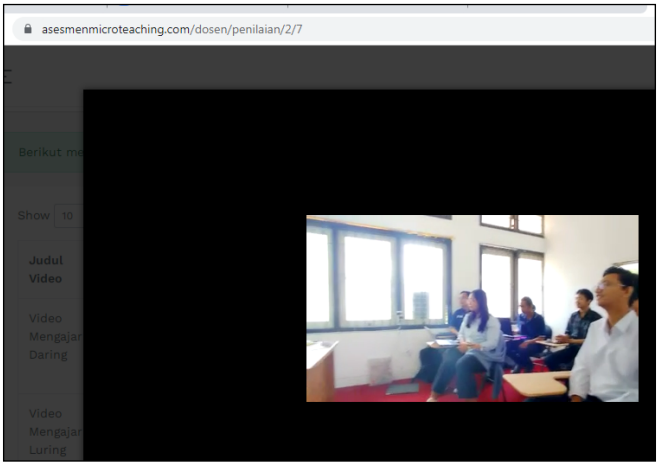

Figure 4. Offline teaching video product

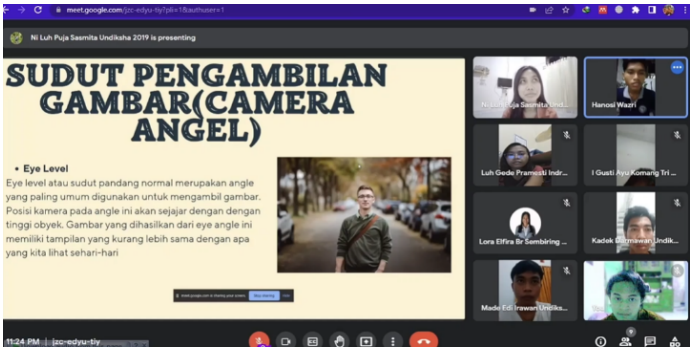

Figure 5. Online teaching video product

At the implementation stage, system user responses were also taken. Then the results are reviewed and analyzed at the evaluation stage.

5. Evaluation

In accordance with the ADDIE stages in Figure 1, the evaluation stage is carried out at each stage of analysis, design, development and implementation. At the evaluation stage, learning outcomes data were also collected. The analysis of student learning outcomes for online and offline teaching videos using the standard deviation formula (SDi) and the mean ideal (MI). The learning outcomes for Online Teaching Practice obtained an average score (N) of 53 students which was 87.12, classified as "Very Good". While the learning outcomes for Offline Teaching Practices obtained an average value (N) of 87.65 which is classified as "Very Good".

> Based on the results of the response calculation analysis, the results obtained were 113.25 with the criteria "Very Practical" referring to table response test criteria. So, the peer assessment digital can support the learning process of microteaching courses effectively, both in online and offline classe. (Choirul Huda, 2017) (Sugihartini, Hadi, Wahyuni, Agustini, et al., 2023) (Sugihartini, Hadi, Wahyuni, & Agustini, 2023)

Innovation Strategy

Innovation strategy is a way to make the innovation process and implement it in the midst of society. In this study, the intended implementation is to apply digital peer assessment to students. Very good responses were given by students after using digital peer assessment in microteaching courses. Analysis of student responses using the standard deviation formula and the ideal mean shows very practical results with an average value of 113.25. While the analysis results for student learning outcomes in online teaching practice amounted to 87.12 which is classified as very good. And learning outcomes for offline teaching practice amounted to 87.65 which is classified as very good. This shows that digital peer assessment is very well used in supporting the microteaching learning process. The implementation of digital peer assessment in microteaching courses has changed the students' mindset in the learning process. There are several concepts that students feel after using peer assessment in learning (Enny Wijayanti, 2015), including:

1) Students learn to give good feedback based on the quality of the video products they watch.
2) Students learn to compose sentences to provide objective and constructive feedback for the improvement of teaching methods on the video.
3) Students learn to understand and translate into quantitative numbers through instruments available on the web system.
4) Very good interaction occurs on the web system, it can be seen that the final score on the system that provides a linkert scale of 1-5, after being given an average peer assessment gives a score between the ranges of 3-5.
5) There is a conducive learning environment, because students support each other and improve themselves in the practice of teaching through the feedback provided.

Strategic innovations that occur in the implementation of digital peer assessment are expected to continue and be developed in other courses with a larger number of students. This innovation has created excellent students and processed them to improve critical, objective and transparent thinking so that the learning process with higher order thinking skills (HOTS) can occur (Salbiah Omar et al., 2017).

4 Conclusion

Based on the results of research on the development of E- assessment as one of the trends of innovation in the field of learning, it can be concluded that E-assessments for microteaching courses have met the criteria of validity and practicality. The results of the microteaching instrument expert test showed that the instrument was valid with a gregory value of 1.00. The instrument was then integrated with a web-based system to implement peer assessment. The response analysis results show that the digital assessment system is very practical to use with an average value of 113.25. The analysis results for student learning outcomes in online teaching practice amounted to 87.12 which is classified as very good. And learning outcomes for offline teaching practice amounted to 87.65 which is classified as very good. This shows that digital peer assessment is very well used in supporting the microteaching learning process. In further research, experimental research can be carried out that distinguishes two groups to see the learning outcomes of students who use digital peer assessment and those who do not.

5 Acknowledgment

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Contact email: sugihartini@undiksha.ac.id

Towards Absolute Pitch Training With Wearable Technology That Incorporates Tactile Stimuli Based on Auditory-Tactile Simulated Synesthesia

Japheth Duane C. Samaco, Ateneo de Manila University, Philippines
Andrei D. Coronel, Ateneo de Manila University, Philippines

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Abstract
This study intends to tackle the challenge of Absolute Pitch (AP) training through multisensory stimuli. Recent studies have investigated new methods of AP training; however the results were not satisfactory when compared to the output of natural AP possessors in the context of both success rate and closeness to pitch recognition. This study intends to tackle this challenge with an innovation in auditory learning through the design and development of a technology that will provide tactile sensation to add another stimulus in AP ear training. This will be done by adding haptic feedback as vibrotactile stimuli for participants, alongside tones, simulating an auditory-tactile synesthetic experience. The training design will be conducted for two groups: the experimental group will be trained using both auditory and tactile stimuli while the control group will be trained with the isolated auditory stimuli only. Both the hardware components and software will be developed to accommodate the new training design and the haptic feedback stimuli. A comparative analysis of the results will be performed to determine the effectiveness of the multisensory training as compared to isolated auditory training. The results may validate not only the effectiveness of a multisensory approach to learning, but more so give insights on the effectiveness of both the specific technology and adopted methodology that is used.

Keywords: Absolute Pitch, Perfect Pitch, Synesthesia, Multisensory, Multimedia, Tactile-Auditory Synesthesia, Music, Ear Training, Haptic Feedback

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Introduction

Absolute Pitch (AP), also known as perfect pitch, is defined by Deutsch (2013) as the ability of a person "to name or produce a note of a given pitch in the absence of a reference note". On the other hand, an alternative to pitch recognition called Relative Pitch (RP), wherein persons can name the note if a reference note is given by recognizing "the musical interval (pitch distance) between any pair of tones (e.g., perfect fifth, major third), which enables them to name the second of two tones when the first is named" (Trehub, 2003). One could argue that persons with AP have an advantage over those with RP by having the ability to instantly recognize notes, as opposed to those with RP who need a reference note first.

However, according to Deutsch (2013), as much as people have Implicit AP, meaning they can recognize well-known melodies, it is difficult for people to associate individual sounds to their names as notes. As an example, a person can hear the first few notes of "Twinkle Twinkle Little Star" and be able to associate and recognize the song, yet isolated notes are harder to process and name, which is what AP possessors can do. In fact, AP has been known to be incredibly rare for people to possess, with only around 1-5 in every 10,000 people possessing it (Takeuchi & Hulse, 1993). There have also been multiple studies in the past which suggest that AP possessors have some genetic variable tied towards it (Baharloo et al., 1998) or that AP should be learned and trained during a critical period of childhood of around 3-7 years old, stating that "none of [the] survey respondents who began musical training after the age of 9 years possessed AP," (Takeuchi & Hulse, 1993) or a combination of both. However, more recent studies (Van Hedger et al., 2019; Wong et al., 2019) have refuted these claims by training adults in AP with different auditory training methods resulting in successful tests in accuracy of note classification, albeit with low success rates in training.

These researchers have proven that AP can be learned but will need to be refined to be more efficient and have a higher success rate. A good method is to use multimedia to enhance this learning process. Multimedia learning is the use of multiple senses to enhance this learning (Moreno & Mayer, 2007). According to John Medina (2014) in his book "Brain Rules," which uses some of Mayer's work as basis, the use of this multimodal perception can significantly increase recall and transfer rate of students as compared to unimodal learning. This works because of how our senses generally functions, which is that humans process the world with multiple senses working at the same time, which "takes advantage of the full capacity of humans for processing information," allowing us, for example, to not just process the world with just our eyes, but also with our ears, or even with touch (Medina, 2014).

To develop this Multimodal process for AP training, the studies on synesthesia and the experience of synesthetes can be used as a model. Synesthesia is defined as an experience where one stimulus of a sense evokes an experience in another sense (Banissy et al., 2014). Some occurrences are when synesthetes tasting food might trigger a simultaneous experience of sound, or the imagining of words can cause experiences of feelings of touch (Moreno & Mayer, 2007) or seeing visual words can evoke the experience of taste (Banissy et al., 2014). This experience of the "merging of the senses", is known to be incredibly rare, and affects only a small number of people with various kinds of manifestations due to the different combination of sense activation (Simner 2011), and yet there has been a study that shows a significant population of synesthetes are also AP possessors, and vice-versa (Loui et al., 2012).

Context of the Study

AP has always been thought to be an untrainable skill once a certain age has passed, or that it can only be acquired through genetics (Baharloo et al., 1998; Takeuchi & Hulse, 1993) However, recent studies have proved that AP can be trained even past the age of childhood (Van Hedger et al., 2019; Wong et al., 2019). It is now a question of how one can create and design effective training programs to improve AP learnability.

To attempt this, an AP training will be conducted, similarly modeled after the previous training studies done, with the addition of a tactile stimulation to enhance this training process through multisensory activation and learning. This tactile stimulation will be done, along with auditory prompts, using wearable devices to simulate a synesthetic experience.

Research Objectives

The objective of this study is to design and implement technology that will enable the simultaneous stimulation of both tactile and auditory senses to train AP for non-possessors and, at the same time, investigate the effectiveness of multisensory stimuli (auditory-tactile) in training AP. This training aims to recognize whether a multisensory approach to learning and training AP will be an improvement compared to an unisensory auditory training approach that most studies have conducted. In the end, this study hopes to provide another method for training AP and provide an alternative to the norm of ear training, RP training.

Research Questions

The primary research question for this study is: Will participants trained with multisensory auditory-tactile stimuli lead to better pitch recognition compared to participants trained only with unisensory auditory stimuli?

Secondary research questions are the following:

1. How will the multisensory and unisensory AP training programs be designed?
2. What technologies will be used to simulate the auditory-tactile multisensory stimuli?
3. Will the multisensory participants be able to recognize notes based on their AP training using only tactile stimuli?

Scope and Limitations

The study will only concentrate on AP training and not include other types of pitch training. This AP training will also be focused on individual notes played from a selected number of octaves using the recorded sounds of a single source (digital piano) through earwear. Because of this, the target participants for the experiment should be familiar with basic musical terminology, especially the 12 notes of the chromatic scale (C – C#/Db – D – D#/Eb – E – F – F#/Gb – G – G#/Ab – A – A#/Bb – B). In this regard, the study will not be discriminatory to people who already possess RP, as the nature of learning of the two different ear training are still inherently different. The study will not be able to include nor solve issues of people who have amusia, or tone deafness. This study will be conducted on adults around 18-26 years old. The study will not handle long term retention to see if the participants are able to retain AP months after the experiment.

This training will only focus on two senses – hearing and feeling. The training will be conducted using a wearable device providing the tactile and auditory stimulus connected and controlled to a mobile phone. An application will be designed to control the auditory and tactile stimulus for pitch training.

Significance of Study

Due to the low passing and success rates of the previous isolated sensory (auditory) trainings for AP (Van Hedger et al., 2019; Wong et al., 2019), this study could potentially be used as an alternative to AP training. If proven effective, this opens an alternative for ear training for people, especially musicians who tend to train their ears to improve their craft. People would only default to RP training due to how previous studies denied AP trainability. This study would allow another option to ear training: to have effective AP training as an alternative to RP training. Finally, this research could also show the effectiveness of synesthesia-modeled multisensory training, which could lead to further developments in learning and education using multimodality.

Methodology

The Experiment Design of this study will mostly be using the AP training design of the study "Is it impossible to acquire absolute pitch in adulthood?" (Wong et al., 2019) with some differences. This study will be using an experimental group for the multisensory training, which would mean double the number of participants to create a control and experimental group. The experiment will also be using a custom-made application to play and control the stimuli, as well as record the responses and return feedback for both the tests and the training sessions.

The experiment will be divided into four parts- The Questionnaire, the Pre-Test, the Training Program, and the Post-Test. The questionnaire at the beginning, and the post-UX test for the experimental group will both be accomplished through pen and paper. Everything else will be handled by the application.

Participants

20 participants aged 18-26 will be invited to partake in the training experiment. All participants will be checked via an information form to make sure that they do not exhibit any levels of neuropathy (e.g., impairment or disfunction of sensation in their fingertips), a form of amusia (i.e., the inability to recognize changes in pitch, or tone-deafness), or that the participants do not already possess AP. The participants will also be checked for basic knowledge of music, i.e., knowledge of the 12 notes of the chromatic scale, as well as music and instrument experience.

These participants will be divided into two groups: 10 participants for the multisensory training (henceforth called the experimental group) and 10 participants for the unisensory (auditory) training, henceforth called the control group. Equal number of males and females (three males and three females) will be assigned to a group. The group assignment shall be handled such that the musical experience of the two groups will be balanced.

Participants will be given monetary compensation for each completed training day with additional payment for completing the whole experiment.

Technology Design

The training program will be using a desktop application to facilitate the experiment. The experimental group will be conducting training sessions using both the vibrotactile haptic glove and headset simultaneously for tactile and auditory stimulus respectively. The hardware devices will be connected via wires to the computer and used through the application to create the simultaneous integration of the two senses and calibrated to create a connected and simultaneous experience of the two senses. The control group will be conducting the training sessions using only a headset for the auditory stimulus.

To simulate the tactile experience, a glove will be designed and developed that simulates various kinds of haptic experiences. In a survey (O'Toole et. Al., 2021) conducted on people and their emotional responses to sounds, the study was able to find out that people have associated the 12 pitches of the chromatic scale to various emotions (Joy, Fear, Anger, Sadness). The table below shows the distribution, where the survey shows more people choosing the emotion association to the pitch, while some pitches are mixed results (noted as Neutral). Using these emotions, sounds that are known to reflect such emotions will be played through the haptic controller to be translated to tactile feedback. These sounds will be pitch shifted to fit the associated pitch as well. The sounds chosen for the haptic feedback of the pitches are arbitrary and are designed for more diversity of tactile stimuli.

Pitch	Emotion
C	Joy
C#	Joy
D	Joy
D#	Joy
E	Anger
F	Sadness
F#	Sadness
G	Sadness
G#	Neutral
A	Neutral
A#	Neutral
B	Neutral

Table 1: Emotions Associated to Pitches

The glove will contain aluminum vibration motors on the five fingertip areas of the participants chosen hand (the other hand will be used to control the application). These disc-shaped motors, connected to an Adafruit Haptic Motor Controller, will create the haptic sensations based on the audio played. These will be connected to an Arduino board, which is then connected to the computer with the training application.

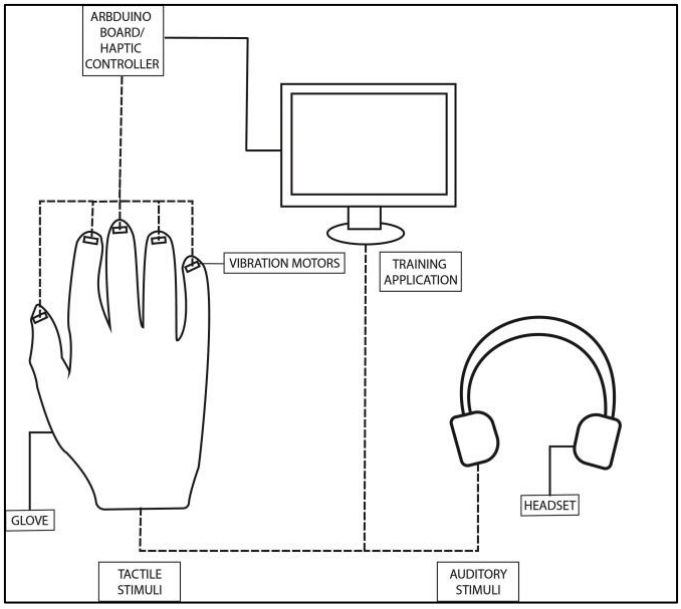


Figure 1: Technology Design for the Experiment

A headset will be used to play the auditory experience. This headset will also be connected to the computer via wired connection.

A computer, through a designed application, will host the training sessions and control the different devices.

Application Design

Software will be developed using the Unity Game Engine. This software will contain both the pre-test and post-test for the participants, as well as the training programs for both control and experimental groups. The software will be able to communicate with the haptic glove through the Arduino Board and the headset to send the information on what tactile and auditory stimuli will be received by the participants simultaneously. The application will also collect the data based on the inputs and responses of the User.

Pre-test & Post-test

The participants from both groups will have the same pre-test and post-test, except for an additional tactile test for the experimental group and post-UX survey regarding the tactile experience.

Test Proper

Participants will be using the custom-made application for their testing. The Pre-Test will be performed by the participants after answering the Information Questionnaire and before starting the Training Program to assess their learning performance after the training program.

The Post-Test will be performed at least a day after the participant's last training session. No tactile feedback will be used for these tests, even for the experimental group.

The test will require the participants to name the pitch based on a tone played. The tone will play for 1 second and, afterwards, the participant has 5 seconds to name the pitch. The mapping of the pitch names will be set up either horizontally (from C-> B), or via a keyboard layout with the notes placed on the keyboard key. Participants may take a break anytime by pressing a pause button, but there will be mandatory breaks during the test, in which the participant may decide when to continue. The test, however, should be finished within the day.

The test will use a total of 120 unique tones twice, leading to a total number of 240 tones to be named by the participant. The 96 of the 120 tones are composed of 48 tones from octaves 3-6 (C3-B7, 12 tones per octave) for both the synthetic and piano tones. The last 24 tones are going to come from violin tones of octaves 4-5. It should be noted that participants were not trained in octaves 3 and 6, nor in violin tones. For violin tones, only trained pitches (octaves 4-5) will be used. Overall, the test will only use tones that are under either trained Octaves and Trained timbres, Trained Octaves and Untrained Timbres, or Untrained Octaves and Trained Timbres. The pitches will be presented in a randomized order.

	Octave 3 (C3-B4)	Octave 4 (C4-B5)	Octave 5 (C5-B6)	Octave 6 (C6-B7)	Total per Instrument
Synthetic	12	12	12	12	48
Piano	12	12	12	12	48
Violin		12	12		24
Total per Octave	24	36	36	24	Total Tones: 120

Table 2: Pitches Used for Testing

Before the test proper, the participant will be given a practice test consisting of 10 randomized tones to familiarize oneself with the layout, and to adjust the volume of the tones.

The number of correctly named pitches will be recorded. Incorrectly named items will be recorded as well for relative distance to the correct pitch. Time in between the tone being played, and the participant inputting an answer will also be recorded.

Additional Post-test and Questionnaire for the Experimental Group

The experimental group dealing with the multisensory stimuli will be given an additional questionnaire and test at the end of the experiment, after the post-test. The additional post-test will test whether the participants retained the connection between the haptic feedback and the pitch that they associated with.

The test will require the participants to name the pitch based on haptic vibration played. The vibration will occur for 1 second and, afterwards, the participant has 5 seconds to name the pitch. Like the pre-test and post-test proper, the mapping of the pitch names will be set up either horizontally (from C-> B), or via a keyboard layout with the notes placed on the

keyboard key. Participants may take a break anytime by pressing a pause button, but there will be no mandatory breaks during this test due to the shortened length.

The test will use the haptic feedback from the trained pitches of octaves 4-5 for a total of 12 unique tactile experiences, with only the vibration level changing based on the octave of the pitch. Overall, the test will amount to a total of 48 items, using the 24 pitches twice.

The number of correctly named pitches will be recorded. Time in-between the tone being played, and the participant inputting an answer will also be recorded. Incorrectly named items, however, will not be recorded as the different haptic effects are not associated with the relative distance of the pitches.

The questionnaire will be a post-UX survey on their experience using the vibrotactile haptic glove.

Training Design

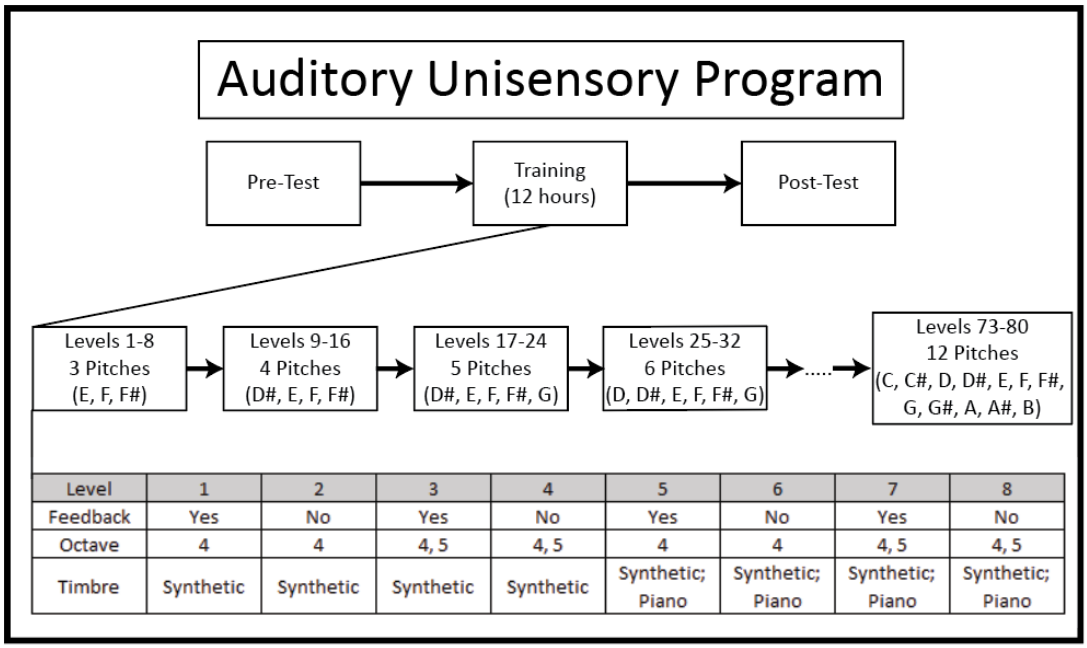
The training design, as modeled in the study (Wong et al., 2019), will be structured and organized using different levels, with the experimental group having a different system from the control group to account for the additional tactile stimuli. For every level, the participant will be given a total of 20 tones based on the given pitches and characteristics of the level. If the participant can correctly name at least 90% of the tones, or 18/20, they may move up a level, but they may visit any level previously done.

Control Design

Participants of the control group will be trained using a program with 80 levels in total. The 80 levels will be divided into 10 groups. The groups determine the number of pitches to be used for training. Every group is divided into 4 subgroups. These subgroups have different characteristics to target specific kinds of training.

Initially, only 3 pitches will be introduced, and the number of pitches will increase every 8 levels, until level 73 where all 12 pitches are being used for training. For the four subgroups, divided into levels 1 and 2, 3 and 4, 5 and 6, and 7 and 8, all odd numbered levels will show the participant immediate feedback on whether their answer is correct or not. Even levels will only show the results after all tones have been named to determine whether the participant is moving on to the next level. For the first subgroup, only one octave (octave 4) will be used. For example, for level 1 and 2, only pitches E4, F4 and F#4 will be used. For the second subgroup, two octaves of the pitches will be used. Hence, in our example, E4, F4, F#4, E5, F5, F#6 will be used. For the third subgroup, we will return to using only one octave, but will introduce a timbre using the same pitches. Synthetic timbre will be used throughout the 80 levels, but a piano timbre will be added for the third and fourth subgroups. For the fourth subgroup, it will use both octaves 4 and 5, and timbres synthetic and piano. After the eight levels, the combination will reset again to using only one octave and one timbre, but a new pitch will be introduced. The figure below illustrates the different combinations per group, with a more detailed table in Appendix A.

After any levels with feedback, a 15 second glissando clip will be played in order to erase any memory of existing referential tones from the previous level for the no feedback levels.



Level	1	2	3	4	5	6	7	8
Feedback	Yes	No	Yes	No	Yes	No	Yes	No
Octave	4	4	4, 5	4, 5	4	4	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano

Figure 2: Auditory Unisensory Program

Similar to the pre-test and post-test, every item in a level will play a tone for 1 second. The participant will have 5 seconds to identify the correct name of the pitch of the presented tone. For training, incorrectly identified pitches will be considered wrong, and their relative distance to the correct answer will not be acknowledged.

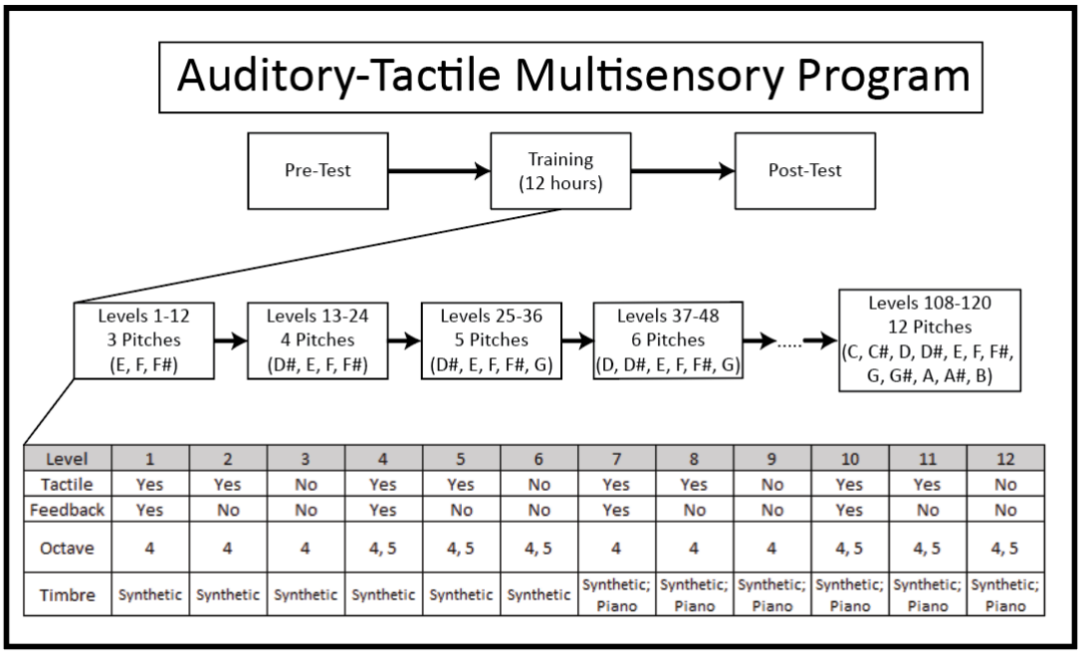
Participants may also freely listen to sample tones before entering the training level.

The training will be completed once the participant has completed all 80 levels, or 12 hours of training have passed. Participants may complete 1 hour of training per day but should be finished with the whole experiment within a month and a half.

Experimental Design

The experiment design acts similar in structure to the control design, but with 4 additional levels within the groups due to the inclusion of the tactile feedback, for a total of 120 levels.

Rather than having 8 levels per group, it will now have 12 levels, with 3 levels per subgroup. The first level in a subgroup works similar to the control design, with immediate feedback on whether the answer is right or wrong, but the played tone will also be accompanied by a tactile stimulus. The second level in a subgroup will include the tactile stimuli as well, but the feedback will only be revealed at the end of the level. The third level in a subgroup will not include the tactile stimulus. Instead, only the tone will be played, and the feedback will all be revealed in the end as well. This is to make sure that the participants are not completely reliant on the tactile stimulus during the whole training program. The other subgroups work similarly to the groupings in the control group. The figure below shows the different combinations based on the levels, with a more detailed table in Appendix B.



Level	1	2	3	4	5	6	7	8	9	10	11	12
Tactile	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Feedback	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
Octave	4	4	4	4, 5	4, 5	4, 5	4	4	4	4, 5	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano

Figure 3: Auditory-Tactile Multisensory Program

Similar to the control design and the tests, every item in a level will play a tone for 1 second along with a haptic response (depending on the level). The participant will have 5 seconds to identify the correct name of the pitch of the presented tone.

After any levels with feedback, a 15 second glissando clip (no tactile feedback will be attached) will be played to erase any memory of existing referential tones from the previous level for the no feedback levels.

Participants may also freely listen to sample tones before entering the training level. They may also include or exclude the haptic feedback to their preference.

The training will be completed once the participant has completed all 120 levels, or 12 hours of training have passed. Participants may complete 1 hour of training per day but should be finished with the whole experiment within a month and a half.

Analysis

Once all participants have completed the training and post-tests, the results of the tests will be collected and analyzed. One-Way ANOVA will be used to analyze the differences between an individual's pre-test results and their post-test results, using both metrics of correctly named pitch, or relative distance between the correct pitch and the answers of the participants. This will determine whether the training program was successful in having the participants learn AP or not, whether under the control or experimental group. The scores of the two groups will also be compared to examine whether one group's program, either the auditory unisensory program or the auditory-tactile multisensory program, was more successful in training AP.

The results of the additional tactile post-test will also be analyzed using Mean Absolute Deviation to determine whether the participants have developed a link between a specific pitch and the haptic feedback used to reinforce its AP learning.

Conclusion

Absolute Pitch training has always been in the backseat of ear training, second to Relative Pitch due to various reasons. Various designs and training methodologies need to be implemented to make the training worthwhile and have more positive results. The results of this experiment aim to create a methodology in learning the skill with better end results. This study hopes to also encourage more studies using synesthesia-designed multimedia in training various other skills. There are hopes to invigorate further studies in AP training for musicians, with varying designs in technology and implementations.

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Appendix A: Table of Levels for Auditory Unisensory Training Program

AUDITORY UNISENSORY STIMULUS								
3 Pitches (E, F, F#) - Levels 1-8								
Level	1	2	3	4	5	6	7	8
Feedback	Yes	No	Yes	No	Yes	No	Yes	No
Octave	4	4	4, 5	4, 5	4	4	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano
4 Pitches (D#, E, F, F#) - Levels 9-16								
Level	9	10	11	12	13	14	15	16
Feedback	Yes	No	Yes	No	Yes	No	Yes	No
Octave	4	4	4, 5	4, 5	4	4	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano
5 Pitches (D#, E, F, F#, G) - Levels 17-24								
Level	17	18	19	20	21	22	23	24
Feedback	Yes	No	Yes	No	Yes	No	Yes	No
Octave	4	4	4, 5	4, 5	4	4	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano
6 Pitches (D, D#, E, F, F#, G) - Levels 25-32								
Level	25	26	27	28	29	30	31	32
Feedback	Yes	No	Yes	No	Yes	No	Yes	No
Octave	4	4	4, 5	4, 5	4	4	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano
7 Pitches (D, D#, E, F, F#, G, G#) - Levels 33-40								
Level	33	34	35	36	37	38	39	40
Feedback	Yes	No	Yes	No	Yes	No	Yes	No
Octave	4	4	4, 5	4, 5	4	4	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano
8 Pitches (C#, D, D#, E, F, F#, G, G#) - Levels 41-48								
Level	41	42	43	44	45	46	47	48
Feedback	Yes	No	Yes	No	Yes	No	Yes	No
Octave	4	4	4, 5	4, 5	4	4	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano

9 Pitches (C#, D, D#, E, F, F#, G, G#, A) - Levels 49-56								
Level	49	50	51	52	53	54	55	56
Feedback	Yes	No	Yes	No	Yes	No	Yes	No
Octave	4	4	4, 5	4, 5	4	4	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano
10 Pitches (C, C#, D, D#, E, F, F#, G, G#, A) - Levels 57-64								
Level	57	58	59	60	61	62	63	64
Feedback	Yes	No	Yes	No	Yes	No	Yes	No
Octave	4	4	4, 5	4, 5	4	4	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano
11 Pitches (C, C#, D, D#, E, F, F#, G, G#, A, A#) - Levels 65-72								
Level	65	66	67	68	69	70	71	72
Feedback	Yes	No	Yes	No	Yes	No	Yes	No
Octave	4	4	4, 5	4, 5	4	4	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano
12 Pitches (C, C#, D, D#, E, F, F#, G, G#, A, A#, B) - Levels 73-80								
Level	73	74	75	76	77	78	79	80
Feedback	Yes	No	Yes	No	Yes	No	Yes	No
Octave	4	4	4, 5	4, 5	4	4	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano

Appendix B: Table of Levels for Auditory-Tactile Multisensory Training Program

AUDITORY-TACTILE MULTISENSORY STIMULUS												
3 Pitches (E, F, F#) - Levels 1-12												
Level	1	2	3	4	5	6	7	8	9	10	11	12
Tactile	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Feedback	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
Octave	4	4	4	4, 5	4, 5	4, 5	4	4	4	4, 5	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano
4 Pitches (D#, E, F, F#) - Levels 13-24												
Level	13	14	15	16	17	18	19	20	21	22	23	24
Tactile	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Feedback	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
Octave	4	4	4	4, 5	4, 5	4, 5	4	4	4	4, 5	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano
5 Pitches (D#, E, F, F#, G) - Levels 25-36												
Level	25	26	27	28	29	30	31	32	33	34	35	36
Tactile	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Feedback	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
Octave	4	4	4	4, 5	4, 5	4, 5	4	4	4	4, 5	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano
6 Pitches (D, D#, E, F, F#, G) - Levels 37-48												
Level	37	38	39	40	41	42	43	44	45	46	47	48
Tactile	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Feedback	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
Octave	4	4	4	4, 5	4, 5	4, 5	4	4	4	4, 5	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano
7 Pitches (D, D#, E, F, F#, G, G#) - Levels 49-60												
Level	49	50	51	52	53	54	55	56	57	58	59	60
Tactile	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Feedback	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
Octave	4	4	4	4, 5	4, 5	4, 5	4	4	4	4, 5	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano
8 Pitches (C#, D, D#, E, F, F#, G, G#) - Levels 61-72												
Level	61	62	63	64	65	66	67	68	69	70	71	72
Tactile	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Feedback	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
Octave	4	4	4	4, 5	4, 5	4, 5	4	4	4	4, 5	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano
9 Pitches (C#, D, D#, E, F, F#, G, G#, A) - Levels 73-84												
Level	73	74	75	76	77	78	79	80	81	82	83	84
Tactile	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Feedback	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
Octave	4	4	4	4, 5	4, 5	4, 5	4	4	4	4, 5	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano
10 Pitches (C, C#, D, D#, E, F, F#, G, G#, A) - Levels 85-96												
Level	85	86	87	88	89	90	91	92	93	94	95	96
Tactile	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Feedback	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
Octave	4	4	4	4, 5	4, 5	4, 5	4	4	4	4, 5	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano
11 Pitches (C, C#, D, D#, E, F, F#, G, G#, A, A#) - Levels 97-108												
Level	97	98	99	100	101	102	103	104	105	106	107	108
Tactile	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Feedback	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
Octave	4	4	4	4, 5	4, 5	4, 5	4	4	4	4, 5	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano
12 Pitches (C, C#, D, D#, E, F, F#, G, G#, A, A#, B) - Levels 108-120												
Level	109	110	111	112	113	114	115	116	117	118	119	120
Tactile	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Feedback	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
Octave	4	4	4	4, 5	4, 5	4, 5	4	4	4	4, 5	4, 5	4, 5
Timbre	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano	Synthetic; Piano

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Contact emails: jsamaco@ateneo.edu
acoronel@ateneo.edu

A Serial Mediation Model Testing Family Interaction, Anxiety, and Zest for Life as Predictors of Perseverance of Effort

Kelly Ka Lai Lam, University of Macau, Macau SAR

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Abstract
Perseverance of effort, an individual long-lasting exertion to achieve a long-term goal even when facing obstacles (Duckworth & Quinn, 2009), has been consistently supported as a key indicator of subjective well-being and success. Due to the profound and significant role of perseverance of effort across the literature (Salisu et al., 2020), it is important to investigate potential factors that contribute to perseverance of effort. In this study, we took a sociocultural perspective of perseverance of effort and examined this mechanism using a serial mediation model that included anxiety and zest for life. A total of 326 undergraduate students were included in a cross-sectional study and responded to an online survey package. After controlling for demographic covariates, the results of structural equation modeling with maximum likelihood and bootstrapping with 5,000 resamplings (95% confidence interval) supported that anxiety and zest for life mediated the association between family interaction and perseverance of effort in a sequential fashion. It can be claimed positive and warm family interaction is related to individual perseverance of effort, and this relation is mediated by anxiety and zest for life sequentially. Practically, in order to enhance individual perseverance towards long-term goal-striving, researchers and educators can incorporate strategies to foster improved family interaction and zest for life in interventions, further providing anxiety prevention strategies.

Keywords: Anxiety, Family Interaction, Serial Mediation, Zest for Life, Perseverance of Effort

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Introduction

Perseverance of effort, an individual long-lasting exertion to achieve a long-term goal even when facing obstacles (Duckworth & Quinn, 2009), has been consistently supported as a key indicator of subjective well-being and success. Due to the profound and significant role of perseverance of effort across the literature (Salisu et al., 2020), it is important to investigate potential factors that contribute to perseverance of effort. Also, according to the literature, the internal mechanisms between family factors, particularly in focusing on family interaction and perseverance of effort have not been sufficiently studied. It remains unclear how we can help individuals build perseverance of effort through the lens of family influence. Therefore, this study aimed to investigate the internal mechanism and conditions that can promote individual perseverance of effort in a sample of Chinese university student sample. University students were targeted because this population navigates numerous major roles (i.e., struggling with self-identity) which put them at high risk for various mental illnesses (Lee & Gramotnev, 2007).

Family Interaction and Perseverance of Effort

Family interaction has been broadly characterized by warm and supportive behavior, open communication, and firm within a family system, while within a Chinese context, three components of family interaction have theoretically and empirically emerged: communication, mutuality, and harmony (Shek, 2002). Operationally, family communication refers to verbal and non-verbal information exchanged between family members, which enables family members to express their love and concerns to each other. Family mutuality refers to mutual care and concern among the family members that goes beyond a quid pro quo type of family interaction in which each member wishes to benefit from the other (Miller, 1986). Family harmony, as a cultural value of Asian Families, refers to the intensity of peace, happiness, and safety among the family members (Ip, 2014). From a view of Bowlby's (1982) internal working model, family is a fundamental factor that shapes individual mental representations (also called schemas) of self and of others. These mental representations are the template for interpretations or reactions to future events (Bowlby, 1982). For example, positive and supportive parenting significantly promoted individual positive schema toward their positive psychological development (Saleem et al., 2020). Particularly in the Chinese context which is rooted in the Confucian heritage cultures, a high cultural value has been placed on perseverance which is highly empathized as an essential factor for success, and Chinese families exert a great influence over the shaping of an effortful attitude among their children and encourage them to study hard for better future success (Fwu et al., 2016). Although this empirical evidence confirmed that family factors are related to individual perseverance of effort in striving for long-term goals. However, the internal mechanism is relatively underexplored. This study aimed to explore this mechanism and provided theoretical support for designing positive psychological interventions to improve the perseverance of effort.

Anxiety and Zest for Life as Mediators

Anxiety, one of the subjective experiences of negative emotional states and psychiatric disease, refers to a feeling of tension and worry, and is usually generalized as an overreaction to a threatening situation (Lovibond & Lovibond, 1995). One Chinese meta-analysis result indicated that the overall prevalence of anxiety symptoms among Chinese students was 24.0%, while the prevalence of anxiety among the university population was even higher

(26.0%, Zhang et al., 2021). According to the literature, family consistently acts as a crucial indicator of psychiatric disease (e.g., Ee & Arshat, 2017; Lam & Chen, 2022) that individual's perceived family as a source of social support that helps them to facilitate their development of coping strategies for stressful events and psychological well-being. Several correlational (Olson, 2021) and systematic review studies (Rapee, 2012) have indicated that unhealthy family interaction (such as poor or ineffective communication, and lower level of family harmony) contributes to the development of anxiety. In addition, anxiety has been found to decrease individual desire and limit motivation for long-term goal attainment (Fishbach & Labroo, 2007).

Zest for life, one of the character strengths and a positive attitude towards life, refers to strong willpower in life and approaching life with excitement and energy in showing a positive outlook on life (Seligman et al., 2005). Family has been considered an important sociocultural factor that facilitates individual positive character strengths and traits (Shubert et al., 2022). In contrast to life satisfaction and happiness, the conceptualization of zest for life includes vitality that covered both energy and enthusiasm and could predict individual and social well-being among the student population; that is, for example, zestful students tended to exhibit less social isolation, perceive better psychological well-being, and better perseverance of effort (Park et al., 2004; Lam, 2021). Plus, emotion has consistently shown its substantial influence on individual cognitive processes, especially motivating action and behavior, for example, individuals perceived attachment anxiety significantly predicted their attitude toward being humorous (Besser et al., 2012).

In sum, this study tested the two predicted mediators in the family interaction-perseverance relationship, while anxiety would precede zest for life. It is also assumed that individuals' perceived positive family interaction (i.e., better harmony) may diminish their anxiety level (i.e., feeling of tension towards threatening events), and this negative emotion influences their zest for life (i.e., the positive attitude towards life and being energetic), further leading to perseverance level.

The Present Study

Grounded on theoretical and empirical evidence, it is assumed that family interaction might affect individual perseverance of effort directly as well as indirectly through anxiety and zest for life in a Chinese context. By clarifying this assumption, this study can provide a comprehensive picture for showing the internal mechanism (anxiety and zest for life) of family interaction-perseverance of effort link which is lacking in the empirical literature. The following hypotheses were formulated (see Figure 1):

- H_1: Family interaction positively predicts perseverance of effort.
- H_2: Family interaction inversely predicts anxiety (H_{2a}), and positively predicts zest for life (H_{2b}).
- H_3: Anxiety inversely predicts perseverance of effort.
- H_4: Zest for life positively predicts perseverance of effort.
- H_5: Anxiety and zest for life operate as serial mediators between family interaction and perseverance of effort.

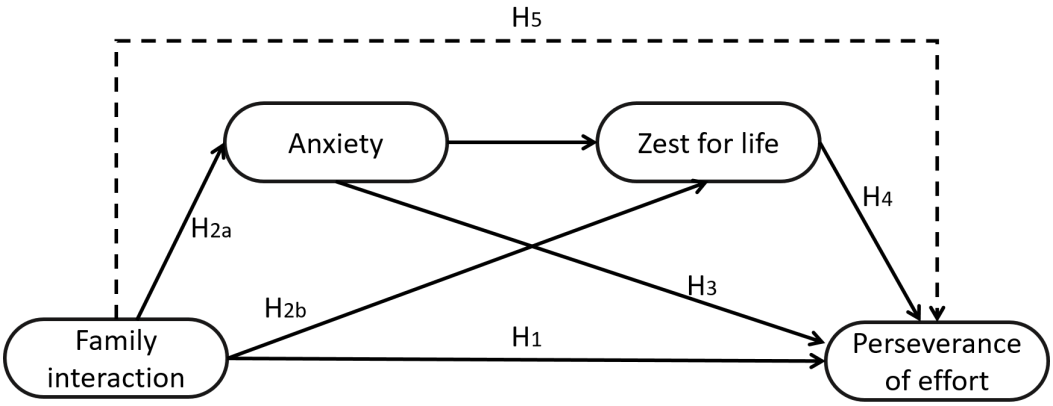

Figure 1: The Hypothesized Mediation Model.

Note: Solid lines represent direct paths and dashed lines represent indirect paths.

Method

Participants and Procedure

A convenience sampling method of correlational design was employed. We randomly issued a paper invitation on campus at a public university in Macau SAR, China. We also provided an informed consent with information explicitly stating the research purpose, nature, and procedure. No illegal information was collected from the participants, and they volunteered to participate in this study. Qualtrics was used to collect survey responses. A total of 335 students (aged between 18 to 31, M = 21.15, SD = 2.51; 68.06% female) accessed the online questionnaire and completed the questionnaire packages. Given the 2017/2018 student population composition in higher education in Macau (56.39% female, Tertiary Education Services Office, 2017), the current sample can be considered representative of the student population under study.

Materials

All the measurements were used in the Chinese validated versions showing good validity and reliability among Chinese samples.

Family interaction was assessed using the Chinese Family Assessment Instrument (C-FAI; Shek, 2002). The participants rated their perceptions of their family interaction in three dimensions—covering communication, mutuality, and harmony, with scoring range from 1 (*describes our household very well*) to 5 (*does not describe our household at all*); higher average score indicated a higher level of positive and warm family interaction. Shek (2002) showed that the C-FAI possesses good psychometric properties with its good factor structure for measuring family interaction in Chinese adolescent samples. The Cronbach's alphas for the three subscales were from .78 to .95, indicating an acceptable to excellent internal consistency.

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 (*never*) to 3 (*almost always*); higher average scores indicated higher levels of anxiety. Good reliability and validity were supported in the Chinese samples (Hou et

al., 2015). A good internal reliability coefficient was shown in the current sample (Cronbach's alpha = .81).

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. The Chinese version of this zest for life subscale has shown good reliability and validity in a university student sample (Duan et al., 2012). A good internal reliability coefficient was shown in the current sample (Cronbach's alpha = .84).

Perseverance of effort was measured with four items from the Chinese version of Short Grit Scale (Duckworth & Quinn, 2009) that refer to students' consistent efforts in long-term goal striving. Each item was rated on a 7-point Likert scale from 1 (*not like me at all*) to 7 (*very much like me*); higher average scores indicated higher levels of perseverance of effort. The Chinese version of this scale was developed by the Duckworth research lab and has shown high reliability (Li et al., 2012). A good internal reliability coefficient was shown in the current sample (Cronbach's alpha = .80).

A set of demographic variables were collected in this study, including basic information (gender and age) and family socioeconomic status which was measured by Hollingshead's Two Factor Index of Social Position (Hollingshead, 1975). This index assessed parental socioeconomic status based on the education level and occupation of the parent who earns a higher income. According to Hollingshead (1975), the SES score of an individual is calculated by multiplying the scale value for occupation by a weight of 7 and the scale value for education by a weight of 4 in a raw score, ranging from 11 (higher socioeconomic status) to 55 (lower socioeconomic status), and these factor weights were calculated by the use of multiple regression equations. This formulation of SES is one of the most widely used measures of objective family SES level (Cooper et al., 2010). High SES was indicated by a score ranging from 11 to 29, medium SES was indicated by a score ranging from 30 to 40, and low SES was indicated by a score ranging from 41 to 55. In the current sample, the mean score of SES was 21.06 (SD = 10.10), indicating a high level of SES.

Statistical Analyses

IBM SPSS Statistics 24 was used to calculate the descriptive statistics and correlations of tested variables. Amos 24.0.0 was used to analyze the structural equation model (SEM) with maximum likelihood estimation (MLE) and this approach is able to account for all estimates of all the paths in the model and provide the fit statistics to evaluate goodness-of-fit in the model. To estimate good model fit (Hooper et al., 2008), comparative fit index (CFI > .90 acceptable), Tucker-Lewis index (TLI > .90 acceptable), root mean square error of approximation (RMSEA < .08 acceptable), and standardized root mean square residual (SRMR < .08 acceptable). Bootstrapping was used to test the mediating effect when the sample size is small and not normally distributed. The 5,000 bias-corrected bootstraps with 95% confidence intervals were performed to estimate the indirect effect and confirm the mediating effect.

Results

Preliminary Analyses

The ranges of skewness (from -.96 to 1.38) and kurtosis (from -1.38 to 1.50) for all the main variables were in the acceptable range for SEM of between -2 and +2 (Kline, 2010). Table 1 presented the descriptive statistics and bivariate correlations among variables. As expected, family interaction, anxiety, zest for life, and perseverance of effort had significant correlations with each other. Age and SES were significantly associated with all three dimensions of family interaction, while gender was only significantly associated with individual anxiety.

Variables	1	2	3	4	5	6	Gender	Age	SES
1. Communication	-						-.04	-.15**	.13*
2. Mutuality	.82***	-					-.02	-.20***	.12*
3. Harmony	.62***	.73***	-				-.01	-.12*	.12*
4. Anxiety	-.12*	-.14*	-.18**	-			.13*	-.06	-.09
5. Zest for life	.27***	.25***	.21***	-.31***	-		-.04	-.05	.06
6. Perseverance of effort	.28***	.23***	.28***	-.31***	.61***	-	-.08	.03	.02
Mean	3.43	3.83	3.76	1.56	3.53	3.45	.68	21.09	21.06
Standard Deviation	.84	.74	.77	.55	.79	.76	.47	2.41	10.10
Skewness	-.58	-.96	-.47	.19	-.29	-.14	-.79	.84	1.38
Kurtosis	.18	1.50	-.01	-.23	-.34	-.39	-1.38	1.03	1.28

Table 1: Descriptive Statistics and Bivariate Correlations among Variables (N = 332).

Note: SES = Socioeconomic status. *$p < .05$; **$p < .001$; ***$p < .001$.

Test of Measurement Model

A confirmatory factor analysis (CFA) using MLE on the variance/covariance matrices was used to estimate the reliability and validity of all of the main variables in this study. The measurement model revealed a poor model fit: $\chi^2(108) = 347.34$, $\chi^2/df = 3.22$, CFI = .92, TLI = .89, RMSEA [90% C.I.] = .082 [.072, .092], SRMR = .102. Notably, the factor loading of one anxiety item (*I feel content*) was only .20. Followed by Hair and others' (1992) suggestion for improving the fit of the measurement model, the items with factor loadings of .40 or below were removed from the analysis. The final measurement model fit was further improved: $\chi^2(94) = 266.60$, $\chi^2/df = 2.84$, CFI = .94, TLI = .92, RMSEA [90% C.I.] = .074 [.064, .085], SRMR = .079. All the parameter estimates were significant at the $p < .001$ level, and the standardized estimates for all items were acceptable, ranging from .41 to .97.

Test of Mediation Model

Figure 2 presented the mediation model which has been tested. The SEM with a maximum-likelihood estimation (MLS) was used to examine the hypothesized model, with controlling for demographic variables (gender, age, and SES). As shown in Figure 2, the hypothesized mediation model generated a good model fit: $\chi^2(130) = 309.74$, $\chi^2/df = 2.38$, CFI = .93, TLI = .91, RMSEA [90% C.I.] = .065 [.055, .074], SRMR = .070. All factor loadings of the indicator variables for each latent variable are significant at $p < .001$. Family interaction had a significant negative effect on anxiety and showed positive effects on both

zest for life and perseverance, anxiety had a significant negative effect on zest for life, and zest for life had a significant positive effect on perseverance.

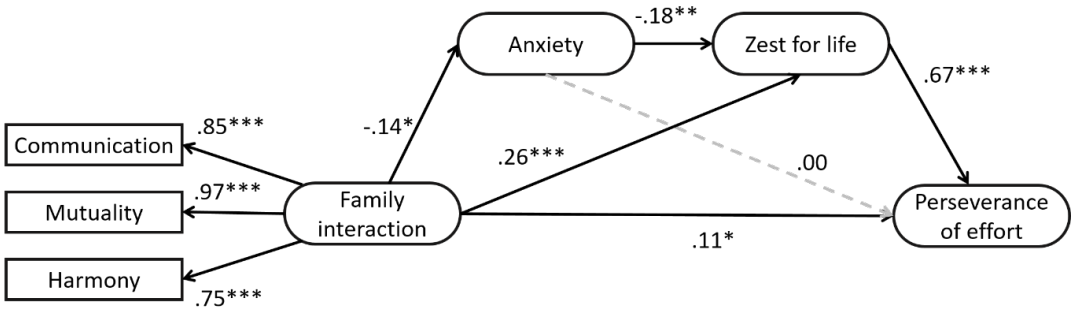

Figure 2: The final model (only the latent variables are presented in this figure).

Note. Solid lines indicate significant paths while the rounded rectangles indicate the latent variables. The effects were reported in standardized values. *p < .05; **p < .001; ***p < .001.

Further, we used Hayes' (2013) SPSS macro PROCESS (Model 6) with 5,000 bias-corrected bootstraps with 95% confidence intervals to examine the indirect effect of anxiety and zest for life separately, after controlling for gender, age, and SES. This approach allows the simultaneous examination of the indirect effect through up to four parallel mediators and provides pairwise comparisons between the proposed indirect effects (Hayes, 2013). The results showed that anxiety mediated the association between family interaction and perseverance (β = .02, 95% CI [.003, .042]), as did zest for life (β = .13, 95% CI [.065, .187]). The results also supported the serial mediating effect (β = .02, 95% CI [.006, .044]) explaining a total of 41% variance of perseverance of effort (R^2 = .01). We then conducted pairwise comparisons among the three indirect effects to test whether they exerted equal impacts on the association between family interaction and perseverance of effort (see Table 2). The results indicated that the indirect effect of family interaction on perseverance of effort through anxiety was significantly smaller than the indirect effect through zest for life (β = -.10, 95% CI [-.175, -.039]), while the indirect effect through zest for life was significantly greater than the serial mediating effect (β = .10, 95% CI [.032, .171]).

			Bootstrapping CI	
Effects	β	*SE*	Lower	Upper
Model 1: Family interaction ➔ Anxiety ➔ Perseverance of effort	.02	.01	.003	.042
Model 2: Family interaction ➔ Zest for life ➔ Perseverance of effort	.13	.04	.065	.187
Model 3: Family interaction ➔ Anxiety ➔ Zest for life ➔ Perseverance of effort	.02	.01	.006	.044
Contrasts				
Model 1 versus Model 2	-.10	.03	-.175	-.039
Model 1 versus Model 3	-.01	.01	-.029	.013
Model 2 versus Model 3	.10	.04	.032	.171

Table 2: The comparisons of indirect effects of family interaction through anxiety and zest for life on perseverance of effort (5,000 bias-corrected bootstraps 95% confidence intervals).

Note: Controlling for gender, age, and SES. β = Standardized Beta; *SE* = Standard Error; CI = Confidence Intervals.

Discussion

This is the first study to investigate the potential serial mediating mechanism in the association between family interaction and perseverance of effort. In support of H_1, results showed that family interaction was positively associated with the perseverance of effort in Chinese students. This aligned with previous findings that students who perceived positive family interactions and attachment security with their family members tended to show higher perseverance of effort (Lan & Wang, 2020). Further, family interaction was significantly associated with anxiety (supporting H_{2a}), and zest for life (supporting H_{2b}), suggesting that students' positive family interactions (i.e., better harmony) significantly decreased their anxious symptoms and promoted zest for life. This is in line with earlier research highlighting the important role of family interaction in promoting and predicting mental health in students (Bramlett & Blumberg, 2007). Surprisingly, the current findings did not indicate a significant association between anxiety and perseverance of effort (thus not supporting H_3). Studies have documented that anxiety can be a domain-specific construct (Lauer et al., 2018), and this study only investigated students' general anxiety levels. It is reasonable that students may have a higher tendency to be anxious about failing to achieve their goals. Further investigations are warranted.

The confirmed serial mediation model was found in favor of three indirect effects (Model 1 to 3), supporting H_5. Specifically, the indirect effect of family interaction on perseverance through zest for life (Model 2) had a significant and greater impact than the other two indirect effects (Model 1 and 3). First, this confirmed model is consistent with previous studies in highlighting the essential role of emotion in shaping individuals' attitudes and behavior (Besser et al., 2012), providing new insights into the different strengths of the indirect effects of emotions (anxiety) and attitude (zest for life) in the association between family influences (interactions) and behavior (perseverance in sustaining effort consistently). The current findings also showed that zest for life accounted for a significantly larger proportion of the total effect of family interaction on perseverance than anxiety. This implied that a positive attitude towards life could play a stronger role in explaining how positive and healthy family interactions are related to individual perseverance towards long-term goal-striving.

Limitations and Future Work

The current study should be interpreted in the context of three limitations. First, this was a cross-sectional study that failed to suggest causality among the tested variables. Second, the self-reported data may (1) cause a common-method variance, which may have allowed covariation between variables and produced significant bias in the results, and (2) include social desirability bias that the participants tend to present a favorable image of themselves. Therefore, multiple data resources are recommended in future studies. Third, this study only recruited a sample of Chinese university students, therefore, the current findings cannot generalize to other educational contexts, and non-Chinese populations or religions. More studies in this line with identifying other confounding factors such as the individual desire for goal-attainment and emotion regulation are highly recommended.

Implications and Conclusion

Theoretically, this study addressed a research gap by investigating and confirming the mediating role of anxiety and zest for life in the association between family interaction and perseverance of effort. The results provided a serial mediation path for understanding the role

of family interaction in cultivating perseverance of effort, which enriches the theory of positive youth development. Practically, in order to enhance individual perseverance towards long-term goal-striving, researchers and educators can incorporate strategies to foster improved family interaction and zest for life in interventions (such as writing day journals about using the zest character strength each day for two weeks; Proyer, Ruch, & Buschor, 2013), further providing anxiety prevention strategies. Since zest for life is still an emerging area of research in the school context, more studies targeting intervention development of zest for life can be fruitful in this research area.

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Contact email: KaLaiLam@um.edu.mo

Navigating the Impact of Social Media on Cross-Cultural Learnings and International Mobility: Students' Perception

Pushp Lata, Birla Institute of Technology and Science–Pilani, India
Sugandha Bhatnagar, Birla Institute of Technology and Science–Pilani, India

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Abstract
In an era marked by the pervasive social media, its evolution transcends from mere communicative instruments to becoming synonymous with communication. Considering that human existence today is heavily characterized by cross-cultural intersections, the present study discusses the transformative influence wielded by social media on the perceptual landscape of cultural distinctions. The study, therefore, is a comprehensive analysis of the impact of social media on the adaptation trajectory of 20 engineering students from India who travelled abroad to do their internships. This qualitative research delves into the role of social media in enhancing their Intercultural Competence when their leaving for the host country was confirmed and the role social media played while they started residing in the host country. Researchers have used the phenomenological approach of examining the data using the Deardorff Pyramid Model of Intercultural Competence (ICC), attempted to understand the existing presence of cross-cultural knowledge and the impact of social media in cross-cultural settings, and explored the need for structured cross-cultural education within academic programs. Results suggest that Social Media helps in early adjustment in the host culture through knowledge of tangible aspects but does not help much in learning the intangible aspects. Also, social media does not support for better internal and external outcomes, required for effective ICC. Hence, a well-structured cross cultural training is required in the academic programmes at tertiary level.

Keywords: Cultural Diversity, Social Media Impact, Deardorff Pyramid Model of Intercultural Competence, International Student Exchange Programs, Cross-Cultural Training

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Introduction

In the present era, globalization and social media have transcended the barriers and increased the interconnectedness. Social media (SM), as a vital tool for daily social interaction, has opened the door where individuals can interact with others on the web with ease. Individuals can access information and learn the points of view of others on diverse issues, subjects, and occasions. People, especially students who plan to travel abroad, use this easy access to information for forming perceptions, beliefs, and attitudes towards other communities and nationals. Recent researches have shown a rising trend of students' mobility across the globe for higher education, work experience, better skills, and research (Paige 2005; Chen & An 2009; Krzaklewska 2008; Eder et al., 2010).

The International Migration Report 2017-Highlights, published by the United Nations, reports that India was the largest country of origin of international migrants (17 million), followed by Mexico (13 million), the Russian Federation (11 million), and China (10 million). According to the Ministry of External Affairs report in 2022, 13,24,954I Indian students went for studying abroad, out of which 1,64,000 went to the United Arab Emirates, 55,465 to the United Kingdom, and 4,65,791 to the USA. Going abroad grapples most students with the fear of unsettlement and worries of not being accepted by the natives of other countries (Wells, 2014; Holland & Kedia 2003; Sachau et al., 2010). Due to lack of proper intercultural competence (ICC) training, students depend heavily on social media to explore facts and information about the host culture (Al-Jarf, 2020; Wu & Miller, 2021). Though social media is instrumental in the acceleration of globalization and internationalization, it does not necessarily provide authentic information that indirectly puts students at a risk of suffering from identity misalignment. Therefore, the study explores the interplay between the use of social media and their Intercultural Competence (ICC), and discusses how social media influences their ICC and argues that it is important to explore the need for cross cultural training at college and university level for equipping them with necessary ICC. Considering this background, the present study has focused on achieving the following objectives:

Research Objectives

- To examine the extent to which social media influences students and contributes to their cultural understanding or misconceptions.

- To understand whether there is a need for cross cultural training at college and university level.

Literature Review

In the present world, with the emergence of the internet, social media platforms are used as tools for enhancing intercultural understanding for smooth international mobility (de Wit, 2015; Hunt, 2016). These platforms offer more flexible, open, and diverse geographical, intellectual, and social avenues for interactions and learning. In fact, social media has become vital because of easy access, wealth of information, and relationship building (Chang, 2021; LaRose et al., 2001; Bregman and Haythornthwaite, 2003). The rising number of students, who go abroad for higher studies or industrial training or internships, also make use of social media for gaining information about other cultures for their smooth transition.

Various studies have focused on the role of social media for the development of ICC. One such study has been done by Karakaş (2013), who investigates the intercultural attitudes of Turkish students in a UK university. The study employs Bennett's Developmental Model of Intercultural Sensitivity (DMIS) as a framework to analyze students' attitudes towards intercultural interactions. Results offer insights into the challenges and adaptations experienced by Turkish students in a foreign cultural context. Kim, Yun, and Yoon (2009) explore how the internet aids cultural hybridization and interpersonal relationship management among Asian international students in South Korea. Integrating a framework combining Hofstede's cultural dimensions and relational maintenance strategies, the paper highlights the internet's crucial role in fostering cultural exchange and interpersonal connections in a multicultural context. Another research critically how international students utilize social networking sites for everyday life information seeking (Sin et al., 2013). Employing the Information Grounds Theory (IGT), the study explores the informational value of these platforms. Findings reveal that social networking sites serve as crucial sources for students in navigating various aspects of daily life, showcasing their significance in information access and social integration.

A study done by Luthfia et al. (2019), examines how social media enhances intercultural communication competence among European students in Indonesia and Indonesian students in Europe. Using Byram's Intercultural Communication Competence (ICC) framework, it analyses the impact of social media on cultural understanding and interaction. The study underscores social media's pivotal role in fostering cross-cultural communication skills among students from diverse backgrounds. Liu (2019) investigates the influence of social media in developing the ICC of Chinese people living in Sweden. This study adopts a mixed method, using a survey questionnaire followed by interviews. The researcher builds upon Fantini's four dimensions of ICC and derivates from his Intercultural Competence Scale (ICS) to examine how social media usage affects individuals' ability to effectively interact across cultures. Results suggest that while social media can enhance certain aspects of ICC, it may also pose challenges to intercultural understanding and communication.

Reflective analyses of the most literature in the domain focuses on how the social media plays a role in developing the ICC of students but these studies have not explored to what extent these media help in developing ICC, and whether these media help in learning both the tangible and intangible aspects as given in the Iceberg Model developed by anthropologist Edward Hall in 1976 (cited in Badham et.al., 2020). Moreover, the above studies have used the models which focus on the general perception, attitudes, and skills, but none of them have analysed the outcomes of the assessed perceptions, attitude and skills in their behaviour. Therefore, the present study explores the influence of social media by using the Deardorff's Pyramid Model as the theoretical framework, which includes not only knowledge, attitude, and skills, but also the internal outcomes (shift in mindset) and external outcomes (change in behaviour) (Deardoff, 2008).

Research Questions

- ✓ How does social media influence Indian students' perceptions about the host culture and to what extent does social media contribute to cultural understanding or misconceptions among students?

- ✓ Is there a need for a systematic training for Intercultural Skills for smooth internationalization and mobility?

Research Methodology

This section presents the description of various aspects of the context in which the research was conducted.

Research Setting and Participants

Since the intent of the present research is to understand the lived experiences of the student participants in using social media to build their perception about the host country culture and how far it helped in preparing them to adjust in their international mobility; the study, therefore, uses phenomenological approach. This approach aided in exploring what the student participants experienced, comprehending the meaning of their cultural understandings, and also focusing on their experience of phenomena. The research was conducted in one of the esteemed technical institutions of India. The snowball sampling was used to recruit the participants for the study. Researchers contacted the students, they had taught in the previous semesters and who were going abroad for their summer internships. They were requested if they would like to be interviewed for the current research. 20 students accepted the request and were interviewed once they returned from their foreign internships. Individual face-to-face interviews were conducted with these participants to understand the impact of usage of social media on their adjustment in their host country. The researchers adhered to the ethics of research and also asked for the consent from the students to use their interview data for publishing purposes of this research.

Research Data Collection

As mentioned above, the researchers employed semi-structured interview schedule. The idea behind integrating this method into the research was that there is no fixed answer to any question and to understand holistically every variable of the research, we need to elicit different perspectives, if any. Therefore, we used semi-structured interview method.

Research Data Analysis

Once the data was collected and transcribed, the researchers used the Interpretative Phenomenological analysis for analysing the data. For this purpose, the researchers read and re-read the transcripts to form the emergent themes and subthemes to discuss the findings of the research (Larkin, Watts & Clifton, 2006; Eatough & Smith, 2017).

Findings and Discussions

This section of the study outlines the profiling of the research participant group, followed by findings and ends with the comparative analysis of cultural dimensional learning of students before going to their host country and while staying in the host country.

The participant profile for this research is displayed in the figure1 given below. Out of 20 interviewees 16 students were males (80%) and 4 were females (20). The figure 1(b) exhibits the number of student participants went to different countries.7 students went to European countries (35%) whereas 6 students went to North American countries (30%) for their internships. A small percentage of students went to China (5%), Japan (15%) and Singapore (15%).

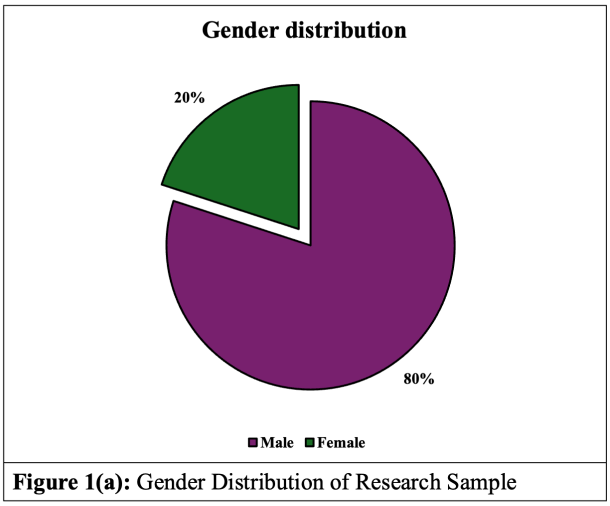

Figure 1(a): Gender Distribution of Research Sample

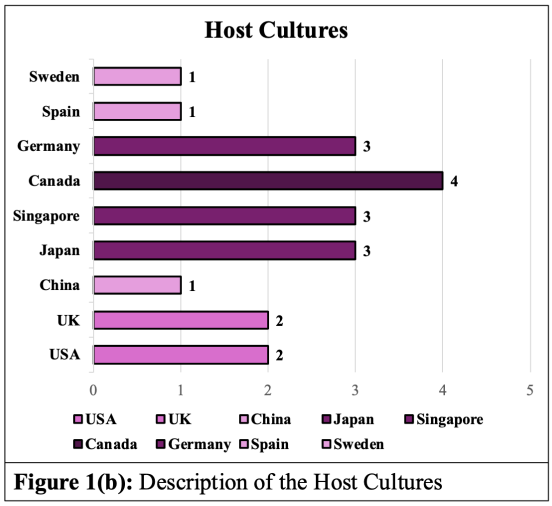

Figure 1(b): Description of the Host Cultures

The preliminary analysis concluded that each respondent consumed at least 1.5 to 2 hours of social media content to learn about the host country's culture. They explained that social media platforms such as Facebook, Instagram, LinkedIn, WhatsApp, to name a few, are their first stop to search about the host country even before browsing about it on web browser, such Google, Bing, etc. For them, these platforms are helpful not only to build connections with the host country people before they left India and during their stay in the host country, but also it helps in providing familiarity with the surrounding and events of the host country through host culture photos and videos, and interactions with local people. Participant 2 shared,

> *When I got to know where I will be going, I first used Instagram to learn about the host culture. I followed some of the accounts which were giving information such as places to visit, food to explore and how to speak small sentences in German. These were quite helpful. Although, I didn't even remember those sentences when I went there but it was helpful to make me confident that I will be fine there.*

80% of the respondents informed that social media helped them collect information about things to do and places to visit before they reached their host cultures. These contents or interactions happened through social media, with host country citizens were mostly intended to understand the "tangible aspects of the host culture" such as availability of food variety, accommodation options and official formalities required to be done for being in the host country. Participant 3 explained, "*Social Media was a helpful tool for me to know the general information such as food choices, language, places and how safe it is for the foreign travellers*". One of the students (Participant 10) who went to China for internship shared,

> *The use of Instagram and Wechat was most helpful to me. People in China, not most of them speak English, so I was able to connect with the other foreign students coming to China for the same programme. This way, I was able to build a friendship with them even before reaching there.. Even our programme coordinator encouraged and organized Zoom weekend meetups so that we know each other even before we meet each other in-person. But I felt really uncomfortable as I could not understand why they expected to conform to the project manager's views, even if those were not doable.*

Thus, we found a unanimous agreement among the participants towards the fact that social media can act as an initial information provider but not as an aid to help them have an in-depth understanding about foreign culture.

Upon grouping the responses of the students and categorizing them, it was found that social media helped them i) places to visit, ii) food variety, especially for the students who were vegetarian, iii) mode of transport and maps, iv) discussion about what to expect when one reaches the host country, v) make connections with the host country citizens and/or others coming from other countries for the same internship, vi) learning language to understand or to speak and vii) host country culture and values. When we take into consideration the components of Deardoff's pyramid model of intercultural competence and aligned these categories, these seemed more reflecting the first and second components of the pyramid – Requisite Attitudes and Knowledge Comprehension.

To comprehend the phenomenon of context better, the researchers enquired on social and professional situations that might have hindered intercultural communication. The students shared that the social media provided information about the host culture which was inconsistent from what the reality was in the host. Participant 6 expressed,

> *Social Media was helpful to know dos and don'ts about the host cultures so that we do not offend them, unintentionally. But it could not help me understand how we should behave in different situations in the host culture.*

Further he added,

> *In UK, when I was not able to understand the route of subway to take to reach my accommodation location. So, I asked a lady who was waiting. When I asked her, her first response was, "Can you be polite while speaking?" I was surprised and felt anxious that how can I offend someone like that. I said to her, "I am polite. What have I done to make you feel like that? She again repeated to me to be polite to her. After I enquired her one more time, she said, "Can you not say please?" At that moment, I realized what went wrong in my conversation with her. Such social etiquettes are taught, even social media would highlight it but such things you understand once you learn about the other culture more in-depth or when you have undergone a basic training to understand different cultures.*

With the help of Table 1, the difference between the perception formed before leaving India and during their stay in host country can be observed. The participants explained in their individual interviews that most of the information they acquired from social media about the host country was basic. Although social media did help them, but they learnt more about the host culture after going there. Participant 12 stated,

> *I knew before going that Swedish people don't speak much. But when I went there, I found them as similar to us, Indian. They were very humble, kind, and approachable. They love to speak but they always explain themselves in small sentences, unlike me who like to be as detailed oriented as possible. So social media did not help me in understanding whether they are not speaking to me because they are not interested or explained their point in small sentences.*

Table 1 illustrating students' perceptions about their host culture before leaving India and during their stays in host countries.

Table 1: Students' perceptions about their host culture before leaving India and during their stays in host countries

Host Country	General Perception about the country before the stay	Perception about the country during the stay
United States of America	It was a clean, technologically advanced country and a highly individualistic nation with high crime rates.	It has mixed working styles, depending upon the individual. Serious about keeping working hours and leisure hours separated.
Germany	Mechanical Engineering has a high developed status. It is a highly monochronic culture. People are passionate about cars and beer.	It is highly advanced in technology. They ask lot of questions to make sure everyone is on the same page.
Canada	People would be helpful and polite. A lot of Punjabis reside there. Cheaper than the USA.	It is a diverse country but more than Punjabis residing there. The weather conditions are brutal, but people are more conservative by nature.
Singapore	Multicultural Community, disciplined, efficient public transport, legally strict	People have very efficient working styles. They work but then off working hours enjoy their personal lives. Very safe. Lot of focus on health
Japan	Technologically advanced. Hard working society with high moral values. Polite people. Love their heritage and food. Expensive.	Strong hierarchical system of communication. Difficult to communicate in English. Very Polite and patient people.
China	Hard working people, Negative impression that they don't treat Indians well. Not very friendly, majorly non-vegetarian and sea food	Hierarchical system of communication. Difficult to communicate in English. Reserved people, as they do not open up quickly. Workaholic.
Spain	Good architecture and a collectivist and vibrant culture. Value their heritage	Jovial people who give importance to relationships over work. Polite and very helpful. Loud and boisterous
Sweden	Conservative and disciplined, sprawling spaces, speak less	People talk less and like their privacy, but everyone was very approachable and humble. Huge personal space, strict laws
United Kingdom	They are very cultured and reserved people. Status conscious dry humour	People were always presentable. They reciprocate your behavior style. Sense of personal space, queuing etiquette, and addressing people with their first names

Researchers, then enquired about the students' views regarding their stay in the host countries, with an intention to understand about their adjustment pattern in the host countries. 16 participants (80%) found the adjustment to the new culture very difficult. They found it challenging to become self-reliant and independent while settling in the host country. They enlisted that the absence of helping hand to take care of them, prepare meals, clean their living spaces and clothes, and the like, made living in the new culture not as easy as they thought it to be. Beside this, there were many "non-tangible aspects of the culture" they learnt while staying in the host country. Based on the close analysis of the interview transcripts, we have grouped their responses under different components of Deardoff's Pyramid Model of Intercultural Competences, as displayed in Table 2.

Table 2: Responses under different components of Deardoff's Pyramid Model of Intercultural Competence

Requisite Attitude	**Knowledge and Comprehension**	**Skills**	**Internal Outcomes**	**External Outcomes**
Learnt the social, cultural, and political facts	Food- types and places, transportation, places to visit, and official procedures for immigration and work	Learned about the language difference		
On working days, work over leisure is priority whereas on weekends, party culture is highly prevalent (USA, Germany, Spain, Singapore, Canada, and UK).	Nuclear family structure with less bonding specially in the USA and Germany	Got to learn generic social norms and taboos for weddings and giftings		
More prevalent individualism and privacy are priorities in Western cultures.	People adhere to rules sincerely, both in personal and professional spheres, in the USA, Germany, as compared to China and Spain.	Subtleties of language of friendship, face saving in case of Chinese and Japanese culture, tolerance and acceptance are hard to develop.	Culturally specific expressions can be learned through social media but their appropriate use in a context, and time are something hard to learn.	

Effective scheduling, punctuality and efficiency in work in Germany, USA,UK and Sweden.	All cultures give importance to time, but Western cultures such UK, USA and Canada consider time as money which should be used optimally.			
	Some of the countries such as China and Japan operate on hierarchical kind of communication and believe in respecting the authority.			

Therefore, from the students' responses, we made a comparison of their learning before reaching their host countries and after they reached their respective host countries. From the analysis, it can be observed that the tangible aspects were easily learnt by the students with the help of social media, whereas the non-tangible aspects such as cultural tradition, values, beliefs and norms of the cultures were difficult for them to learn. They could learn only through their personal exposure with the cultures., which involved lot of risks and challenges. The analysis has been done using the Deardorff's Pyramid Model of Intercultural Competence and the findings show that the social media is instrumental in equipping the student participants for enhancing their knowledge and attitude, but hardly have they learnt the skills, internal outcome, and external outcome.

Furthermore, we found unanimous agreement among students when we probe whether there is a need for a cross culture skill course in their curriculum. They expressed that if they were taught how to understand and explore a new culture in their academic program, they would have appreciated and adjusted to the host culture better. One of them (Participant 13) expressed,

> *I regret for not enrolling in the Cross-Cultural Skills course, being offered as an elective. If I had done my systematic intercultural training, I would have been to understand people of the host culture and my employers better and would have been mindful about my actions and their impact on their behaviours.* [Another participant (Participant 17) expressed,] *Having such courses help us learn about the other cultures and behaviours of those people better. Everyday, I was always surprised with the similarities in the behaviours of Spanish people with ours but simultaneously I would always find differences too. Since now I have enrolled in Cross cultural skills course, I hope it will help me with a lens to look at such similarities and differences better without any judgement and appreciate both the cultures.*

To summarize, social media is an instrumental tool for fostering intercultural attitude, increase knowledge and awareness of new cultures. However, the findings in this study, in relation to Deardoff's Pyramid Model of ICC, suggest that role of social media in development of ICC is primarily restricted to first two levels (attitude formation and knowledge acquisition) when researching new culture before immersing oneself. Consequently, social media lacked in its capacity to bringing in substantial change in the intercultural behaviour and sensitivity among Indian students towards the host cultures.

Conclusion

The present research highlighted that despite their exposure to social media inputs, the Indian students faced significant challenges in adapting and navigating workplaces communication norms, expressing appropriate emotions and etiquette, and understanding the social traditions and values of the host culture. The study, hence, is a valuable contribution to the field of intercultural communication skills as student participants have unanimously felt a need for offering such courses at university level aiming at nurturing and fostering ICC in students to better equipping them to adapt, appreciate, and integrate in the host country culture. The study recommends that providing structured cross-cultural trainings, has become indispensable in the present global interconnectedness. The provision of ICC education underscores the importance of preparing students for their future global academic and professional environments, and successful cross-cultural interactions and experiences.

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Contact emails: plat@pilani.bits-pilani.ac.in
p20210034@pilani.bits-pilani.ac.in

ORCID: 0000-0002-4187-2644
0000-0003-2224-1430

The Art of Observation and Documentation of Children's Play

Jennifer Wong-Powell, JWP Consulting - Inspired by Children, Mongolia

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Abstract
How might we use data to make children's learning through play visible? Noticing and valuing the ideas, thinking, theories, questions and feelings of our youngest learners involves the process of observation. Understanding their strengths, interests, needs and challenges also comes from meaningful documentation. At the same time, one of the most difficult aspects of observing and documenting children's play is the *what* and *how*. So much data can be gathered about our students that we get lost in what to look for. The end result is that data is either diluted or there is too much data. Another challenge to the process is what is worth documenting and how do we present data to reflect who our students are and to accurately make visible their learning stories. This action research explored the possible influences of teaching a pattern of observation and documentation on play practices. Findings that were revealed through a thematic approach to data analysis include: 1) feeling more intentional about what to look for and what to document; 2) becoming more aware about the filters and perspectives brought to the observation and documentation process; and 3) implementing the pattern to inform planning and to personalize play for students. Implications to future practice require systematic engagement with ongoing, collaborative practices of observing and documenting children's play.

Keywords: Observations, Documentation, Play, Data, Perception

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Introduction

The perceptual shift in assessment for learning has been moving away from traditional ways of gathering evidence (Mackenzie, 2021). Most certainly as early childhood educators, there is recognition that the old methods are developmentally inappropriate for young learners. Rather holding great value in the early years is assessment through the process of collecting and interpreting information during children's play through observation and documentation.

Valuing who children are, acknowledging their feelings and respecting their working theories and ideas happen through observing children's play. Making visible children's ideas, their strengths and their work in progress require forms of documenting (Stacey, 2015). However understanding the complexities and nuances in learning through play requires a purposeful and systematic approach to observation and documentation. While observation and documentation has the potential to yield powerful insights, the perceived challenge surrounds the what and how to observe and document children's play. Without direction, the process becomes cumbersome (City et al., 2013). Either too much information is gathered, lacking in purpose or data is diluted, missing essential details. Either way, the effectiveness and value of observing and documenting diminishes.

The gap between the desired and actual experiences and benefits with observation and documentation of children's play defines the parameters for action research. Responding to the gap, this study investigated the impact of teaching a pattern for observation and documentation of children's play on early childhood practices.

Engaging in Action Research

For early childhood teachers, questions about what children are really learning as they play are infinite. Observation and documentation offers an antidote to understanding children's everyday play moments that are filled with extraordinary meaning (Curtis & Carter, 2022). Generating understanding and knowledge around observation and documentation of children's play however, is fraught with so many questions.

- What aspects of children's play should be observed and are worth documenting?
- What processes, skills and tools might support teacher observations?
- How might observer subjectivities and biases be addressed?
- In what ways might the process serve learning and teaching?
- How might children's identities be made visible and life stories be valued through observation and documentation?

Responding to these questions, the author developed a course entitled "The Tapestry of Play" and used action research to explore the impact of teaching an observation and documentation pattern on play practices. The course involved virtually delivering a series of three workshops at 90 minutes each session. Participants included 24 early childhood educators working in different international schools in Spain, the United Arab Emirates, Malaysia and Vietnam.

The process involved a collaborative, iterative and reflective approach to build teacher knowledge and competency. Participating teachers were first introduced to a pattern of observing and documenting children's play, consisting of three elements:

- **Collecting data:** What information about students and learning during children's play is worth gathering and documenting?

- **Forming perceptions:** What is involved in the process of reflecting, analyzing and interpreting data?
- **Planning next steps:** What role might observation and documentation play in curriculum design and lesson planning?

After its introduction, participants engaged in continuous practice using the observation and documentation pattern throughout the course. Embedded into each virtual session were opportunities to watch videos of children's play, analyze data collaboratively and reflect on the process as an individual and in a whole group. Post-session tasks were also assigned, giving additional and extended time for application and reflection in daily practice.

Time deliberately allocated for reflections was essential to the process (Stacey, 2015). First, reflections served to inform adaptation and refinement of teaching the observation and documentation pattern based on participant feedback. Reflections also enabled teachers to consider how and what aspects the observation and documentation process impacted their play practices.

The research process therefore situated participants in a teachers-as-researchers role. Participants used their knowledge from their pedagogical experiences, their learning from the virtual sessions and their experiences on the job to drive the research process and construct their own knowledge, with the shared goal of improving play pedagogy.

Methods

Data sources came from the three virtual sessions including small group dialogue, whole group processing, individual teacher reflections, course facilitator field notes and session recordings.

Small Group Dialogue

Opportunities for small group conversations were provided throughout the course. To help facilitate conversations, indirect questions were provided to initiate and guide discussions (Cohen et al., 2017). Dialoguing allowed participants to generate ideas about the observation and documentation pattern and co-construct their understanding about the use and impact of the pattern on their play practices.

Whole Group Processing

Whole group sessions were facilitated to bring together individuals with differing experiences and viewpoints. By sharing insights from the small group conversations, common patterns and themes were identified. Processing as a whole group also allowed assumptions about the observation and documentation pattern to be challenged and nuances to be highlighted. The time given to extend ideas, qualify responses and exemplify points added to the depth of data.

Individual Teacher Reflections

Participating teachers maintained a journal for written reflections throughout the course. Being deliberate about time for individual reflections served as a valuable form of documentation of the research journey, informing about the progress of the study (Spencer et al., 2020). Reflections shared by participants made visible their interpretations of the use of

the observation and documentation pattern through the lens of their own experiences in both the virtual sessions and their own classroom contexts. Capturing teacher thought processes, experiences with the pattern, challenges faced with its implementation and lessons learnt contributed to the comprehensiveness in data.

Course Facilitator Field Notes

Adding to the written documentation of teacher reflections, the course facilitator's field notes tracked the evolution of participant questions and impact of the observation and documentation pattern on play practices. Field notes have the power to enhance data and provide a rich context for analysis (Phillippi & Lauderdale, 2017). Notes taken during the virtual sessions captured both spoken words and non-verbal communication to deepen understanding of participant feedback to the pattern's use and its effects. Notes taken immediately after the sessions minimized possibilities of details being forgotten and inaccurately remembered or represented with passage of time.

Recordings of Virtual Sessions

All sessions were video and audio recorded, allowing specific moments or the entirety of whole session processings to be reviewed as many times as needed. The recordings gave a full spectrum of information, capturing the saying, doing and relating of individuals (Mitchell & Reid, 2016). Revisiting the course through recordings enabled the subtle exchanges which may have been overlooked in real time, serving to further refine data collected.

Analysis

A thematic approach to data analysis was used to build complex and nuanced descriptions from multiple perspectives. Similarities and differences were detected across the various data sources through repeated review and revisit of content (Maguire & Delahunt, 2017). Categories were formed based on patterns including common use of language, recurring concepts and shared experiences. Repeated occurrences within the categories; relationships and connections between categories; and contrasting aspects for distinct differences provided broader concepts and overarching ideas for themes to then be identified.

Feeding the themes back to participating teachers throughout the sessions served to validate the ideas, increasing the trustworthiness of findings. The collaborative approach where opportunities to further discuss what resonated with participants from the themes resulted in more representative findings. Where content was surprising and unanticipated because of the nuances presented, opportunities to clarify and elaborate on ideas were possible.

Findings

The order of findings presented follow the sequence of the observation and documentation pattern introduced to participating teachers in the virtual sessions. Each component of the pattern resulted in a distinct impact on play practices.

Collecting Data: Being Deliberate & Intentional About the Work

Serving as preliminary information to the course, participating teachers were given the opportunity to address their current knowledge and skills surrounding observation and

documentation of children's play. Provided were expressions that the process was vague, decreasing the value in the purpose for collecting data and the efficacy of details gathered.

> Impression 1: *I don't know what I'm supposed to watch for when the children are playing. I just write down everything and then I don't know where to go from there.*
>
> Impression 2: *It's too much. I have all this information piling up but I don't know what to do with it.*
>
> Impression 3: *Where do I begin? And when do I make my observations of children at play? And how do I know what to observe and what to document?*

Exploring the question '*What information about students and learning during children's play is worth gathering and documenting?',* the data collection component of the pattern fostered a more deliberate approach, enhancing intentionality of the process. The pattern ensured teachers focused on the collection of relevant information fit for purpose, contrary to the random data previously collected without a framework. The implication resulted in a shift in practice. Prior to their observations, teachers needed to think critically and determine carefully the aspects of learning they intended to gather data about. Teachers then understood what was worth documenting as there was now purpose given to the observation process. Recognizing the need for planning in advance of making observations, teachers felt the process was more targeted and it gave value to their work. One participant remarked:

> *I've become more mindful of what I'm looking for. My data is more focused when I think about the learning I'm going to observe and note down, before I make my observations. I think about data differently and I see the importance of observation.*

The pattern also enabled teachers to make the distinction between data and perception. Data on its own has no value, as making judgements and forming interpretations are not involved (Satapathy, 2019; France & Almarode, 2022). Perceptions on the other hand, requires a process of making sense of information to construct meaning of what one sees and hears (Curtis & Carter, 2022). Knowing the difference between data and perception helped teachers become more aware of how quickly they formed opinions when making observations. Teachers became conscious of their assumptions about children's play, prioritizing the need to gather enough data before making accurate perceptions. The practice of not rushing the process and pausing enabled teachers to use data to drive their interpretations.

Slowing down to gather enough data before meaning making resulted in a more holistic view of students, leading to a better understanding of the motivations and intentions behind children's play. As one participant articulated:

> *Collecting data before I insert my meaning has filled in the missing pieces to a jigsaw puzzle. When I jump to conclusions too quickly, I miss pieces, and then I get confused and I misunderstand my students. I need to take a much bigger step back and not allow my perceptions to dictate so I can have a bigger picture of the situation and what children are really doing. Not everything's in black or white. It helps me to know what's really going on because I've taken the time to see all that I can.*

After repeated experiences of gathering data in both the virtual sessions and on the job, what became apparent to participating teachers is that they were making more generous

interpretations of children's play. The process of moving beyond initial impressions and looking deeper into children's play enabled teachers to see different perspectives and consider other factors to the situation that may have been overlooked had they formed interpretations prematurely. As one participant concluded in her written reflection:

> *Be aware! Take more time to find out why. Listen better. Ask more questions. Because if you observe long enough, you might not be really married to the idea of your initial interpretation. You will find that you have changed your perspective and see the children differently. You can always learn so much more.*

Forming Perceptions: Broadening Perspectives & Deepening Understanding

After collecting data, participants were posed with the question of *'What is involved in the process of reflecting, analyzing and interpreting data?'*. As they experienced collaborative analysis of data in both small and whole group conversations, this led to the emergence of a central concept, the notion of filters (Wong-Powell, 2017). Participants brought diverse values, beliefs, teaching experiences, life backgrounds and contextual factors to the study. By recognizing the influences of these unique filters on their perceptions of children's play, the diversity of participants enriched their interpretations of play observations. After processing data with colleagues, one participant highlights:

> *We have similar and different experiences growing up and experiencing life's achievements and challenges. And coming from similar and different places somehow gives us different views and attitudes about children's play. Looking at data together, these conversations have opened a door: we can talk about play but it could have so many meanings.*

Perception is a filtered experience shaped by the different dimensions of one's identity, serving as lenses through which individuals view and make meaning of the world. The John Hopkins Diversity Wheel (2021) outlines the conscious and unconscious filters that influence the information one chooses to focus on and the interpretations one makes. In one example, as participants were watching a video of three boys building with blocks, it was observed that one boy raised a block over the head of another boy and paused in that position. Different interpretations of the boy's actions emerged.

> Interpretation 1: *It looked like he was being playful. The students in my class do similar things like that because they're trying to get the attention of another student, to engage them in play.*
>
> Interpretation 2: *I was waiting for the boy to be hit over the head with that block. I've seen it happen so many times! I was waiting for it!*
>
> Interpretation 3: *He was probably playing planes so of course he would fly a block over the head of another boy. It's what kids do when they play planes. We see this all the time, pretending to fly something around.*

While participating teachers watched the same video of three boys playing with blocks, the various work experiences that the teachers drew upon influenced the way they interpreted the boy's behavior. While in the first interpretation, the teacher used her own students and

classroom context to form her perceptions, the second and third statements were conclusions grounded on former situations experienced.

The value of seeing and understanding differently emerged through small group conversations as participants explored the possible filters they used in observing the three boys and then interpreting data.

> Participant 1: *Everyone has a different life story and these stories allow us to connect in different ways. When we're open to sharing our thoughts, beliefs and ideas we can begin to understand where each person is coming from. And that's enriching!*
>
> Participant 2: *It has been helpful to hear the different viewpoints because it has allowed me to reframe my thinking. Sometimes I see things in a certain way. So, hearing other perspectives lets me consider a different outcome because I'm reminded that I can see things differently than maybe the way I usually do or want to.*

Through collaboration and by incorporating different voices, assumptions were challenged, prompting participants to reevaluate how they saw a situation and their interpretation of that observation (Bocala & Boudett, 2022). The diversity in voices enabled teachers to build upon each others' ideas and reveal aspects that were previously overlooked through a singular perspective. Participants concluded that the exposure to diverse viewpoints led to a richer pool of experiences, contributing to a more comprehensive understanding of children's play.

Planning: Developing Meaningful Next Steps

Through observations, teachers' understandings of their students were enhanced and knowledge about children's play increased. Combined with the question of *'What role might observation and documentation play in curriculum design and lesson planning?',* participants felt empowered to leverage documented observations and insights to inform the planning process. Developing curriculum and designing lessons no longer happened by chance; there was thoughtful attention to specific aspects of the curriculum and learning and teaching based on data.

> *Bringing my observations to the planning meetings with my team has guided our time together. It helps to focus our conversations on what provocations we need to next provide our students. It tells us what's missing from our lessons. And, it lets us know what we should observe for next.*

With the emergence of more deliberate and intentional approaches to planning for play, participants gained confidence in personalizing play experiences for their students in different aspects shown in Table 1. The depth of information about students supported teachers to plan for more focused and impactful play provocations; modify play environments purposefully; and reflect on their presence and facilitation in children's play.

PURPOSE OF OBSERVATIONS	INTENDED DATA TO BE COLLECTED	OUTCOMES ON PERSONALIZING PLAY
For assessment	Gain a deeper knowledge about children's strengths & challenges in areas including: -developmental milestones -language & communication skills -mathematical & scientific thinking -social & emotional development -executive functioning skills -metacognitive skills	Planning play provocations -built on student strengths -support individual challenges Informing adult-student exchanges -kinds of questions posed by adults -knowledge & skills needed to be explicitly taught Extending play through feedback -student self-assessment -reflections from both students & adults
For scaffolding	Monitor how play evolves & documenting learning over time	Responding to students in: -levels of adult facilitation -pacing of play provocations -complexity of play experiences
For inspiration	Reveal student curiosity & wonder by understanding: -motivations behind play -intentions for playing -engagement in play -ways to extend play scenarios	Designing play environments -presence of focal points -varied learning materials -individualized displays

Table 1: Personalizing play experiences

The benefits of teaching the observation and documentation pattern on planning for personalized play were shared during the final session of the course as participants described:

> Participant 1: *Because I know my students better, my lessons are more student centered. The observations help me to see learning from the child's point of view. I can now better plan for their play based on what I'm seeing and not what I'm thinking.*
>
> Participant 2: *Observations are key to all that we do. The data enables us to refine our thinking and understanding of each individual student. We can plan for their unique play journey.*
>
> Participant 3: *Observing students is truly a gift in getting to know your students. I use my documents of children's play to inform my next steps as I look to differentiate my approaches to play.*

Limitations to the Study

Teaching a single pattern may limit the ability to adapt, possibly making it context specific and oversimplifying the complexities of play. While acknowledging the potential limitations, the pattern offered a valuable framework to the initial vagueness expressed by the participating teachers about the process of making observations and documenting children's play. In addition to clarifying the purpose and process, the pattern promoted consistencies in how and what data were collected. Utilizing data to form more accurate perceptions about children's play also minimized potential bias emerging from teacher filters, contributing to data-driven decisions for planning children's play.

The use of a small sample size with immediate results also may not guarantee findings are representative, generalizable and have longevity. Purposive sampling provided relevant information to the study as participation was by virtue of professional role. Further investigation with a larger sample size and extending the course to additional study groups is warranted. Additionally, to determine the residual impact of teaching an observation and documentation pattern, follow up conversations including interviews with participating teachers should be made (Schmoker, 2021). While the framework may show positive results to play practices, the study requires follow-up to detect potential drift over time.

Implications to Practice

While the study yielded immediate results from a small sample size, there are promising influences to teaching an observation and documentation pattern on play practices. The iterative and reflective process in developing teacher knowledge, skills and competencies highlight the need for a systematic approach to observation and documentation. Arising out of the initial concern identified by early childhood teachers, a framework helps to define the purpose for observing and identify what is worth documenting. A pattern for observation and documentation serves to systematize the process of gathering data before forming perceptions, serving to acknowledge and minimize the impact of filters as potential biases. Additionally, the process can be used to facilitate planning to improve play experiences that are data driven and personalized.

However the impact of teaching an observation and documentation pattern goes beyond systematizing the process. Ongoing practice in the virtual sessions and practical application of the framework shifted the thinking of participating teachers, holding value in repeated experiences. Collection of evidence therefore requires multiple measures and more than a single entry (McTighe, 2018). Through an iterative and ongoing process, participating teachers developed a more holistic view of their students and a deeper understanding of children's play. As expressed by one early childhood teacher:

> *I needed to go back and observe again and again because when I processed my notes with peers, our perceptions were so different that I wondered if I was missing something. It was useful to observe again because what I first saw wasn't what I saw again the next time, and the next, and this added to how I was seeing my student.*

With repeated observation and documentation practices, participants also experienced increased accuracy in their perceptions. Providing opportunities to engage in frequent observations and return to data is necessary, resulting in more complete portraits of students and optimal conclusions (Axelsson, 2023). As one participating teacher recalls:

> *I'm more careful not to judge the first time I observe because I've been in a place where I formed my opinions too quickly. And, I was wrong! I am reminded that observing and documenting is a process if we want to make the right interpretations of our students.*

While mining for robust data and forming accurate perceptions require discipline by committing time for practice and being deliberate about repeating the process, it also demands a collaborative approach (Campbell et al., 2016). The collaborative inquiry of participants in experiencing the observation and documentation pattern is a powerful shift. Collecting and interpreting data can be challenging for one teacher alone. Moving the observation and documentation process to a shared experience transforms individual understanding to collective insights, significantly deepening understanding about children's play and enriching the perspectives about students.

While teaching a specific observation and documentation pattern is a valuable starting point, the study supports a systematic approach, ongoing practice and collaborative engagement as crucial elements in harnessing the full potential of providing a framework. By incorporating these features in the process, a more comprehensive approach to fostering habits and mindsets around observing and documenting children's play is cultivated.

Conclusion

Engaging in action research values the knowledge and experiences that teachers hold and can bring to the field. Serving as an authentic way to approach professional learning, action research provides opportunities for teachers to identify areas for professional growth, dialogue about experiences, share practices, reflect on processes and adjust approaches based on their learning.

The significance of this study informs the direction of observation and documentation of children's play. As teachers inquire into the why, what and how of the process, teaching a pattern brings purpose, value and a pragmatic approach into practice. Through careful observation and documentation, teachers can represent with accuracy, the identities and stories of children and give respect to who they are as individuals and as learners (Curtis, 2017; Carr & Lee, 2017). Children are complex individuals with a rich background of experiences, strengths and interests waiting to be uncovered.

The depth in findings obtained from small and whole group conversations, combined with individual participating teacher reflections and course facilitator field notes, empower teachers to use a pattern as the cornerstone to observation and documentation practices. By developing these skills, teachers can move beyond assumptions and premature perceptions about children's play and truly value children for who they are, fostering a more responsive and personalized learning environment for all.

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Caring in Crisis: Unveiling Compassion Fatigue Among Indonesian School Counselors

Dwi Sri Rahayu, Universitas Negeri Malang, Indonesia
Adi Atmoko, Universitas Negeri Malang, Indonesia
Muslihati, Universitas Negeri Malang, Indonesia
Arbin Janu Setiyowati, Universitas Negeri Malang, Indonesia
Setyorini Setyorini, Universitas Kristen Satya Wacana Salatiga, Indonesia

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Abstract
The large number of traumatic problems in adolescents and the shortage of school counsellors cause school counsellors to have a heavier workload. Compassion fatigue occurs when a counsellor is unable to consistently demonstrate empathy, compassion and care to clients. This is due to the fact that constant contact with clients undergoing intense emotional experiences is very draining on the counsellor's physical and emotional reserves. This study aims to identify and describe compassion fatigue in school counsellors in Indonesia. A systematic research approach was required for this methodology to be successful. We used an online survey to collect data. To analyse it, we used the RASCH model to categorise the level of compassion fatigue in school counsellors. There are two indicators: job burnout and secondary trauma. The 13 items in the tool were used to measure the severity of compassion fatigue in counsellors. The study involved 69 school counsellors who were all actively involved in providing counselling services in junior high schools in Indonesia. The findings obtained from this study revealed that school counsellors in public junior secondary schools in Indonesia experience compassion fatigue at a moderate level.

Keywords: Compassion Fatigue, School Counsellor, RASCH Model

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Introduction

Compassion fatigue, also known as secondary traumatic stress, is a state of exhaustion and sadness experienced by individuals who regularly provide care and support to others who have experienced trauma or suffering. It is a form of burnout that results from prolonged exposure to the suffering and trauma of others (Figley, 1995). Compassion fatigue can manifest in several ways, including emotional exhaustion, depersonalisation, inability to complete tasks, loss of motivation, decreased empathy, and decreased ability to respond effectively to the needs of others. This can affect an individual's physical, emotional, and psychological well-being, and can affect the quality of care provided (Sangganjanavanich & Balkin, 2013). A counsellor is not exempt from this problem.

The notion that counsellors are likely to experience compassion fatigue is one that is widely accepted by many experts in the field of mental health and counselling. Counsellors and other mental health professionals who regularly provide care and support to clients experiencing trauma and suffering can be vulnerable to compassion fatigue (Coetzee & Klopper, 2010). School counsellors face a variety of challenging demands that lead to stress, empathy fatigue, emotional exhaustion, instability and subsequently cause counsellors to quit the job (Mullen et al., 2017). It was noted that 53.7% of counsellors experienced compassion fatigue, characterised by low ability to manage stress, experiencing difficult clinical events, having more clinically troubled counsellors, relying on religion as a coping strategy, and seeking support to manage stress (Udipi et al., 2008). Counsellors in the West also face similar issues such as career and personal conflicts resulting in stress, burnout, and compassion fatigue (Smith, 2017). This is also the case in Malaysia, where guidance and counselling teachers also face difficult situations in their careers and personal lives, and this must be addressed so that clients get quality services (Mahomed et al., 2019). Meanwhile, the condition of counsellors in Indonesia is almost the same. School counsellors in DKI Jakarta experience compassion fatigue at a moderate stage (Ristian et al., 2021).

Counsellors may be directly or indirectly exposed to their clients' traumatic experiences, and sometimes deal with very difficult and complicated cases. Counsellors can also feel overwhelmed by the expectations and demands of their clients and work environment, and feel less emotionally and professionally fulfilled (Skovholt & Trotter-Mathison, 2016). If a counsellor experiences compassion fatigue, this can have a negative impact on their physical, emotional, and psychological well-being, and can affect the quality of care they provide to clients (Stamm, 2012). Some of the impacts that may occur if counsellors experience compassion fatigue include: (1) prolonged emotional and physical exhaustion, (2) loss of motivation and passion in work, (3) depression and anxiety, (4) sleep and eating disorders, (5) inability to complete tasks or responsibilities effectively, (6) decreased empathy and ability to respond well to client needs, (7) difficulty in building healthy and positive relationships with clients, (8) increased risk for errors and accidents in counselling practice (Jenkins & Baird, 2002). At this stage counsellors will experience several symptoms that indicate they are experiencing compassion fatigue including feelings of sadness, anxiety, depression, nightmares, difficulty sleeping, dizziness, interference with daily activities, obsessiveness, withdrawal from the environment (Hoffman et al., 2007). Compassion fatigue can erode a professional's ability to function at an optimal level (Showalter, 2010). Therefore, it is crucial for counsellors to recognise the early signs of compassion fatigue and take steps to address and prevent it (Adams et al., 2006). If a counsellor feels that they have experienced compassion fatigue, they should seek professional support and appropriate resources to help them overcome this and restore emotional and psychological balance.

It is concluded that there are two questions in this study, namely:

Q 1: What is the compassion fatigue profile of junior high school counseling teachers in Indonesia based on gender?

Q 2: What is the compassion fatigue profile of junior high school counseling teachers in Indonesia based on length of service?

Methods

The method used in this research is quantitative with the data analysis technique is the RASCH model. The instrument used to measure the level of compassion fatigue of counsellors consists of two indicators, namely job burnout and secondary trauma, all totalling 13 items. The purpose of this study was to obtain a description/profile of compassion fatigue of junior high school counseling teachers in Indonesia. Whether it is classified as high, medium, or low. Respondents involved were 69 junior high school counseling teachers in Indonesia spread from 11 provinces, namely East Java, Central Java, West Java, Bali, Riau, South Sumatra: Palembang, Lampung, East Kalimantan: Samarinda, Madura, DKI Jakarta, Special Region of Yogyakarta. Respondents were asked to complete the questionnaire online. Data were collected in excel and then analysed with the help of WINSTEPS Version 5.1.5.1. for data validation and cleaning.

Results

Q1: What is the compassion fatigue profile of junior high school counseling teachers in Indonesia based on gender?

First, the compassion fatigue profile of junior high school counseling teachers in Indonesia in terms of gender was examined. The findings in Table 1, show that the mean measure for male respondents is -1.75, while for female respondents it is -2.38. This indicates that male junior high school counseling teachers in Indonesia have a higher level of compassion fatigue than female junior high school counseling teachers.

Table 1. Analysis of Compassion Fatigue Level by Gender

Subtotal specification is: PSUBTOTAL= @JENIS-KEL

ALL PERSON SCORES ARE NON-EXTREME

PERSON COUNT	MEAN SCORE	MEAN COUNT	MEAN MEASURE	S.E. MEAN	P.SD	S.SD	MEDIAN	MODEL SEPARATION	MODEL RELIABILITY	TRUE RMSE	MEAN SD	OUTFIT	CODE
63	21.3	13.0	-2.22	.19	1.46	1.47	-2.33	2.19	.83	.61	1.33	.93	*
16	23.2	13.0	-1.75	.35	1.35	1.39	-1.62	2.32	.84	.53	1.24	.78	L
47	20.6	13.0	-2.38	.22	1.46	1.48	-2.60	2.10	.81	.63	1.32	.98	P

Q2: What is the compassion fatigue profile of junior high school counseling teachers in Indonesia based on tenure?

From the data obtained, it was found that compassion fatigue of junior high school counseling teachers in Indonesia is more likely to be experienced by counseling teachers who have less than 5 years of service. It can be seen in Table 2, that counseling teachers with less

than 5 years of service have a compassion fatigue score of -1.30. Meanwhile, the longer the BK teachers' tenure, the lower their compassion fatigue level. It appears that the compassion fatigue score of counseling teachers who have more than 5 years of service and less than 10 years is -2.54. While the lowest compassion fatigue is for counseling teachers who have more than 10 years of service, with a score of -2.97.

Table 2. Analysis of Compassion Fatigue Level Based on Years of Service

Subtotal specification is: PSUBTOTAL= @MASA-KERJ

ALL PERSON SCORES ARE NON-EXTREME

PERSON COUNT	MEAN SCORE	MEAN COUNT	MEAN MEASURE	S.E. MEAN	P.SD	S.SD	MEDIAN	MODEL SEPARATION	MODEL RELIABILITY	TRUE RMSE	MEAN SD	MEAN OUTFIT	CODE
63	21.3	13.0	-2.22	.19	1.46	1.47	-2.33	2.19	.83	.61	1.33	.93	***
25	25.2	13.0	-1.30	.23	1.13	1.16	-.87	2.27	.84	.46	1.04	.94	< 5 Tahun
25	18.4	13.0	-2.97	.29	1.41	1.44	-3.29	1.68	.74	.72	1.22	.97	> 10 Tahun
13	19.3	13.0	-2.54	.32	1.11	1.16	-2.60	1.52	.70	.61	.93	.85	> 5 Tahun

Conclusions and Discussion

This study aims to determine the compassion fatigue profile of junior high school school counsellors in Indonesia. Specifically on the details of gender and tenure of school counsellors. Based on the results obtained, it is known that based on gender, it is the male junior high school counsellors in Indonesia who experience higher compassion fatigue. Although generalisations based on gender are not always accurate, and each individual is unique. However, in certain contexts, male counsellors may experience higher compassion fatigue scores compared to their female counterparts. This is because Indonesia has a deeply rooted and long-standing patriarchal culture (Nilan & Demartoto, 2012).

Patriarchal culture is a social system that places men at the centre of power and decision-making (Weber, 1974). In a patriarchal culture, men are considered superior to women, and women are considered subordinate to men (Brahmana, 2017). In this culture, men are often portrayed as strong, tough, and able to protect (Lindsey, 2015). Meanwhile, women are seen as the opposite. They are often portrayed as weak, gentle, and in need of protection. This stereotype causes men to feel required to always appear strong, assertive, and have good self-control (Courtenay, 2000). This gender stigma in Indonesia's patriarchal culture leads men not to show feelings and emotions that are considered weak such as sadness, fear, or anger that they feel openly (O'neil, 1981). (Naylor et al., 1980) suggest that role conflict may arise when an individual expects roles from more sources, yet he or she is unable to fulfil all of these expectations. This can lead to stress and emotional exhaustion. Societal stigma towards gender inequality as well as the absence of support for male counsellors tends to increase the sense of isolation that leads to gender role conflict.

Role conflict that arises because a man or woman is unable to perform the role expected by society or the norms/rules that apply in the environment is generally referred to as gender role conflict (O'neil, 2015). The concept of gender role conflict among men began in the late 1970s, when research topics focused more on women than men. The women's movement in the 1970s, known as women's emancipation, was the foundation of the increasing concern for

women's rights (O'neil, 1981), so men seemed to be neglected. Gender role conflict among men, as stated by O'neil (2008), consists of four patterns including Success/Power/Competition (SPC), Restrictive Emotionality (RE), Restrictive Affectionate Behaviour between Men (RABBM) and Conflict Between Work and Family Relations (CBWFR). RE is defined as the limitation and anxiety of individuals in expressing ideas, feelings, as well as limitations in obtaining words to express basic emotions. It is not uncommon for male counsellors to be unable to express what they feel freely. RABBM is the limitation in expressing feelings and thoughts to fellow men, as well as the difficulty in making physical contact. Therefore, male counsellors may feel less supported by their peers or the community in managing their emotional burden. The third factor, SPC, is described as a personal attitude towards what success achieves through competition and power. Meanwhile, CBWFR reflects limitations in balancing work, education and family relationships that lead to health problems, overwork, stress, and lack of leisure and relaxation.

The role conflict experienced by male school counsellors brings about negative feelings. These persistent negative feelings tend to lead to stressful experiences that affect the physiological condition and behaviour of the individual. According to O'neil (2015), gender role conflict in men generally has a very adverse negative impact, such as stress, depression, drug use, heart attacks, alcohol consumption, and suicidal ideation. This opinion is also supported by the statement (Mahalik & Rochlen, 2006) that the psychological problems experienced by men related to gender role conflict are depression, anxiety and stress.

The dynamics of stress and compassion fatigue have been discussed by (Pearlin et al., 1981) which states that challenging environments (stress) usually require individuals to respond either physiologically through changes in cognitive function. Similar to the stress process, compassion fatigue researchers argue that other aspects of the formal work environment may influence the likelihood of increasing compassion fatigue (Figley, 1995, 2002; Kassam-Adams, 1995), including societal stigma in patriarchal cultures. Therefore, they tend to feel stressed, making male school counsellors more vulnerable to compassion fatigue.

Meanwhile, based on tenure, it is the novice counsellors who have a high compassion fatigue score. Novice counsellors are exploring the early stages of their career in counselling. Of course, as novice counsellors, they may not have sufficient experience (Skovholt & Trotter-Mathison, 2016) to effectively manage the emotional burden and stress that arise in the context of counselling work (Kuznetsova et al., 2019). Crisis situations or intense case stories can be a more challenging stimulus for those who are still building skills and understanding. The process of learning to adapt (Star, 2013) to the facts on the ground that provide real cases of negative counselling experiences, will attract novice counsellors to soak in the emotions of the counsellor more intensely and excessively resulting in performance anxiety (Skovholt & Rønnestad, 2003a). Moreover, they still do not have mature skills (Borders & Brown, 2022) in dealing with complex or emotionally demanding cases. These conditions tend to increase the risk of emotional exhaustion (Baggerly & Osborn, 2006) which leads to compassion fatigue.

Novice counsellors usually have high expectations about how important their role is in helping the counsellor (Karymova, 2017). When they encounter difficulties in carrying out effective counselling, it may become a self-record that they feel incompetent. Being aware that expectations and work realities may not always align (Skovholt & Rønnestad, 2003b), encourages novice counsellors to swallow disappointment early in their career. This condition is one of the triggers of compassion fatigue in novice counsellors.

Another variable that causes compassion fatigue in novice counsellors to be higher than their senior counterparts is a less supportive work environment (Skovholt & Rønnestad, 2003b). Possibly, some novice counsellors work in an unhealthy environment, for example with excessive workload (Amatea & Clark, 2005), lack of resources such as supportive mentors (Daniels & Larson, 2001) or lack of employee welfare support policies. Most schools in Indonesia have a disproportionate number of counselling teachers, which is around 1 counselling teacher to 306 students (Bahri, 2020). If novice counsellors face too large a workload, they may find it difficult to manage the number of counsellors or tasks assigned. The inability to balance the workload can lead to serious physical and mental fatigue in novice counsellors (Bickmore & Curry, 2013). This will be exacerbated by the lack of required resources, such as time, funds, or equipment. These resource limitations can hinder the counsellor's ability to provide optimal services. If novice counsellors are faced with conditions that lead to negative self-evaluation, they will easily feel helplessness and confidence deficit in their work. As a result, they will be closer to compassion fatigue.

It is therefore necessary for educational institutions where counsellors work to provide adequate employee welfare support policies. However, novice counsellors working under institutions that are unable to provide this support, will also be highly vulnerable to compassion fatigue. Basically, novice counsellors need social or professional support (Crutchfield & Borders, 1997). Although counsellors in Indonesia have MGBK, this is still very difficult to realise. The inability of novice counsellors to share experiences and gain support from colleagues (Skovholt & Rønnestad, 2003) may increase the risk of emotional isolation. In addition, policies that do not support (Bickmore & Curry, 2013) employee well-being, such as lack of leave, work flexibility policies, or mental wellbeing programmes, can make it difficult for counsellors to maintain a work-life balance. Novice counsellors who feel unsupported in maintaining their well-being tend to be more prone to stress and emotional exhaustion.

It is not uncommon for novice counsellors to encounter unsupportive supervisors and clients (Bickmore & Curry, 2013). It is possible that they may struggle in the face of pressure from supervisors or counsellors to deliver quick results or fulfil expectations that may be unrealistic. These pressures can lead to anxiety and frustration. This will be exacerbated by novice counsellors not being supported in maintaining their well-being (Chen, 2019). Novice counsellors who go through these experiences are likely to be more vulnerable to stress and emotional exhaustion.

In the face of these conditions, it is important to pay attention to the well-being needs of employees and ensure adequate support (Kincanon, 2022). Organisations need to implement management policies and practices that support counsellors' psychological well-being, including the provision of effective supervision, empowerment of resources including senior counsellors (Bickmore & Curry, 2013), and increased awareness of mental well-being issues in the workplace. However, counsellors can prevent this from happening by developing coping strategies (Mahomed et al., 2019). Furthermore, counsellors should begin to explore and investigate the symptoms of compassion fatigue independently/self-help in order to find solutions and find support so as not to cause harm to others (Fahy, 2007).

The conclusion of this study shows that junior high school counsellors in Indonesia, especially those who are male, tend to experience higher compassion fatigue. Factors that could explain this involve the strong patriarchal culture in Indonesia, where men are considered superior and are expected to show strength, control, and assertiveness.

In male counsellors, gender role conflict arises due to social expectations to always appear strong and not express emotions that are considered weak. Stigma towards gender equality and lack of support for male counsellors can increase feelings of isolation and gender role conflict, ultimately contributing to compassion fatigue.

In addition, novice counsellors, especially in the early stages of their careers, are also prone to compassion fatigue. Factors such as lack of experience, high expectations, lack of social or professional support, and unsupportive work environment conditions may increase the risk of compassion fatigue in novice counsellors.

Suggestions

1. Organisations need to implement management policies and practices that support counsellors' psychological well-being, including providing effective supervision and empowering resources.
2. There is a need for education and training that raises awareness of mental wellbeing issues in the workplace.
3. Counsellors need to develop coping strategies to deal with pressure and stress that arise in their work. This involves developing effective coping mechanisms and planning preventive actions.
4. Counsellors need to self-monitor and self-investigate symptoms of compassion fatigue. Building awareness of their own psychological state can help identify potential risks early.
5. The establishment of a support network among counsellors, both experienced and novice, can help reduce emotional isolation and provide necessary support.

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Contact email: dwirahayu.gp@gmail.com

Understanding the Dynamics of Online Hatred and Mental Health Issues Among Adolescents: Exploring Factors, Impacts, and Alternative Strategies

Nila Zaimatus Septiana, Universitas Negeri Malang, Indonesia
Muslihati Muslihati, Universitas Negeri Malang, Indonesia
Adi Atmoko, Universitas Negeri Malang, Indonesia
Dwi Sri Rahayu, Universitas Negeri Malang, Indonesia
Eka Riyana Dewi, Universitas Negeri Malang, Indonesia
Setyorini Setyorini, Universitas Negeri Malang, Indonesia

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Abstract
The phenomenon of hatred is a crucial problem in the digital era, particularly among adolescents. However, it remains unclear what motivates them to become more involved and how hatred impacts their mental health. This study aims to investigate phenomena associated with the causes and effects of online hatred among adolescents, as well as appropriate intervention strategies. In this research, 5 adolescents from Indonesia participated in a case study. Two sources of information were gathered: focus groups and open questionnaires. The results of a thematic analysis of the data revealed that: 1) External and internal causes of adolescent hatred, including cyberbullying as an example of an external factor, and the tendency towards differences such as ethnicity, religion, gender, and cultural heritage. Moreover, online conflicts with strangers and animosity are transmitted throughout the group. Again, internal factors are associated with anger, frustration, discomfort, dissatisfaction with oneself, a lack of impulse control inability to regulate emotions, and ignorance of the consequences. 2) The effects of hatred on mental health, including stress, anxiety, fear, worry, constant pressure, overthinking, low self-esteem, irritability, regret, maintaining emotional distance, exposure to individuals despised, experiencing appetite disorders, mood/mood, sleep disturbances, depression, and suicidal ideation, and aggressive behavior both online and offline. 3) Digital narrative-based bibliotherapy, Working Alliance (WA) in internet-based cognitive behavioral therapy (i-CBT), online reading such as TeenRead, use of chatbots, digital Empathy-based counterspeech, and digital literacy are alternative strategies for overcoming hatred.

Keywords: Hatred, Mental Health, Intervention Strategy, Adolescent, Bibliotherapy

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Introduction

Online hatred among adolescents is becoming an increasingly urgent problem in today's digital context, especially in social media. A lot of hate speech is done on Twitter, and Facebook (Schoenebeck et al., 2023a), which are even carried out by strangers (Castellanos et al., 2023) and lead to intolerance (Abdallah Tani & Alrasheed, 2023a). Hatred is currently a study interest in educational counseling in Indonesia. There is still little research on the dynamics of online hatred and its impact on adolescent mental health. Even though a virtual police program has been formed to reprimand accounts deemed to have violated Law Number 19 of 2016 concerning Electronic Information and Transactions (Tuela et al., 2023), it turns out that there are still many people who commit detrimental actions on social media, even more massive. Since 2018 the ministry has handled more than three thousand hate cases in the digital space, especially those based on SARA. This problem is also essential in education, especially in schools (Mawarti, 2018).

Recently, researchers have shown increased interest in online hate cases such as online violence (Abdallah Tani & Alrasheed, 2023b), online harassment, trolling, cyberbullying, fake news, and hate speech (Saha et al., 2023). Online hate speech includes a range of acts, such as insults, threats, identity hatred (Vichare et al., 2021), and the dissemination of hateful content online (Castellanos et al., 2023). In Indonesia, hate speech can be seen in the comments column of celebgrams (S, 2021), abusive language on twitter (Aidil Fadilah, 2021), and the spread of fake news (Santi, 2024). Some social media where hate speech occurs include Twitter, Facebook, Instagram, and YouTube (Adhyasta Dirgantara, 2021). This research responds to phenomena that occur in Indonesia with many similar cases that are increasingly developing among adolescents.

The main disadvantage of online hate is that it has negative consequences for both the perpetrator and the victim. Hate can cause mental health problems, including stress (Keum et al., 2022), heavy anxiety, post-traumatic stress disorder (PTSD), and depressive symptoms (Wypych & Bilewicz, 2022). In addition, online hate can also affect social interactions and relationships between peers, disrupt healthy social bonds and exacerbate the social climate in schools or youth communities. It can even increase societal polarization (Schäfer et al., 2022).

To understand this phenomenon comprehensively, it is crucial to explore the factors that influence the occurrence of online hatred among adolescents. Previous research has shown factors such as social pressure, feeling lonely or unwanted (Laufer, 2018), critical relationships with siblings (Campione-Barr & Killoren, 2019), family violence (Herman Grobler & Karel FH Botha, n.d.), victimization from friends and negative experiences with parents (Xavier et al., 2016), and religious extremism (Saada, 2023). The factors that cause hatred remain speculative, so more profound studies are needed regarding this growing phenomenon.

In addition to understanding the factors and impacts of hate, it is also important to explore strategies to help youth prevent and overcome hate online. This strategy includes an educational approach (Collin, 2021a) based on the values of cohesion, social tolerance (Moorthy et al., 2021), counterspeech based on empathy (Hangartner et al., 2021a) and understanding, promoting healthy communication skills, and develop confidence and effective emotional handling. Subsequent approaches are technology-based, such as digital bibliotherapy (Franz et al., 2022a). Several digital-based strategy models can be used to

overcome hate and the impacts that arise; this becomes the basis for researchers to conduct further intervention studies.

This study aims to explore the dynamics of online hatred among adolescents by exploring the factors that cause hatred and the impact of hatred on adolescent mental health. This research will also provide in-depth insights into effective prevention or solution strategies to protect youth from the harmful effects of online hate. Currently, no research strategy uses digital interventions such as bibliotherapy with local cultural content such as folklore. So this study offers a strategic technique based on digital and local wisdom to overcome youth hatred. It will create a more positive, supportive, and safe online environment for youth and assist them in developing healthy social and emotional skills that are culturally based.

Method

The use of qualitative phenomenological studies is a well-established approach to understanding the dynamics of online hatred among adolescents. The benefit of this approach is to understand in depth the phenomenon of youth who are involved in online hate, as well as explore the factors that influence the occurrence of online hate and the possible consequences. Furthermore, the researcher will explain alternative strategies to overcome the problem. This descriptive method is also used to understand the structure of individual experiences based on the normative questions asked (Cibotaru, 2023).

The subjects of this study were 5 adolescents, who had experienced online hatred either as perpetrators or victims. Data was collected through focus groups and open questionnaires (Denzin & Lincoln, 2018). Focus groups focus on discursive activities, not just structured or semi-structured interviews where there is a gap between the researcher and the participants; the aim is to explore phenomena related to the dynamics of online hatred more flexibly and profoundly. The open questionnaire contains open questions following the objectives of this study, which are distributed directly to the subject. The results of the two data are combined to answer the research problem.

Data analysis in this study uses thematic analysis. This analysis aims to understand the complexity of meaning in data rather than measuring its frequency. Researchers are directly involved in the data and analysis. The study contains a search for patterns of meaning that are further explored and describes the data based on predetermined themes. In addition, the research should be guided by openness. Thus, analysis involves a reflective process to illuminate meaning (Sundler et al., 2019). The analysis process is carried out by identifying meanings, organizing them into patterns, and writing down the resulting themes related to the research objectives and the actual context.

The validity of this research will be strengthened through the triangulation of data sources (Denzin & Lincoln, 2018) by comparing findings from interviews and discussions with different participants. It will enable a more complete understanding of online hatred among adolescents.

Research ethics will be an essential concern in this research. Ethical approval will be obtained from the participant before the start of the interview, and applicable research ethical standards will strictly maintain the confidentiality and anonymity of the participant. This study uses a phenomenological approach, and this research is expected to provide in-depth insight into online hatred in adolescents beyond just the superficial aspects.

Results

This study explores the meaning of online hatred among adolescents, primarily related to the causal factors and their impact on mental health. In the discussion, future intervention strategies that might be carried out to overcome this issue will be described. There are three themes related to this topic: the causes of hatred, the impact of hatred on mental health, and appropriate intervention strategies for adolescents. The results of this study are described based on discussion studies in focus groups and answers to open questionnaires from respondents. It will then be discussed according to the following themes.

Factors Causing Online Hatred in Adolescence

The first theme to be explained is related to the factors that cause online hatred in adolescents, divided into external and internal factors. For external factors, the discussion results in the focus group show that the participants have explored their experiences of hating. The targets of online hate for teenagers depend on context and situation, but common targets usually include fellows, specific communities or groups, celebrities or public figures, and even strangers. Teenagers will hate others if it is triggered by an antecedent, such as cyberbullying, which usually manifests in intimidating, humiliating, or harassing behavior. For adolescence, this behavior is unacceptable, so hatred arises. Then in certain online groups or communities, it is usually caused by prejudice against their differences. Usually, this is related to their identity, such as ethnicity, religion, sexual orientation, gender, or cultural background. This prejudice is typically transmitted to each group member, giving rise to verbal harassment and victimization behavior or online discrimination by individuals or groups with bigotry or hatred towards that group.

Furthermore, related to celebrities or public figures, teenagers are often involved in following accounts of celebrities or public figures they admire. However, sometimes teenagers redirect their hatred towards celebrities or other public figures they don't like. They may verbally attack and insult others on social media or other online platforms. According to them, the behavior of hating by venting it on social media will make them relieved. Conflicts with strangers may be experienced online; this is usually triggered by comments uploaded by celebrities / public figures and even viral news that appears. They sometimes attack each other verbally. Based on respondents' experience, most hate speech is experienced on the TikTok, Instagram, and YouTube platforms as frontal words that lead to humiliation and harassment. Meanwhile, satirical comments are often made on WhatsApp and Facebook media, usually done by those closest to them.

In this regard, anyone can become a target of online hate for teenagers, and no particular group or individual is specifically targeted. However, this depends on complex online dynamics and contexts and the personal preferences or animosities of the individuals involved.

The explanation above is supported by the results of an open questionnaire which shows data related to factors that cause online hatred, namely cyberbullying, bullying behavior, and prejudice against certain groups. Behavior that arises when they hate, among others, by giving direct satire on online platforms, transmitting hatred towards those closest to them and will, jointly carry out online attacks against hated individuals/groups, being silent or not commenting, limiting communication, and avoiding for example by

blocking hated person's account, doing satire. Of these options, some respondents chose to make satire and hate speech online.

Furthermore, we explain the internal factors of online hatred in adolescents. The discussion results in the focus group show that several things, including anger, frustration, and discomfort, cause adolescent hatred. Adolescents who have unresolved personal or emotional problems tend to express anger or frustration through hate online. They use online platforms as a channel to vent the negative emotions they feel. Next is self-dissatisfaction, which is related to feelings of inferiority, social anxiety, or feelings of not being accepted in a social environment, then online hatred can be a mechanism for releasing or diverting this self-dissatisfaction to others. Lack of impulse control is also a contributing factor; they have difficulty controlling sudden impulses or desires and are more prone to hateful online behavior. They often respond emotionally or impulsively without thinking about the possible consequences.

The results of an open questionnaire support this data, namely that teenagers hate because of their lack of ability to manage emotions; respondents admit that they have not fully developed practical skills to manage and deal with their feelings, including difficulties in identifying and expressing emotions healthily and constructively. As a result, they channel negative emotions through hateful behavior online. Lack of knowledge or understanding of consequences is also a cause of cruel online behavior. They express a lack of adequate knowledge of the impact this can have on the mental and emotional health of others or their own reputation and social relationships.

The Impacts of Online Hatred on Adolescent Mental Health

The second theme discussed is the effects of online hatred on adolescent mental health. The results of the focus group, the respondents experienced stress, anxiety, overthinking, low self-esteem, irritability, regret, keeping emotional distance, dreaming of people they hated, and experiencing appetite, mood, and sleep disturbances. What's worse is depression and suicidal ideation. Based on the respondents' confessions, these various disturbances arise as a result of previous events, namely online harassment, humiliation, or ostracism can make them feel sad and hopeless and even lose interest in daily activities. It can negatively affect their mood and interfere with daily functioning. In addition, teenagers who are the target of online hate can experience decreased self-esteem and low self-esteem. Harassment or humiliation directed at them can make them feel worthless, embarrassed, and even doubt their abilities. It can harm the self-confidence and identity development of adolescents. Online hate can also lead to social isolation in teens. They may feel afraid or reluctant to interact with other people in person because of the negative experiences they have had online. It can lead to social withdrawal, lack of social support, and loneliness.

The results of the open questionnaire revealed a similar thing. Constant exposure to hate online can lead to high stress and anxiety levels in teens. They experience constant fear, worry, and tension, which can interfere with their emotional and mental well-being. Adolescents who engage in online hate also tend to have a higher risk of exhibiting aggressive and offline behavior. They can imitate patterns of behavior they see or experience and then take them out on others verbally or physically. Additionally, online hate can affect teen sleep patterns. They have trouble sleeping, insomnia due to stress, anxiety, or negative thoughts about online hate.

From the explanation above, it is essential for teenagers who experience online hate to seek support and help so as not to exacerbate the disorder they are experiencing. The following sub-chapters explain the experiences of adolescents in reducing hate.

How Does Adolescence Reduce Hatred?

Theme three explains how adolescence reduces the hatred they experience. Based on respondents' reports in focus groups, adolescents do various ways, such as establishing communication while limiting themselves both online and offline to people they hate; this is usually done to people closest to them, such as friends. They also choose not to touch or keep their distance both in person and online to minimize conflict and the emergence of other negative influences. Furthermore, they are more careful in commenting on social media so as not to trigger hatred from individuals or other groups. They also try to understand the character of each well. Finally, they make spiritual efforts by praying to win themselves if they experience emotional pressure from the hatred they encounter online. It is effective for those with strict religious beliefs.

In line with the results of the focus group, the open questionnaire also reveals various ways for adolescents to reduce hatred, including trying to make peace with people they hate by establishing communication both in person and online. Staying away from the target is considered more able to neutralize their hatred than they choose to be silent to make themselves calmer, or sometimes express their hatred to others they trust. If they feel they have gone too far and have had a negative impact, they will talk directly to the target about what is the problem and try to find solutions to their problems. some of which have been mentioned, most respondents choose to make peace and stay away from the target, this is interesting to discuss.

Discussion

The initial aim of this study was to investigate the causes and effects of online hate in adolescents and assess appropriate intervention strategies. The findings above have shown that the factors causing hatred vary widely. The most prominent characteristics are the negative experiences, such as cyberbullying, social jealousy, jealousy, and negative prejudice against individuals or online groups. Hatred can occur due experiences, for example, being betrayed by a friend. Hatred can also be shared. For example, negative feelings expressed by a crowd towards someone from an opposing group can increase and trigger a collective response against the opposing group (Navarro, 2013).

Hate can develop, several things that contribute to the development of hatred are prejudice (Allport, 1954, Oksanen et al., 2014a), frequent and repeated hate speech causes desensitization to forms of verbal violence and then lowers the evaluation of the victims so that it becomes more protective. distance, and increasing prejudice against out-groups (Oksanen et al., 2014a). Negative representation and the spread of fake news on social media which is published continuously and unfiltered also causes hatred to develop in society (Aldamen, 2023), as well as incitement from organized hate groups (Levin & McDevitt, 2022).

There are two meanings that consider hatred inappropriate, namely moral and non-moral. Morally appropriate hatred in the face of perpetrators of serious crime or wrongdoing

and shows that all such proposals are based on problematic assumptions, however, hatred remains inappropriate, because hatred has an affective focus that is too general and indefinable (Szanto, 2021) because the hater has logical reasons and is considered appropriate to hate. Another word for rational hatred is primordial hatred (Le Fourn & Laura, 2021), used to defend oneself from the ideal ego. This hatred is a key idea in psychoanalysis that must be considered in a way other than as a flip side of love. Hate can be an individual or a group problem. Violent manifestations and hate speech have taken root in social networks due to users' lack of awareness and reservations about using phrases or publishing images or content that offends individuals and institutions (Abdallah Tani & Alrasheed, 2023).

Online hate is mostly about close people like friends and family. However, the study's results also revealed that online hate speech mostly comes from strangers (Castellanos et al., 2023). Social pressures during adolescence, such as feeling lonely or socially unwanted, being rejected, feeling ugly or dissatisfied with their appearance, and hating their job, school, or parents, also cause teenagers to experience depression and even hate themselves, which results in self-harm and even suicide (Laufer, 2018). Prejudice plays an essential role in hatred; bias consists of antipathy towards other individuals or groups based on poor generalization and inflexibility (Katz, 1991); such prejudice is resistant to experience with people outside the group. It is felt but not necessarily expressed in actions towards other people. In addition, it can address entire groups of people or individuals believed to be members of that group. Furthermore, the prejudice factor is usually aimed at other groups; for example, in terms of beliefs, study results show that religious extremism can cause hatred or violence against followers of other religions (Saada, 2023). Not only religious differences but discrimination against racial groups (MacIntyre et al., 2023) and ethnicity (Marrun et al., 2023) is also a cause of hatred for certain groups online.

Hate is built on a complex mix of cognition and emotional roles (Garaigordobil, 2014). In the cognitive aspect, respondents have negative ideas regarding other people, this is related to cognitive distortions in automatic thought. The findings of the study show that two factors are the roots of hatred, namely the devaluation of victims and the ideology of haters, these two factors shape and expand hatred (Navarro, 2013) from a cognitive aspect. A person who hates tends to have less empathy because the hater is further away from the object of their hatred and has ideas of violent rejection and a desire to hurt others (Collin, 2021b). They also remove barriers that can limit our hatred of others by turning feelings into hatred. Negative experiences with parents, peer victimization, and the absence of positive memories with the family harm the notion of Non-Suicidal Self-Injury (Xavier et al., 2016); these experiences are associated with depressive symptoms.

On the affective aspect, hatred is related to various feelings such as anger, sadness, shame, "melancholic social relations" (Le Fourn & Laura, 2021), fear, distress, and hostility (Garaigordobil, 2014). Hate develops progressively, an emotion with a complex formation that links feelings of guilt, empathy, and violent behavior. The combination of anger, contempt, and disgust (ANCODI) is an essential element of hatred (Matsumoto et al., 2017) and is a crucial emotion associated with intergroup aggression. Resentment leaves a lasting wrong impression on interpersonal relationships (Aumer et al., 2016). Adolescents are likelier to report less intimacy, satisfaction, and love with people they previously hated.

Affective intentionality of aversion differs in three interrelated ways: (1) overgeneralization and erratic affective focus, which usually leads to forms of target collectivization; (2) Short of a defined affective focus, haters derive extreme affective power from an attitude not as a reaction to a particular feature or action of the target or from some phenomenological trait of the attitude, but from a commitment to the attitude itself; (3) finally, in sharing the commitment to hate with others, hatred involves a particular negative social dialectic, firmly strengthening itself and taking root as a shared habitus (Szanto, 2021).

Hate overgeneralizes its target, has an affective focus formed jointly by outgroup/ingroup distinctions, and is accompanied by a subject's commitment to hostility. In its more straightforward form, hate targets another person as an individual, where the adverb "unpleasantly" expresses the subject's desire to destroy that target (Salice, 2021).

One of the other exciting things in the research findings is the setting and form of online hatred in adolescents. Social media such as TikTok, YouTube, Instagram, Twitter, and Facebook are developing. According to respondents, hate Speech often occurs on TikTok, YouTube, and Instagram; the results of other studies show that Twitter and Facebook also have negative consequences such as online harassment, trolling, cyber-bullying, fake news, and hate speech (Schoenebeck et al., 2023b). For example, expressions of hatred, twitwars on Twitter, and excessive activity on other social media platforms can form a spiral of anxiety among netizens (Syahputra, 2019). This anxiety can affect active netizens on social media or even those who passively use it. The anxiety spiral begins when individuals experience anxiety due to overwhelming expressions of hatred on Twitter and other social media. This personal anxiety gradually develops into group anxiety, intergroup anxiety, and finally, communal anxiety.

Forms of adolescent hatred on social media are related to fake news, spam, and hate speech that trigger social anxiety (Makarova et al., 2022). The result of hate speech that is spread and aims to provoke or incite, encourage, or justify racial hatred, xenophobia, or other forms of intolerance-based hatred is based on negative attitudes toward others. It gives rise to mass violence (Tripathi & Natraj, 2021), so efforts are needed right to address this issue. Adolescents who support distal counseling or technical assistance are less likely to become victims, perpetrators, or victim abusers (Wachs et al., 2023). Thus digital-based interventions with customized content can be proposed as the right strategy to help youth minimize hatred and negative impacts that arise among them.

Alternative Digital Intervention Strategies in Overcoming Hate

The findings reported here indicate that adolescent online hate requires appropriate intervention strategies, so we propose several that allow for further in-depth study by future researchers. First, we suggest a digital narrative-based Bibliotherapy. Previous studies show that this strategy is effective for those at risk of suicide and can work by increasing feelings of shared experiences and optimism (Franz et al., 2022b). Thus, this strategy is also suitable for dealing with adolescent online hatred. Secondly, we suggest the use of the Working Alliance (WA) developed in Internet-delivered cognitive-behavioral therapy (i-CBT) (Barceló-Soler et al., 2023) is effective in treating depression in patients by using this strategy with a note for youth experiencing mental severe health impacts related to online hate. The third recommendation is to utilize online reading, such as TeenRead, which involves managing users and articles, analyzing users' dynamic

reading behavior, and making recommendations based on user stress categories, stress levels, and reading interest (Xin et al., 2017). With online reading that is packaged attractively and content according to the interests of youth, it is hoped that it will be more targeted in overcoming hate.

Another digital-based intervention is text-based chatbots (McAllister et al., 2020). Chatbots are becoming exciting nowadays because their use is more flexible, and teenagers can get responses quickly. Even though many are currently developing chatbot-based service systems, their use still needs to be adjusted to their respective goals. Another alternative is Empathy-based counterspeech (Hangartner et al., 2021b) which is packaged in digital form. This strategy is a tactic against hate speech or misinformation by presenting alternative narratives rather than censoring offensive Speech. The Digital Literacy Model can also be an alternative to digital literacy to fight hate speech (Widodo, 2017). The moral value added in digital literacy is expected to minimize hatred; this includes two indicators, namely ethical behavior and motivation skills. Hate speech does not only appear in hoaxes but also inaccurate information. Increasing youth digital literacy is an essential effort in overcoming hate online. Training on fake news recognition, online privacy, the consequences of online actions, and skills for sound online content judgment can help youth become intelligent and responsible users of the digital world.

These alternative strategies can be used to deal with online hate among teenagers. It is important to remember that these digital efforts must be supported by collaboration across sectors, including government, educational institutions, social media platforms, and society. We can move towards a safe, secure, and impactful online environment for young people by raising awareness, engaging users, and promoting positive attitudes and behaviors.

Limitation

Although the study suggests prevention options and offers insightful information about the causes and consequences of teenage online hatred, there are a few important limitations to take into account. First off, the results can't be applied to a larger population due to the limited sample size of 5 Indonesian teenagers. Furthermore, biases like response bias and social desirability bias could be introduced by using focus groups and open surveys as the only data sources, which could affect the validity of the findings. Furthermore, the study mainly concentrates on the viewpoints of the teenagers themselves, possibly ignoring the viewpoints of other important stakeholders, such as parents, teachers, or mental health specialists, whose insights could offer a more thorough knowledge of the situation. Additionally, even while the suggested therapeutic techniques show promise, their efficacy has not.

Further research with diverse populations, robust methodologies, and controlled interventions is crucial to solidify understanding and develop effective countermeasures.

Conclusions

In conclusion, it provides some first-hand insights into online hatred among Indonesian adolescents. The issue's importance is shown by its identified causes, which include internal elements like anger, frustration, and discomfort and external issues like negative experiences,

as well as potential outcomes like depression, anxiety, and aggressive behavior. Crucially, the study proposes several intervention options as viable means of reducing online hatred and encouraging positive online behaviors, including digital narrative-based bibliotherapy and digital literacy programs. Although the study suggests prevention options and offers insightful information about the causes and consequences of teenage online hatred, there are a few important limitations to take into account. First off, the results can't be applied to a larger population due to the limited sample size of 5 Indonesian teenagers. Furthermore, biases like response bias and social desirability bias could be introduced by using focus groups and open surveys as the only data sources, which could affect the validity of the findings. Furthermore, the study mainly concentrates on the viewpoints of the teenagers themselves, possibly ignoring the viewpoints of other important stakeholders, such as parents, teachers, or mental health specialists, whose insights could offer a more thorough knowledge of the situation. Additionally, even while the suggested therapeutic techniques show promise, their efficacy has not. Further research with diverse populations, robust methodologies, and controlled interventions is crucial to solidify understanding and develop effective countermeasures. The implication of this research offers a chance to tackle the issue at its root. By addressing underlying causes like frustration and promoting positive online behavior through interventions like digital literacy programs, the study suggests a path towards a safer online space. However, challenges like implementing these programs and addressing broader online negativity remain.

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Contextualising the Principles, Policies and Practices Needed to Implement Education for Sustainable Development Into HEIs in Myanmar

Bo Bo Lwin, The Open University, United Kingdom
Andy Lane, The Open University, United Kingdom
Rachel Slater, The Open University, United Kingdom

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Abstract
Education for sustainable development (ESD) is an important feature of the Sustainable Development Goals, being explicitly mentioned as part of SDG4 dealing with education. While ESD needs to be embedded in all levels and types of education, its conceptualisation and implementation has been particularly driven by academics and the higher education institutions (HEIs) they work in. The Talloires declaration, the Green Campus movement and the UNESCO supported competencies for sustainable development are but a few of the many international developments in this area. However, these international activities also run the risk of embedding conceptions and approaches arising from developed countries that ignore the traditions and cultures of developing countries, countries which themselves may have a diverse set of traditions and cultures. In addition, the nature and scale of the HEIs within any country provide yet more diversity to account for when looking at the principles, policies and practices they might adopt. Myanmar is one such developing country with a diverse population that has also been subject to a distressing political and cultural history. This paper reports on the findings of a doctoral study that used models from the literature to help investigate what graduates from Myanmar HEIs and key informants saw as important for the sustainable future of Myanmar. It discusses activities and approaches that HEIs could use to integrate ESD into their work, and the changes to educational policy and practice within Myanmar's HEIs considered necessary to achieve a more sustainable future for Myanmar.

Keywords: Sustainable Development, Higher Education Institutions, Educational Policy, Educational Practice

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Introduction

While academic discourse notes the variety of terms and meanings around sustainable development, international political discourse has tended to be more focussed. The Brundtland report (Brundtland, 1987) was the first political milestone for defining sustainable development, raising worldwide concerns about the impact of human activities, and inspiring a series of international conferences and meetings. Then, the first UN Conference on Sustainable Development in Rio de Janeiro (Brazil) in 1992 agreed "Agenda 21" as the first step of international commitments on sustainable development from a global partnership.

In 2000, world leaders made a Millennium Declaration as a global partnership to implement the "Millennium Development Goals (MDGs)," which included eight targeted goals with a deadline of 2015. There was no explicit link between the environmental sustainability goal and educational institutions' involvement in MDGs. Nevertheless, the "Experiences and evidence from the efforts to achieve the MDGs" (United Nations, 2015a, p. 3) provided insights for the next 15 year-strategic-plan of Sustainable Development Goals (SDGs). At the UN General Assembly in 2015, all member states adopted the 17 Sustainable Development Goals (SDGs) to extend the global partnership for the next set of 15-year targets and the 2030 Agenda for Sustainable Development was launched on 1st January 2016. Out of 17 SDGs, the role of education is set out in SDG 4 as follows:

> Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. (United Nations, 2015b)

Amongst the different targets under SDG 4, sustainable development specifically features in target 4.7, commonly known as Education for Sustainable Development (ESD):

> By 2030, ensure all learners acquire knowledge and skills needed to promote sustainable development, including amongst others through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship, and appreciation of cultural diversity and of culture's contribution to sustainable development. (United Nations, 2015b)

This doctoral research used this target as the context for investigating the role of the Higher Education (HE) sector in Myanmar towards ESD in general and more specifically what this might mean for individual HEIs.

Education for Sustainable Development and Higher Education Institutions

Although some countries have not given ESD priority in their national agendas, it has been gradually gaining wider attention amongst HEIs since the Rio Earth Summit (Calder and Clugston, 2003). The Talloires Declaration (1990) is an early milestone in the adoption of ESD by some HEI's (526 HEIs from 59 countries by 2023).[1] Another significant network is the International Sustainable Campus Network (ISCN), currently representing 101 signatory member universities from thirty-two countries on six continents.[2] In addition, the greening universities campus movement has become popular across the world (UNEP, 2014). Some

[1] Data from https://ulsf.org/96-2/
[2] Data from https://international-sustainable-campus-network.org/membership-overview/

examples are the China Green University Network, the Green Campus Initiative in Africa (UNEP, 2014), the Environmental Associations of Universities and Colleges (EAUC) in the UK and Ireland, the Green Campus Network in Australia, the Green Campus Association in Korea, and the Dark Green School Project in the Philippines.

However, ESD in Southeast Asia is not as strongly promoted or implemented in HEIs. ASEAN (Association of South-East Asian Nations) launched its "Roadmap on the ASEAN Higher Education Space 2025 and its Implementation Plan" in 2022 which mentions SDG 4 in general but with no explicit mention of ESD (ASEAN, 2022). Similarly, the ASEAN University Network has no mandate or commitment of collaboration for ESD amongst its thematic networks, although individual HEIs are engaging in other international networks around ESD.

Higher Education Institutions in Myanmar

There are 171 HEIs under the control of eight different ministries in Myanmar (Ministry of Education, 2016). Of these, the highest numbers are administered by the Ministry of Education and two main types of HEIs can be distinguished as:

1) full-time/day-campus/face-to-face universities, and
2) distance education universities.

Yangon University of Distance Education (YUDE) and Mandalay University of Distance Education (MUDE) account for about 50% of overall HE students in the whole country (JICA, 2013). In addition, HEIs have had to adjust to three major political transitional periods:

- Military regime during 1988-2010,
- Quasi-democratic governments (2011-2020), and
- on going Military Coup (2021-2023).

The first period was one of relative isolation from international developments, with centralised control of higher education department, a reliance on didactic teaching methods to teach traditional subjects, and little focus on HEIs wider social influence beyond them being treated as potential sources of opposition to the governing regime. Most plans for educational reform were devised and slowly being implemented within the middle period. The Comprehensive Education Sector Review (CESR) (2012-2014) aimed to analyse the educational situation, shape new policies, and draft a comprehensive education plan. A "National Education Strategic Plan (NESP): 2016-2021" was launched in 2016, in which educational transformation was a high priority and a key driver for social and economic development (Heslop, 2019). NESP aimed to promote greater autonomy for HEIs, update curricula and develop the use of technology to enhance teaching methods. Then, in 2018, a "Myanmar Sustainable Development Plan: 2018-2030 (MSDP)", heavily informed by the UN's SDGs, was launched. However, while the MSDP provides a reference point for the Education for Sustainable Development (ESD), ESD was not made explicit in the NESP. A revised NESP that built upon these two previous plans was being developed at the time of the Military coup, but essentially Myanmar's HEIs have had a very limited involvement in shaping educational reforms and any discussion of and plans for implementing ESD.

While plans for reform are on hold in Myanmar, this doctoral study reviewed the potential models for implementing ESD at institutional and sector levels and investigated how those models might be applied in Myanmar's context.

Models for Conceptualising and Implementing ESD at the Institutional Level

While the international networks noted above produced list of points to consider, they did not provide an overarching framework for how ESD might be conceptualised and implemented. One of the first universities to do address this gap was the University of Plymouth in the UK which viewed ESD as a holistic concept requiring a whole university approach. They considered all aspects of teaching, learning, assessment, research and cultural practices as important for ESD development and implementation (Dyer, Selby and Chalkley, 2006). Subsequently, the Centre for Sustainable Futures (CSF) at the University proposed a "4C" model in which *"Curriculum, Campus, Community and (institutional) Culture are seen as mutually enfolded and complementary foci"* (Jones, Selby and Sterling, 2010, p. 7) form a framework for a sustainability-sensitive university. They claimed that the students' learning (curricula) can be facilitated or supported by their experiences in the campus, the community's engagement, and the cultural practices of the university. Equally, they claimed that the students' learning from both formal and informal experiences *"can be directed towards campus, community and institutional cultural change"* (Jones, Selby and Sterling, 2010, p. 7). However, they did not explicitly discuss how campus and community are inter-related and how the university's culture can influence the other three elements. Moreover, although innovative teaching methods or approaches are recommended, pedagogy is not represented in the 4C model, and how culture relates to the HEIs vision and mission is not set out.

Anand et al. (2015) adapted the 4C model by adding research as an additional element and by elaborating 'campus' into 'campus operations' but like Jones, Selby and Sterling (2010) they did not make pedagogy explicit in their model. Neither are they explicit in terms of Universities' expectations for ESD related graduate attributes and competencies for their alumni to contribute to sustainability beyond their University lives. Developing students' ESD related competencies can be achieved by various pedagogical approaches, such as running real projects or undertaking internships (see Brundiers, Wiek and Redman, 2010; Lozano et al., 2017). So, by using the 4C+R model by Anand et al. (2015) and considering "pedagogy" as an explicit element to the "4C+R", a new model i.e., "4C+RP" (Curriculum, Campus, Culture, Community, Research, and Pedagogy), was proposed as a framework for this research (see Figure 1). The five oval elements inside the institutional context are intended to be mutually supportive and interdependent, collectively they support the development of ESD related graduate attributes illustrated at the point they intersect. In addition, the proposed model broadens the context beyond the institutional culture to reflect the influence of proximate and distant communities to encompass their cultural values, policies, and expectations.

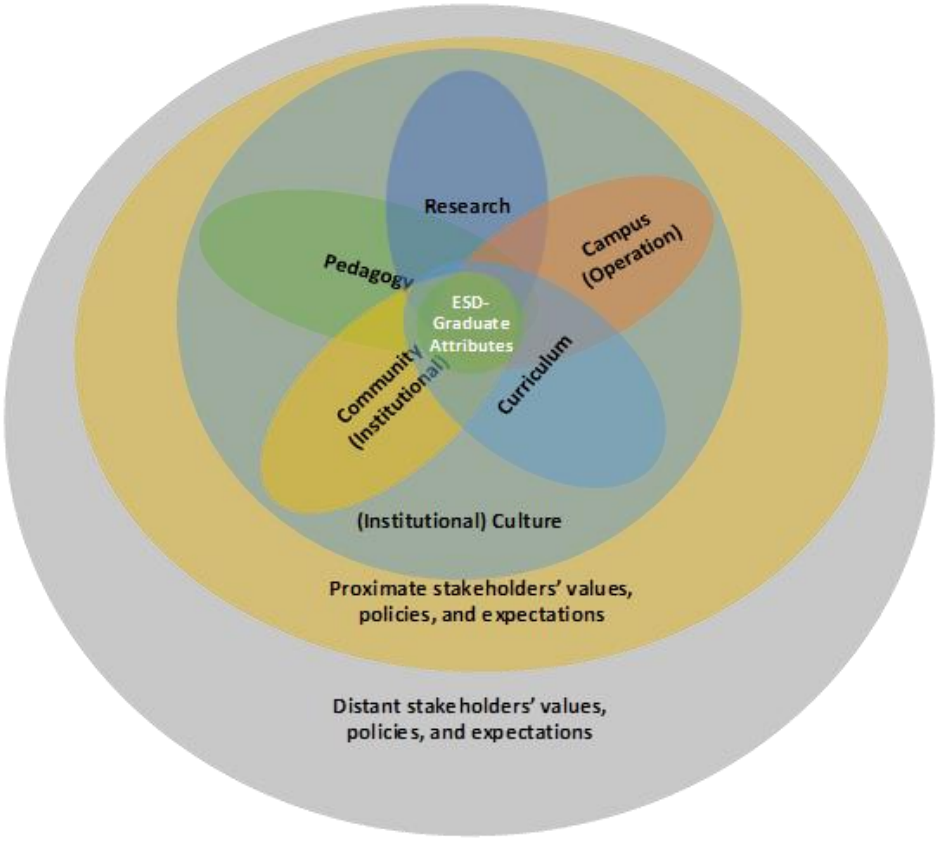

Figure 1: Proposed 4C+RP model of ESD integration in HEIs (Source: authors)

Models for Conceptualising and Implementing Education for Sustainable Development at the Sector Level

As discussed earlier, HEIs are expected to contribute to addressing sustainability. Nevertheless, it is acknowledged that reforming the whole institutional approach to this global challenge is a difficult and challenging long-term process for HEIs (Holmberg et al., 2012), often requiring external support from government and other national and international stakeholders, as evidenced by the many networks mentioned above. The option and potential for ESD implementation by HEIs depends very much on the current state of the HEIs and the relevant country context. For some, implementation will require relatively small changes, for others it requires more fundamental reforms of the HEI, particularly where the country context is also changing dramatically.

Education is also considered as a vital role in the reform process for war-torn countries or countries severely affected by natural disasters or ethnic/religious conflicts. At this level, the concept of education for reconstruction developed by Arnhold et al. (1998) provides an appropriate framework through which to study the HE sector in Myanmar, which has suffered from civil unrest, various conflicts, and civil wars. The model, based on the experiences of countries with prolonged civil wars and conflicts like Bosnia, Rwanda, etc., includes five components of reconstruction (Arnhold et al., 1998, p. 11):

- Physical reconstruction
- Ideological reconstruction
- Psychological reconstruction
- Provision of materials and curricular reconstruction
- Human resources

Methods

Against the backdrop of limited ESD literature and practice in Myanmar, this research set out to investigate the relevance of these two models for informing the principles, policies and practices needed to develop and implement ESD. Two methods of qualitative data collection were used. First, through seven Key Informant Interviews (KIIs) with experienced professionals from different backgrounds and second through two Focus Group Discussions (FGDs) with 9 and 10 university students and teachers, with all participants being from Myanmar. Both the KIIs and FGDs were recorded, transcribed, and verified with the participants concerned.

As the research aimed to explore how ESD and the roles of HEIs were viewed from the research participants' perspectives, it employed an interpretivist approach using grounded theory (Glaser and Strauss, 1967). Research data management and participant recruitment processes were cautiously handled due to the higher risks and potential likelihood of ethical issues being imposed by the COVID-19 pandemic regulations and the political crisis in Myanmar. Although all participants were Myanmar nationals, many of those invited to take part in the research lived outside Myanmar. This design was intentional to avoid potentially negative consequences for participants given the situation in Myanmar. Remote data collection was employed, and Braun and Clarke's (2006) suggested thematic analysis was conducted using NVivo software.

Findings

The research participants were asked what sustainability means to their personal lives. While asking the participants in both KIIs and FGDs, 'sustainable development' was intentionally paraphrased and inter-changeably used as 'sustainable future or desirable conditions they would like to see in the future of Myanmar' to capture a holistic view of their understandings. Five thematic components emerged from the qualitative data with many coded references (52) being associated with more than one theme (Table 1).

Sustainable future for Myanmar	***Coded References***
Economic view	47
Environmental or ecological view	57
Political view	40
Socio-cultural view	23
Philosophical view	51

Table 1: Themes for the sustainable future for Myanmar

These five themes are regularly seen in the ESD literature and affirm that the participants do see a sustainable future as covering all the themes. They also recognise that there are interconnections between them, given many coded references apply to more than one theme, most notably between the economic and environmental views which share 27 coded references.

Participants were also asked to consider what the role of HEIs might be in contributing to this sustainable future. Analysis of the relevant data resulted in another five themes on the role of the HE sector as a whole and how it might contribute to ESD (Table 2).

Role of HEIs in Sustainable Development of Myanmar	***Coded References***
Investing in education as a foundation of society	14
Preparing students with sustainability literacy and attributes	90
HEIs as exemplar learning hubs	31
Contributing through quality research and innovation	25
Influencing policy leading to sustainability	12

Table 2: Themes for the roles of HEIs for sustainable development of Myanmar

In this case preparing students with sustainability literacy and attributes has more references than all the other themes combined. In addition, it was also possible to define what should be the relevant attributes that all graduates should develop through their learning at these HEIs, although more details on this issue of graduate attributes is addressed in Lwin, B., Lane, A. and Slater, R. (2024).

Expanding slightly on these two sets of themes, a democratic government and a healthy political system without any physical violence or civil wars was expressed as a desirable political future. In the economic view, fulfilment of basic needs, fair opportunities and sharing of benefits, just distribution of power and caring the environmental health system are the key concepts for a sustainable future. Regarding the environmental view, destructive and unethical industries or businesses without sound sustainable environmental management should be curtailed. Education needs to be re-enforced to ensure all citizens care, and use the resources respectfully, and learning from ancestors' sustainable practices should be encouraged. The socio-cultural view reflects the philosophical views in terms of ethical values and social justice. It embraces values such as inclusive decision making and appreciating diversity, mutual respect, and collaboration, sharing power and resources in a just and fair manner, fulfilment of basic needs, happiness and freedom of faith and cultural practices. Without these qualities in society, there will likely be more conflicts and violence over natural and social environments. According to the ethical values and moral constructs in the philosophical view, development interventions need to be locally relevant and feasible, and should not lead to dependency. Current generations need to be resilient to climate change and should be able to pass this knowledge to future generations.

These features of the desirable sustainable development/future of Myanmar can be taken into consideration in a nationwide reform process for ESD across Myanmar's HE sector. More investment is needed in Myanmar HEIs in providing quality service and facilitating students' learning process and research activities. Moreover, HEIs should act as learning hubs for their communities and the public. These might prepare the students with desirable graduate attributes to contribute to the expected sustainable development or future of Myanmar. Both the HEIs as learning hubs and their graduates will potentially help build more awareness and normalise sustainability practices amongst wider communities. On the other hand, the advancement in research and innovation contributed by the HEIs can help inform policy and recommendations for contextually relevant development. The graduates equipped with

relevant sustainable literacy and attributes will potentially contribute to desirable sustainable development implementations in the country. These ideas for HEI's contributions or engagement in ESD are much like those discussed and claimed for ESD in the literature (for example Liu and Kitamura, 2019; Abunasser, AlAli and Al-Qahtani, 2022).

However, there were also elements in this Myanmar specific data not widely highlighted in the published literature:

- HEIs need to invest and put effort in policy focused research and be actively engaged in the policy influencing process.
- HEIs need to learn from their alumni and their communities, including indigenous knowledge and traditional practices (Myanmar is very diverse in terms of ethnic groups and cultures).
- While ESD in the Myanmar context is like the common international/ western view that more readily links sustainability with environment or climate change, the participants from Myanmar also had a strong focus on justice and equity (which accords well with SDG 4 target 4.7 quoted earlier but is not foregrounded in western interpretations of ESD).

As previously outlined, ESD is relatively new to Myanmar HEIs. There was a need to have a collective understanding and conceptualisation of desirable sustainable development (SD) and ESD in the Myanmar context, before considering how they could be integrated into Myanmar HEIs. It seemed probable, given the in-country context, that future ESD integration into HEIs would need to be a parallel process alongside HE reconstruction. In doing so, it was also important to understand what needed to be changed to enable the reconstruction of Myanmar's HEIs that might support the teaching of desirable graduate attributes. Further analysis of the qualitative data provided several sub-themes under these two main themes of ESD integration and HEI reconstruction (Table 3).

Theme and Sub-themes of ESD integration and HEI reconstruction	*Coded References*
3.1 Ways to integrate ESD in HEIs	
Campus – a learning hub for sustainability practices	21
Community – Creating a community of learning, supporting, and collaborating	120
Culture – Cultivating desirable leadership and happy working environment	45
Curricula – embedded sustainability, locally relevant, flexible, and accessible	38
Pedagogy – appropriate teaching methods for ESD attributes	44
Research – research learning and research projects for both students and teachers	40
3.2 Reconstruction Needs for HEIs	
Administrative and quality assurance systems	48
Curricula and materials	45
Human resources development	36
Ideological reconstruction	100
Physical reconstruction	14
Psychological reconstruction	29

Table: 3 Themes and sub-themes of ESD integration and HEI reconstruction

To reiterate, ESD integration can be viewed as practices that individual HEIs should do whereas reconstruction can be viewed as required changes in the principles or policies in the HE sector in Myanmar to enable and inform ESD integration. Nearly all the sub-themes for ESD integration have some overlapping coded references with sub-themes for educational reconstruction but there were three with significant overlaps - with curriculum being an obvious one, also ideological reconstruction with pedagogy, and community with human resources development. As before, the intersections/interconnections between themes and sub-themes are often as important as the themes and subthemes themselves. Furthermore, the data supports the proposal to add pedagogy to the 4C model while also adding quality assurance as an explicit theme in the educational reconstruction model.

Recommended Changes for Policy, Principles and Practices

Based on the analyses briefly discussed here and those described in Lwin et al (2024) the following recommendations, for changes to in both policy (or principles) and ESD practices, are made, for the transformation of Myanmar HEIs which will potentially contribute to the development of desirable ESD graduate attributes for the conceptualised sustainable future for Myanmar (Table 4):

Policy and Principles	Practices
Ideology ➢ Vision and mission ➢ Autonomy & Academic freedom ➢ Collaboration	• Inform staff and students • Operations, and decisions guided by ESD • Encourage alternative teaching/learning methods • Collaborate with different stakeholders • Provide learning spaces (culture, non-violence, diversity, natural environment)
Administrative principles and systems ➢ Own charters (federal democracy) ➢ Reliable and feasible quality assurance and accreditation system ➢ Democratic values (policies and procedures)	• Facilitate active learning • Provide freedom in selecting the modules • Monitor services and progress • Learn from experiences to ensure graduate attributes • Encourage Students' Associations (extra-curricular)
Human resources development ➢ Own HR policies ➢ Guided by conceptualised ESD ➢ Teachers' professional development (PD) and qualification framework	• Create supportive/nurturing working environment and cultivate desirable practices to become norms • Ensure all decisions and management promoting and respecting multicultures and minorities • Prioritise assessment and management for teachers' PD
Psychology ➢ Leadership embracing mutual respect and empowerment ➢ Respect and care for the natural environment (core policy)	• Encourage democratic practices, empowerment, mutual respect, and collaborative learning in all types of leadership (supervision, and teachings) • Contribute to the students' development (attitude and behaviours) regarding the sustainability
Curricular reconstruction ➢ Locally relevant curricular contents from ESD perspective ➢ Locally relevant degree programmes	• Integrate ESD into the curriculum • Offer a special module (Institute-wide course) • Apply hidden-curriculum approach • Deliver SD degree/diploma programme • Encourage research-based teaching and learning
Physical infrastructure and facilities ➢ Sufficient budget/fund for the required assets and facilities ➢ Infrastructures for stakeholders' wellbeing, supportive learning, and sustainable practices	• Provide sufficient facilities and services (e.g., library, laboratory, sports, and green campus practices) • Upgrade internet service and online technology to enhance teaching and extend services to remote areas • Provide suitable infrastructure/facilities to teachers

Table 4: Recommended changes in policy, principles and practices for Myanmar

Concluding Remarks

This paper has provided a brief account of some aspects of a doctoral study investigating the principles, policies and practices needed to implement education for sustainable development into HEIs in Myanmar. This study examined how a sustainable future for Myanmar might look, what types of reform and reconstruction would be needed following any changes to the unstable political situation in Myanmar, how HEIs could transform their own practices and what attributes graduates needed to be able to contribute to the reform and reconstruction (not covered here but discussed in Lwin et al, 2024).

ESD is an ever-growing part of higher education worldwide although dominated by more developed countries. The many networks and projects over the years have come to highlight the importance of taking a whole institution approach to the implementation and integration of ESD within an HEI and equally the reconstruction of HEI after conflict. This study has found that to also be the case in Myanmar, although we have suggested additions to two of the more common models in the literature and also shown how both models can be used alongside each other. However, while many of the findings resonate with those described in the literature there are also aspects that were specific to Myanmar but may have relevance to many other countries, as are the research methods used to generate contextual data.

First, SD/ESD needs to be contextualised to the social, cultural, environmental, political, and philosophical factors of a country rather than adopting international guidance as is. International guidance can provide a starting point for discussions within a country, but internal consultation and dialogue is more important so that a reasonably common understanding of what is required is developed and this research itself provides a starting point for that dialogue.

Second, the common view of a desirable sustainable future arising from such consultation and dialogue needs to inform sector-wide and institution specific policies and practices by linking the two perspectives of a sustainable future for Myanmar and roles of the HE sector in contributing to that future. And while common, such views need to accommodate the diverse communities within a country.

Lastly, the principles for HEI reform and reconstruction should inform and accommodate the approaches used to integrate ESD which in turn should be supporting the development of the ESD graduate attributes deemed necessary. While graduate attributes are not the only outcomes of the activities of HEIs that can contribute to a sustainable future they do provide the best way to scale up the impact of those outcomes.

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Contact emails: bo.lwin@open.ac.uk
andy.lane@open.ac.uk
rachel.slater@open.ac.uk

Lost and Found: The Connection Between Education Level and First Language Attrition

Rena Alasgarova, The Modern Educational Complex Named in Honour of Heydar Aliyev, Azerbaijan

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Abstract
Language attrition is a complex phenomenon that can be explained as a loss of fluency in one's mother tongue due to a variety of factors. So far, research on the process of language attrition has predominantly been conducted on internal and external emigrants. Nevertheless, native language attrition has also been observed in international schools where English is used as a medium of instruction. This paper discusses the role of education level in the development of the attrition of the mother tongue. For the purpose of the current investigation, the case study was conducted on ten secondary school students in Azerbaijan who switched from the national curriculum to international after completing primary school, thus receiving more quantity and quality second language input and being less academically exposed to their native language. The data for the case study was collected through one-on-one, semi-structured interviews with the subjects. The interviews were transcribed and subsequently coded via the MAXQDA software and manually to mark similar concepts with a code label to retrieve the data for further analysis. Each code was named to provide an indication of the relevant concept and/or idea, divided into sub-categories, and transferred into maps. The results demonstrate that the academic context as well as the interruption of formal education in the mother tongue in primary education contribute to the degradation of the first language performance and competence as well as affect motivation towards maintaining the first language proficiency.

Keywords: Language Attrition, Cross-Linguistic Influence, Applied Linguistic, Language Interference, Secondary School, Bilingualism

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Introduction

As has been widely debated, language attrition is defined as a total or partial degradation of the mother tongue due to a variety of factors and is not connected with any brain injuries and/or health conditions (Schmid, 2011). Since the first conference on language attrition, which was hosted by the University of Pennsylvania in 1980 (Weltens & Cohen, 1989), there have been numerous studies on what language attrition is and is not and its impact on the fluency, accuracy, and speed in the reception and production of mother tongue skills and systems, and attitudes towards the native language and culture alike. The erosion of linguistic competence and fluency can occur due to various factors, often influenced by the linguistic environments that individuals find themselves in (Seliger & Shohamy, 1989). Previous research on language attrition has predominantly focused on individuals experiencing internal and external migration (Schmid, 2011). However, native language attrition has also surfaced in international schools where English serves as the primary medium of instruction.

The proliferation of international schools, wherein students receive their school education in English in non-English-speaking countries, has recently engendered instances of language attrition. Ergo, language attrition is currently spreading beyond immigration settings and expanding to educational contexts. The quality and quantity of exposure to a second language are increasingly recognized as significant contributors to this process (Köpke, 2004). Thus, the linguistic settings created in the schools with the English language as a medium of instruction foster first language attrition. The limitation in the use of the mother tongue is conditioned by the fact that a significant number of international schools generally have a prolonged school day (from 5 to 6 hours of instruction) and pursue an English-only policy, when students are discouraged to use any other language but English during their stay in school, including break time. It is noteworthy that most of the schools continue to offer mother tongue instruction; however, it is observed that the level of linguistic input provided is typically insufficient.

Given that the second language influence is described as a factor that can affect mother tongue attrition, investigating the extent to which both the limited native language exposure and the impact of the second language use and proficiency contribute to the decline in mother tongue proficiency provides insights into the underlying causes of attrition (Gallo et al., 2021). The question that drives this investigation is to what extent the educational level correlates with the progression of native language attrition. To address this question, a case study was conducted by interviewing ten high school students in Azerbaijan. These students transitioned from a national to an international curriculum after completing primary school. As a result, they encountered a substantial increase in second language input, both in terms of quantity and quality, while being progressively removed from academic exposure to their mother tongue.

The study utilized one-on-one, semi-structured interviews as the primary data collection method. The interviews, conducted with ten secondary school students in Azerbaijan, were recorded and transcribed with the aid of the MAXQDA software. Subsequently, the data was coded and analyzed using the same software. The employment of grounded theory in this research helped in constructing a solid foundation for the exploration of the intricacies of language attrition. In addition to grounded theory, the study employed thematic analysis, a technique for identifying and examining recurring themes within the dataset (Braun & Clarke, 2006).

Literature Review

Language Attrition

Language attrition is a phenomenon characterized by the decline or erosion of proficiency in one's native language, primarily due to reduced use or exposure to that language (Schmid, 2011). It often occurs when individuals adopt the second language as their dominant means of communication, leading to changes in their linguistic competence in their first language (Schmid & Köpke, 2017). Several factors contribute to language attrition, including sociolinguistic factors such as age, gender, education level, and language environment (Köpke, 2004). Among these factors, the quality and quantity of input in both the first and second languages play a pivotal role. The linguistic input individuals receive in their daily lives significantly influences their language proficiency and retention, making it a critical aspect to consider when examining language attrition. The literature on language attrition underscores the relationship between linguistic input and the maintenance or degradation of language skills, particularly in bilingual and multilingual contexts (Tokowicz & Kroll, 2007; Köpke, 2004).

Language Attrition in School Settings

International schools often adopt English as the primary medium of instruction, creating a bilingual environment where students are exposed to English alongside their mother tongue. Recent research indicates that bilingualism, when nurtured and maintained, can offer cognitive, cultural, and academic advantages (Bialystok, 2011). However, concerns arise when bilingualism is not adequately supported or when students prioritize the dominant language (English in many cases) over their native tongue. In this context, having a limited or below-par proficiency in the local language while possessing strong English skills may provide opportunities on the global stage but severely limit prospects at the local level.

Several factors contribute to language attrition in international schools. These include the quality and quantity of first language input, peer interactions, and individual language preferences. Students may experience attrition when they receive limited exposure to their first language, leading to reduced proficiency in speaking, reading, and writing. Efforts to mitigate language attrition in international schools are crucial. Strategies include promoting bilingualism by incorporating the first language into the curriculum, encouraging parental involvement in supporting the mother language, and creating a supportive linguistic environment (Crisfield, 2020). By actively addressing language attrition, international schools can help students maintain their proficiency in both languages and maximize the benefits of being bilingual speakers.

Cross-Linguistic Influence

Köpke (2004) has explored the relationship between the first and second languages and how exposure to a second language can influence the native tongue. This phenomenon poses questions about the dynamics of language systems and the ways in which second language exposure affects language attrition processes.

Language attrition does not merely affect overall language competence but operates within distinct linguistic domains. Lexical attrition, where individuals lose specific words or vocabulary in their first language, has been well-documented (Montrul, 2008). Over time,

speakers may struggle to recall or use certain words and expressions, affecting their language proficiency.

Grammatical changes are another dimension of language attrition. Schmid and Köpke (2017) have researched the impact of language attrition on grammar structures, illustrating that as speakers become less exposed to their native language, their grammatical knowledge may deteriorate. These changes can reveal errors in sentence structure and grammatical usage.

Excessive input of a second language can significantly influence an individual's reading and writing abilities in their first language, potentially contributing to mother tongue attrition. Intense exposure to a second language can lead to a decline in linguistic proficiency in the first language (Montrul, 2008). As individuals engage extensively with academic or professional content in the second language, they may become more proficient in the second language, diverting cognitive resources away from the first language (Bialystok, 2011). The complex interplay among language input, cognitive abilities, and first language attrition highlights the fluidity of bilingualism and its influence on linguistic proficiency.

Methodology

In applied linguistics, qualitative research is used to investigate the way the subjects “interact with experience and interact with a phenomenon at a given point in time and in a particular context, and the multiple meanings it has for them” (Crocker, 2009, p. 7). Given that the current study explores the extent to which these educational shifts correlate with the attrition of the first language, the qualitative case study was utilized to enable a more in-depth understanding of the phenomenon of first language attrition from a firsthand source.

The instrumental case study was selected for this research as it is aimed at discussing the issue of language attrition from a wider perspective rather than providing solutions to the particular case (Dörnyei, 2007). Qualitative method employs a variety of research mechanisms to collect and analyze data. Crocker (2009) categorized the methods of qualitative data collection by placing them into two intersecting continuums, the first one defining the extent to which the researcher controls the research settings and the second one expressing the level to which the researcher structures the data collection (Figure 1).

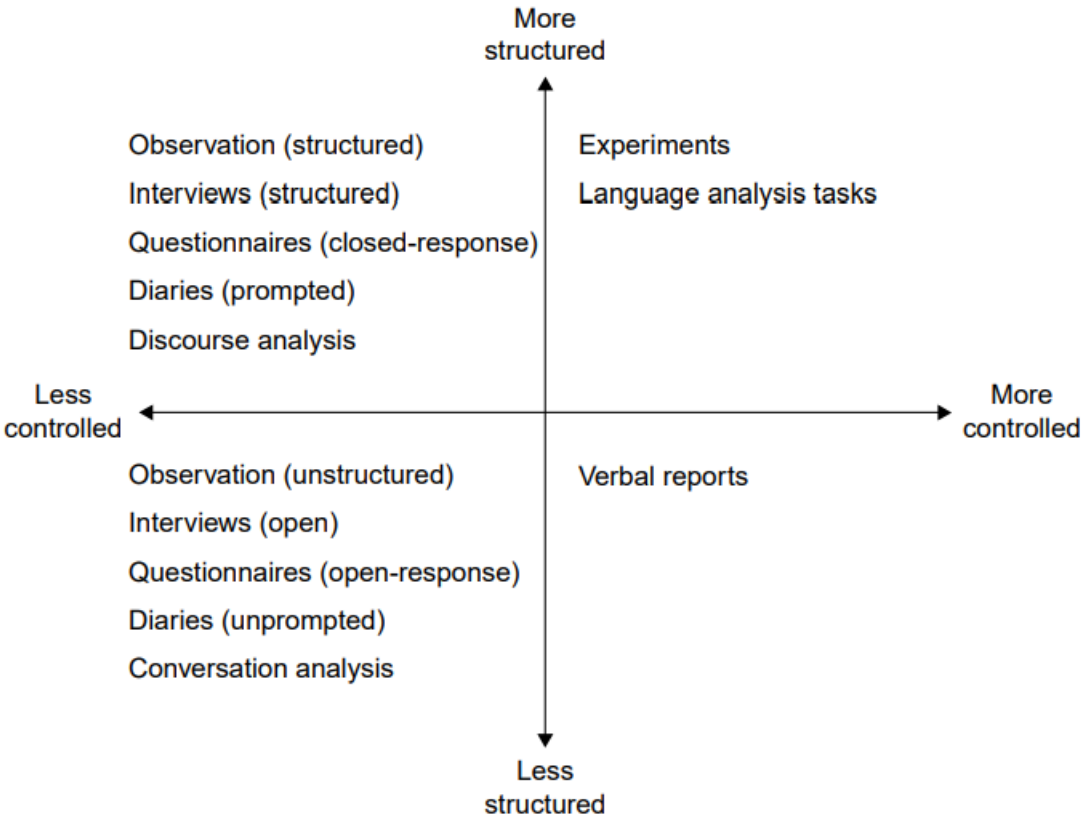

Figure 1. Qualitative data collection methods

To maintain a balanced approach to data collection, the case study utilized a semi-structured interview that can be placed somewhat in the middle of the two continuums. A semi-structured interview includes some pre-designed closed questions while leaving a window for the interviewer to ask some additional questions, either to encourage the interviewee to contribute further into the conversation or elaborate on the response or ask some open questions that may arise during the interview (Fox, 2009).

As argued by Dörnyei (2007), the possible limitations to collecting data via interviews might include a lack of communication skills thus resulting in the interviewee not communicating all the necessary information. In contrast, during face-to-face interviews, there is a possibility that interviewees may attempt to present their responses in the best possible light, potentially leading to the generation of less informative or less candid data (Dörnyei, 2007). These limitations can be avoided by accurate planning, including establishing the code of conduct with participants and careful facilitation of the process (Edley & Litosseliti, 2017).

Population and Sampling

The case study looks at the relationship between the level of education and attrition in first language proficiency. For this purpose, the interview questions were designed in a semi-structured way to provide an opportunity for elaboration on the guided questions (Hancock et al., 2009) and allow for deeper exploration of the ideas, views, and experiences (Edley & Litosseliti, 2017).

This research unfolds in the educational landscape of Azerbaijan, focusing on two international schools where English is adopted as the primary medium of instruction. The key

criterion for selecting the research setting was the prevalence of first language attrition among students making the transition from the national curriculum to international education. The population for this study was specifically drawn from students who had experienced this educational transition. Employing the purposeful sampling technique, participants were selected by the administration of both schools to ensure that they held the relevant experiences and insights necessary for addressing the research question (Palinkas et al., 2013). The request for the interview was sent to two international schools in Azerbaijan to describe the relevance of the study, the research question, and the interview procedure, as well as the consent forms. The administration of both schools selected the students fitting the profile and ensured their participation in the study.

Ethical considerations play a crucial role in this research to ensure the rights and well-being of participants and to uphold research integrity (Duff, 2007). The participants were provided with an opportunity to become familiarized with the objectives, procedures, potential risks, and benefits of the case study and were also informed participation is voluntary. The research was authorized ethically by the principals of the participating schools, and the student was informed that the study would remain anonymous before signing the consent form.

Data Collection and Analysis

To address the research question and investigate the relationship between exposure to the second language and its influence on proficiency in the mother tongue, data were collected through a semi-structured interview. Qualitative interviews should avoid relying on a fixed set of questions that need to be addressed within a predetermined time frame, as this does not allow for in-depth analysis of the focus of the study and "is not really adequate for research" (Fox, 2009, p. 16). Thus, qualitative researchers commonly utilize semi-structured interviews, comprising a set of open-ended questions rooted in the subject areas of interest to the researcher (Hancock et al., 2009). The interview designed for the purpose of this research aimed to explore the participants' daily language use, changes in proficiency and fluency in their mother tongue (Azerbaijani), and their attitudes toward language attrition. The interview was conducted in a one-on-one setting, allowing for a thorough exploration of the participants' experiences and perceptions. This approach allowed for revealing the themes that had not initially been the focus of this investigation, namely the relation between the increased second language input through rigorous academic input and the lack of motivation to keep improving or maintaining the proficiency level of the native tongue.

In the past, transcribing interviews was a laborious and time-consuming task that demanded meticulous attention to detail (Dörnyei, 2007; Hancock et al., 2009). Richards calls it "the least enjoyable aspect of this form of data collection" (Richards, 2009, p.192). Indeed, researchers often had to manually transcribe hours of recorded conversations, which not only consumed a significant amount of time but also posed challenges in maintaining accuracy and consistency. However, in contemporary research practices, a number of transcription software applications have emerged to support and expedite the intricate process of transcribing qualitative interviews. Within the context of this study, MAXQDA was selected as the transcription software for this study due to its multifaceted capabilities, which significantly expedited the intricate process of transcribing qualitative interviews. Unlike manual transcription, which can be time-consuming and susceptible to errors, MAXQDA offers a systematic approach to segmenting and categorizing transcribed textual data (Dörnyei, 2007).

To analyze the data, the research utilized a grounded theory approach followed by thematic analysis of the core codes. Grounded theory guarantees that the theory created is closely connected to the perspectives and experiences of the participants in the study. This connection enriches the authenticity and comprehensiveness of the study's findings (Charmaz, 2006). In this research, grounded theory helped establish a relationship between the increased academic second language input and deterioration in the proficiency of mother tongue skills and systems. The correlation between open codes and between the axial codes at the second stage of coding resulted in four core codes: *L1 Attrition, Academic L2 Interference, L2 Proficiency,* and *Perceptions & Suggestions*. The relationship between the core concept of *L1 Attrition* and its influencing factors is multifaceted. *L1 Attrition* is directly influenced by *Academic L2 Interference*, as the presence and extent of academic language interference in the second language plays a causal role in driving changes in L1 attrition. Similarly, *L2 Proficiency* also exerts a causal influence on *L1 Attrition*, where higher proficiency levels result in varying degrees of L1 attrition. As a consequence, changes in *L1 Attrition* have implications for *Perceptions and Suggestions*. The alterations in the first language due to academic L2 interference and L2 proficiency are reflected in how individuals perceive their language skills and the suggestions they offer, making it a dynamic interaction between causality and outcomes in the context of language attrition.

Further thematic analysis helped to focus on identifying and analyzing broader themes and patterns in the data. By scrutinizing the qualitative interview data, thematic analysis enables the researcher to identify not only overarching themes but also subtler linguistic intricacies, making it ideally suited for investigations seeking to investigate the complexities of language attrition (Braun & Clarke, 2006). *Language Attrition Dynamics in Educational Contexts* serves as the overarching theme of this research, encapsulating the central focus on language attrition processes within educational settings. Within this context, several key themes emerge: *Language Proficiency and Competence*, which addresses various language skills and potential variations across skills due to L1 attrition; *Language Systems and Structures*, exploring the influence of attrition on components like grammar and lexis; *L2 Input and Output*, examining the role of L2 exposure in educational environments; and *L1 Attrition Processes*, which examines the core concept of first language attrition and its associated mechanisms. Additionally, the theme of *Language Attitudes and Motivation* probes students' attitudes toward their first language, uncovering the development of negative attitudes, motivational factors, and their impact on language use.

Discussion

The present study discusses the complex processes associated with language attrition in response to the introduction of a second language in international school settings. The discussion centers on the multilayered dimensions of language attrition within educational settings, considering its consequences for language proficiency, linguistic competence, and the formative aspects of students' attitudes and motivations.

Grounded theory involved the coding process, including retrieving open, axial, and core codes (Table 1), and incorporating this finding into the grounded theory framework as a core concept – *L1 Attrition.*

Open codes	Axial codes	Core codes
Motivation	Mindset	Perceptions and Suggestions
Attitude		
Recommendations	Recommendations	
Lexis	Language systems	Academic L2 Interference
Grammar		
Academic language		
Speaking	Language skills	
Reading		
Writing		
Communication		
School input	Academic L2 Exposure	
Mother tongue	Use of L1	L1 Attrition
Household input	L1 Support	
Second language	Use of L2	L2 Proficiency

Table 1. Coding process

The analysis of the transcribed interviews started with retrieving the open codes. The open codes included mentions of debilitating of first language reading and writing skills, vocabulary loss, and inability to communicate about complicated concepts due to the increased second language input. The majority of students commented on the slowed-down reading pace and inability to understand literary texts in their native language compared to their comprehension of literary texts in English. All of the interviewees also mentioned that they prefer using English while communicating with their friends either in spoken or written modes outside the school, as they feel they do not have sufficient vocabulary to communicate in their mother tongue as well as it is easier and faster for them to produce coherent speech and maintain conversation in their second language. They explained it by saying that they have to translate what they think in English into their mother tongue while conversing with others, which substantially impedes the fluency and accuracy of mother tongue production.

Having discussed what the reason for such a decrease in first language proficiency could be, each participant acknowledged that as they transitioned from a national into an international curriculum, they have had very limited opportunities to develop academic knowledge in their first language. Due to the restricted mother tongue input, their proficiency in skills and systems has also been suffering. With a rather rapid transition from the educational mother tongue-instructed settings to the English-instructed secondary school, the gap between the quality and quantity of input in the first and second languages has created a favorable premise for language attrition (Köpke, 2004). One of the participants reported: “We stopped picking up Azerbaijani naturally and started learning the rules”. This resonates with observations made by Yilmaz (2019), who emphasized that in bilingual or multilingual environments, speakers often undergo changes in their mother tongue even though “it is assumed that the native language, once completely acquired, would be immune to change” (Yilmaz, 2019, p. 304). However, it has been clearly shown that all speakers who live in bilingual contexts and/or routinely use more than one language experience a certain amount of change in their first language, partly through non-use and partly through interference from the dominant contact language (Yilmaz, 2019).

After the subsequent review of the transcribed interviews, more initially unattended codes were retrieved. The newly emerged codes, namely *Motivation*, *Attitude*, and *Recommendations*, are not directly aligned with the research question; however, their correlation with other codes (Figure 2) and the number of instances of these codes in the interviews demonstrated their significance.

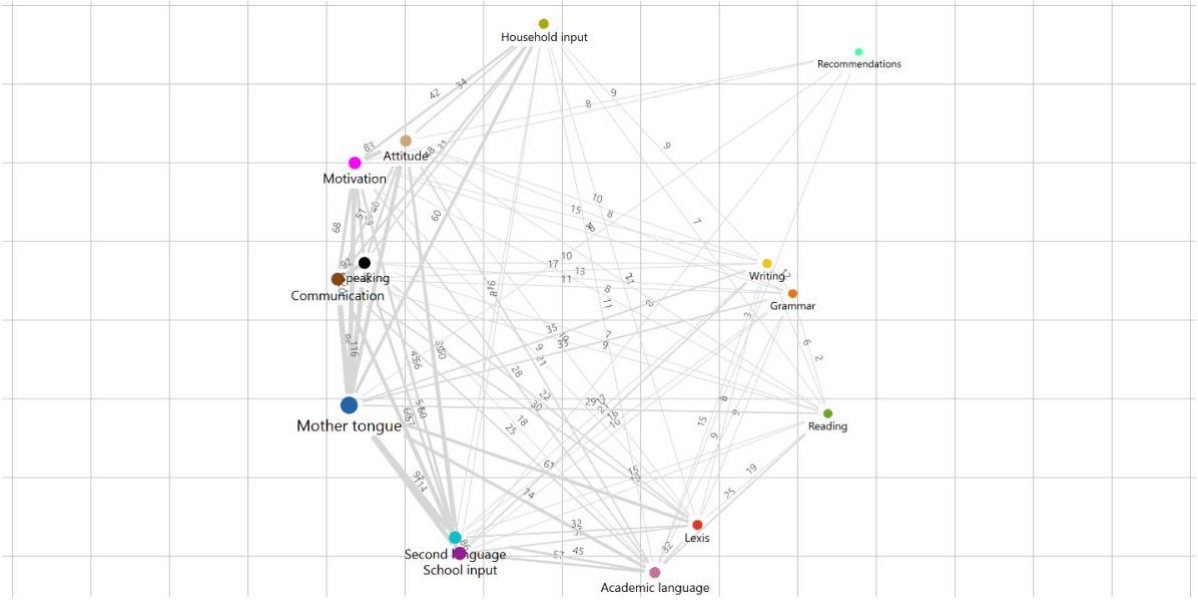

Figure 2. Code map

These interrelations between the open codes helped to combine them into axial codes: *Language skills, Language Systems, Mindset, Recommendations, L1 Support, Academic L2 Exposure, Use of L1,* and *Use of L2*. *Language Skills and Language Systems* are pivotal components that influence language attrition in educational settings. Students in this study reported a decline in their language skills, including reading, writing, speaking, and comprehension in their native language. Such findings align with previous research indicating that reduced use and exposure to the first language can lead to linguistic degradation in various language skills (Schmid, 2011). The lexical attrition observed in this study, where participants experienced difficulties recalling specific words or expressions in their mother tongue, is consistent with established research on lexical attrition in language learning and attrition contexts (Jarvis, 2019; Montrul, 2008). Additionally, students mentioned challenges in grammar and syntax, suggesting that language systems can also be significantly affected by language attrition. Schmid and Köpke (2017) have previously examined the impact of language attrition on grammar structures, highlighting the deteriorating influence of reduced first language exposure. As was identified, productive skills (speaking and writing) in the mother tongue are more significantly affected by the second language compared to reading or language systems (Figure 3).

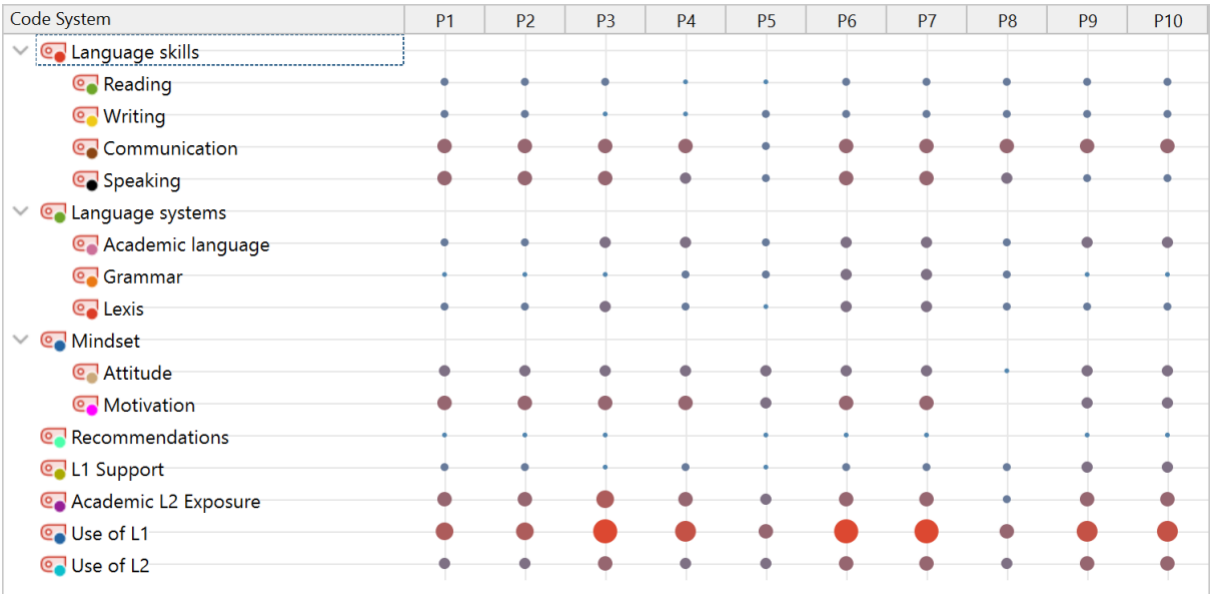

Figure 3. Code system

Mindset plays a crucial role in understanding the dynamics of language attrition, as it underlines the psychological aspects and attitudes of students toward their mother tongue. The emergence of this code echoes the significance of motivation and attitude in language attrition processes. As suggested by Dörnyei (2007), motivation is a driving force behind language learning and attrition. Furthermore, students' preference for using English in everyday conversations can be attributed to their motivation to communicate effortlessly and maintain fluency, aligning with theories on dominant language use (Bialystok, 2011). The interviews also revealed recommendations from students on how to mitigate language attrition and support language proficiency in their first language. Such recommendations align with previous suggestions in the literature, emphasizing the importance of incorporating the first language into the curriculum and creating a supportive linguistic environment (Triebold, 2020).

The core codes, *L1 Attrition, L2 Proficiency, Academic L2 Interference,* and *Perceptions & Suggestions,* that emerged in this study discuss interactions underpinning language attrition in educational settings. The core concept, *L1 Attrition*, represents the decline of the first language due to the introduction of a second language in an educational context. *Academic L2 Interference* denotes the correlation of academic language and its rules in the second language with the proficiency of the mother tongue. This resonates with prior studies highlighting how language interference, particularly in academic contexts, can contribute to changes in the first language (Schmid & Köpke, 2017). *L2 Proficiency* is pivotal in this framework, as it indicates the proficiency level achieved in the second language. Previous literature (Gallo et al., 2021) suggests that students' motivation to maintain high proficiency in their second language can lead to language dominance, affecting their native language. *Perceptions & Suggestions* explains students' attitudes and the recommendations they offer. The link between language attitudes and attrition is consistent with Dörnyei's (2007) emphasis on the role of motivation in language learning. This interplay of core or theoretical codes, based on the principles of the grounded theory framework (Charmaz, 2006), illuminates the causal relationships that underlie the complex nature of language attrition within educational contexts. *L1 Attrition* is directly influenced by *Academic L2 Interference* and *L2 Proficiency*, with implications for *Perceptions & Suggestions*, creating a dynamic

framework for understanding the intricate processes of language attrition in international schools (Figure 4).

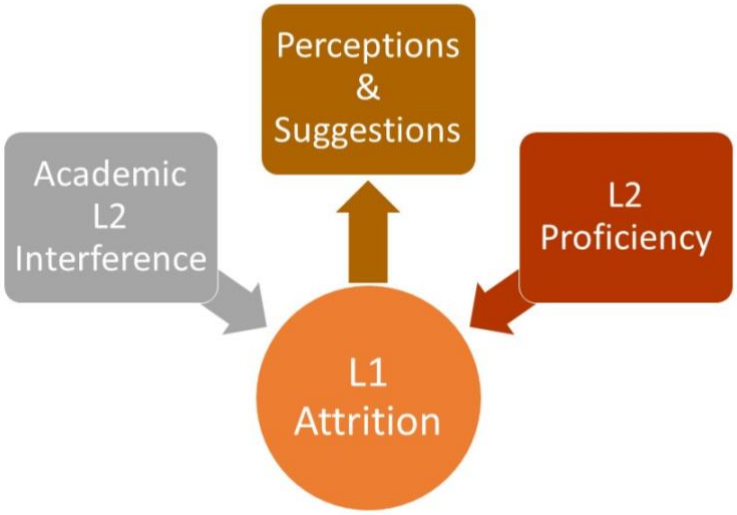

Figure 4. Theoretical Framework

The thematic analysis in this study revealed a subtle interaction between themes and sub-themes that together provided insight into the mechanics of language attrition in educational contexts. The overarching theme, *Language Attrition Dynamics in Educational Contexts*, reflected the central focus of this research, emphasizing the dynamic nature of language attrition processes (Figure 5). Within this theme, *Language Proficiency and Competence* explored variations in language skills across speaking, reading, writing, and comprehension, aligning with previous studies highlighting the complex nature of language proficiency (Schmid, 2011). Additionally, the theme of *Language Systems and Structures* examined the impact of L1 attrition on language components like grammar and lexis (Montrul, 2008). *L2 Input and Output* highlighted the role of intensive second language exposure in the educational context and its consequences on language attrition and proficiency (Köpke, 2004). The core theme, *L1 Attrition Processes*, dissected the mechanisms and cognitive changes involved in the decline of the first language, aligning with the concepts of language interference and language dominance (Schmid & Köpke, 2017). Although *Language Attitudes and Motivation* does not directly align with the initial research question, they emerged as a significant theme.

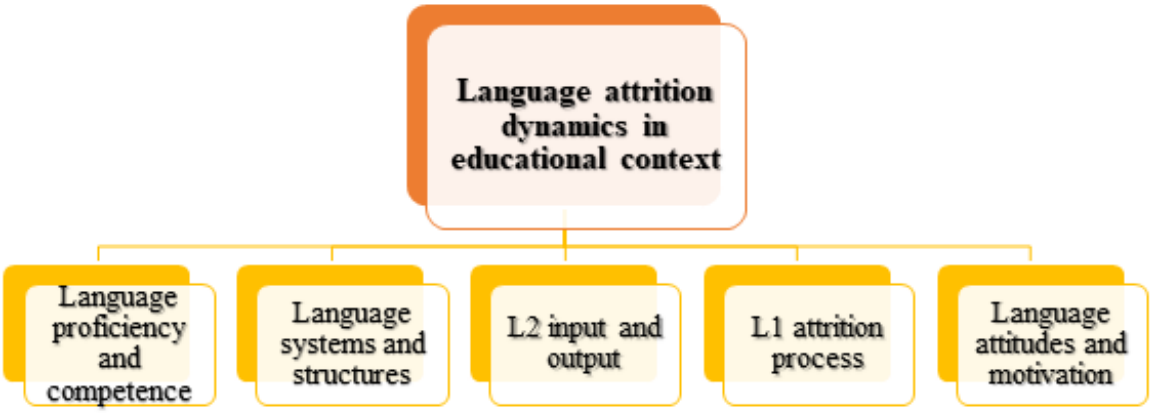

Figure 5. Thematic analysis

Notably, two students described feeling "forced" to use their mother tongue, while one student referred to English as a "native second language", reflecting their subconscious acknowledgment of English as their emerging mother tongue. Furthermore, most students expressed contentment with their current level of native language input at school, illustrating the development of a mindset that prioritizes English proficiency in international school streams. Remarkably, the majority of students did not exhibit embarrassment about their declining proficiency in their mother tongue, attributing it to the school's emphasis on English instruction and their role as passive recipients in shaping their language preferences. As one student noted, "It's a school's choice, not mine".

Conclusion

The study has examined the processes of language attrition within educational settings, with a specific focus on how education level correlates with native language attrition. The findings indicated that the academic context, coupled with the reduction of formal education in the mother tongue during primary education, contributes to the degradation of first language performance and competence. As the research results demonstrated that the first language erosion occurs mostly in productive skills, which Schmid refers to as "interactive language" skills, and less in receptive skills and language systems, further research is necessary to identify the differences in these types of first language "use" (Schmid, 2011, p. 83).

Furthermore, the limited native language exposure and the impact of the second language play significant roles in the progression of native language attrition (Köpke, 2004) and decreasing motivation to improve and/or maintain mother tongue proficiency. The shift from the educational mother tongue to an English-instructed secondary school accentuates this process, reflecting the relationship between increased academic second language exposure and a decline in native language proficiency.

This research contributes to the growing body of literature on language attrition by exploring this phenomenon in an educational context, expanding beyond the typical focus on emigrants. It underscores the importance of considering education level as a significant factor in language attrition dynamics and the resulting consequences for language skills and attitudes (Gallo, 2021).

While this study provides valuable insights into language attrition in educational settings, several limitations should be considered. First, the scope of the research is limited to a specific group of students in Azerbaijan, which may not be universally applicable. The findings may vary in different cultural and linguistic contexts, so caution should be exercised when generalizing the results.

Second, the study's reliance on one-on-one structured interviews could be subject to individual perception biases. Participants' responses may be influenced by their personal experiences and attitudes, which could impact the accuracy and generalizability of the findings. It is important to recognize that self-reported data, especially on sensitive topics like language proficiency, can be influenced by social desirability and personal biases.

To address the challenges of language attrition in educational settings, a more complex approach is recommended. Firstly, there is a need to promote bilingualism by valuing both the second language and the native language (Triebold, 2020). Educational institutions should strive to create an environment that nurtures and celebrates proficiency in both languages.

Secondly, it is crucial to incorporate the native language into the curriculum, even in international school settings, to ensure students receive ample exposure and instruction in their mother tongue (Tsimpli, 2014). Encouraging parental involvement is equally vital; parents should play an active role in fostering their child's proficiency in the native language, establishing home environments where the mother tongue is actively used. In addition, awareness programs and training should be provided to teachers, students, and parents to emphasize the significance of maintaining the native language (Köpke, 2004). Finally, schools should aim to create a supportive linguistic environment that actively promotes the use of the mother tongue within the school community. Collectively, these recommendations serve to empower students in international educational contexts to thrive academically and maintain their language skills and cultural connections.

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Strengthening Magna for Women (RA 9710) via Gender-Responsive Leadership Training for Marginalized Women and Girls in Iligan City, Philippines

Adelfa C. Silor, Mindanao State University-Iligan Institute of Technology, Philippines

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Abstract
This research project in Iligan City, Philippines, aims to establish a gender-responsive leadership program to empower marginalized women, challenge gender stereotypes, and address issues related to violence against women. The program was implemented across seven barangays and involved 190 marginalized women categorized based on their familial roles to assess their leadership qualities. During the training sessions, participants discussed the challenges associated with their specific familial responsibilities, allowing them to identify potential weaknesses in their leadership abilities. After completing following the completion of the training, participants displayed a notable increase in confidence in their leadership capabilities. They identified vital traits they had developed or enhanced through the program, including a sense of responsibility, honesty, empathy, supportiveness, active listening skills, adaptability, and open-mindedness. Significantly, the program also deepened their understanding of the significance of Magna for Women (RA 9710), a legislative act aimed at safeguarding and promoting the rights of Filipino women. Even women facing challenges related to marriage or parenthood benefited from the program, as it inspired them to adopt more positive mindsets and become more adaptable in their roles. In conclusion, this gender-responsive leadership program successfully empowered marginalized women in Iligan City, improving their social standing and equipping them with the resilience needed to combat violence and various forms of abuse.

Keywords: Leadership, Capabilities Stereotypes, Violence Resilience

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Introduction

Gender inequality remains a persistent and multifaceted challenge, obstructing the realization of human rights and impeding social and economic progress in many societies worldwide. In Iligan City, Philippines, this research project confronts this pressing issue by addressing a critical void in existing initiatives through the implementation of a comprehensive gender-responsive leadership program. Focused primarily on empowering marginalized women, challenging entrenched gender norms, and combating violence against women, this initiative aims to catalyze transformative change within the community.

The impetus for this research springs from a sober recognition that despite strides toward gender equality, significant barriers still thwart the leadership aspirations of marginalized women in Iligan City. Traditional societal norms and stereotypes often consign women to predefined roles within the family structure, curtailing their involvement in decision-making processes and their access to leadership positions. Furthermore, instances of violence against women persist, compounding the vulnerability of marginalized groups and exacerbating their exclusion from leadership roles.

This research endeavors to bridge this gap by instituting a targeted program that not only equips marginalized women with essential leadership skills but also addresses the unique challenges they face within their familial roles. Emphasizing a gender-responsive approach ensures that the program is finely attuned to the specific needs and contexts of the participants, nurturing an environment conducive to their empowerment and fostering their leadership capacity.

Implemented strategically across seven barangays, the program engaged 190 marginalized women, categorized based on their familial roles. This nuanced categorization facilitated a detailed assessment of their leadership potential, considering the diverse challenges associated with their specific responsibilities. Through tailored training sessions, participants were provided with a platform to identify and address potential weaknesses in their leadership abilities within their familial contexts.

Moreover, this research extends beyond the local context to contribute to broader discussions on inclusive leadership and gender equity. By delving into the dynamics of inclusive leadership within diverse teams, the study sheds light on the pivotal role of leadership in fostering inclusivity and challenging preconceived notions about the relationship between diversity and inclusion. Notably, it underscores the imperative of leadership that actively champions positive outcomes and mitigates the negative impacts of team diversity, thereby nurturing a culture of inclusivity.

However, while the research provides valuable insights, it also reveals important gaps, particularly in addressing the specific needs of marginalized women and girls within the context of Iligan City and the framework of Strengthening Magna for Women (RA 9710). This underscores the necessity for further research to develop tailored strategies that account for the intersecting factors of gender, ethnicity, socioeconomic status, and other identities shaping the experiences of marginalized women and girls. Such endeavors hold the potential to inform policy and practice, advancing gender equity and empowerment initiatives both locally and globally. Thus, this research study aims to assess the impact of Gender-Responsive Leadership Training on marginalized women and girls in Iligan City and its contribution to strengthening the Magna Carta for Women (RA 9710).

Theoretical Framework of the Study

These theorists provide a solid theoretical foundation for gender-responsive leadership training, ensuring that it goes beyond skill development and addresses the broader societal structures and inequalities that the Magna Carta for Women seeks to challenge and overcome.

Simone de Beauvoir
Relevance: Simone de Beauvoir's existentialist philosophy and feminist writings laid the groundwork for understanding the social construction of gender roles. Her concept of "The Second Sex" delves into how women are relegated to an "other" status in society. She is incorporating her theories into the training program. It provides participants with a critical framework to analyze and challenge traditional gender norms, fostering a deeper understanding of the need to strengthen legal frameworks like the Magna Carta for Women.

Gloria Jean Watkins "Bell Hooks"
Relevance: Bell Hooks is known for her intersectional feminist perspective, emphasizing the interconnectedness of various forms of oppression. Her work encourages the inclusion of race, class, and gender considerations in feminist analyses. Incorporating Hooks' intersectionality theory into the leadership training program can enhance its effectiveness by addressing marginalized women's uniqueness in Iligan City. This theory ensures a more comprehensive and inclusive approach to empowerment, aligning with Magna Carta for Women principles.

Amartya Sen
Relevance: Amartya Sen's capability approach focuses on expanding individuals' opportunities and freedoms. By incorporating Sen's ideas into the leadership training, the program can shift its focus beyond addressing challenges and weaknesses. Instead, it can emphasize the development of capabilities, enabling marginalized women to exercise agency and lead in their communities. This theory aligns with the objectives of strengthening the Magna Carta for Women by promoting legal rights and empowering women to participate in decision-making.

Literature Review

The findings from a collaborative study shed light on the pivotal role of inclusive leadership in moderating the dynamic between team ethnic and cultural diversity and the establishment of an inclusive climate within public sector teams. This study delved into the nuanced dynamics of how inclusive leadership contributes to fostering inclusivity in teams characterized by ethnic and cultural diversity. As anticipated, the results illuminate that inclusive leadership serves as a positive moderator, enhancing the correlation between team diversity and the presence of an inclusive climate. Specifically, highly diverse teams demonstrate a more inclusive climate when guided by strong inclusive leadership compared to when such leadership is lacking. These insights underscore the indispensable significance of leadership that actively champions positive outcomes and alleviates the negative repercussions associated with team diversity, thereby nurturing a culture of inclusivity. This aligns with previous research emphasizing the transformative impact of inclusive leadership on organizational dynamics (Guillaume et al., 2017; Mayo et al., 2016).

Furthermore, inclusive leadership emerges as a crucial mechanism for effectively addressing emotional responses stemming from social categorization processes, particularly within

highly diverse teams. However, it is pertinent to note that the influence of inclusive leadership on team inclusiveness is not statistically significant in teams characterized by low ethnic and cultural diversity. This underscores the contextual sensitivity of leadership approaches and suggests a need for tailored strategies in response to varying team compositions.

Interestingly, the study also reveals that highly ethnically and culturally diverse teams report lower levels of inclusiveness compared to their less diverse counterparts. This finding challenges previous assumptions suggesting a direct positive relationship between ethnic and cultural representation and perceptions of inclusion in public contexts (Andrews & Ashworth, 2015). These insights prompt a reevaluation of prevailing notions regarding diversity and inclusion, emphasizing the multifaceted nature of these constructs and the nuanced interplay with leadership dynamics.

Relating to gender-responsive leadership training, these findings accentuate the importance of integrating inclusive leadership practices within such programs. By fostering a climate of inclusivity and addressing the complexities of team dynamics, gender-responsive leadership training can empower leaders to effectively navigate diverse environments, thereby promoting gender equity and inclusiveness in organizational settings.

Achieving gender equity is essential for fostering healthy lives and overall well-being for all individuals. Within the health sector, promoting gender equity in leadership is a crucial aspect of advancing this objective. The research findings underscore the presence of gender biases in leadership roles within global health, with women being notably underrepresented. Gender roles, relationships, societal norms, and expectations significantly influence the progression and ascension to leadership positions across various levels. Enhancing women's representation in leadership within the global health sphere presents an opportunity to enhance the resilience and responsiveness of health systems. In conclusion, we present an agenda outlining actionable steps aimed at promoting women's leadership in health, thereby contributing to the broader global goal of achieving gender equity (Dhatt,et al., 2017).

The Sustainable Development Goals (SDGs) offer a framework for global endeavors aimed at enhancing gender equity. These goals encompass targets focused on eliminating gender-based discrimination and inequitable resource distribution, promoting and empowering women in leadership roles, addressing the challenges of unpaid care work, abolishing harmful practices, and enhancing sexual and reproductive health services. In practical terms, the pursuit of creating healthy communities is intricately linked with initiatives to combat inequality (Dhatt, et al., 2017).

Although women constitute the majority of the workforce in the global health sector, they are notably underrepresented in top-tier institutions, global policy and governance forums, thought leadership panels, and decision-making structures across both public and private sectors. While gender parity in leadership remains elusive across various domains such as business, law, science, education, technology, and politics, the gender disparity within global health is particularly concerning, given its divergence from the sector's principles and objectives. The absence of full and equitable participation of all relevant stakeholders in pursuing global priorities deprives the global community of a valuable asset in achieving ambitious goals. It is essential to acknowledge that the adverse health ramifications of gender-imbalanced leadership in global health are not fully understood, whereas the

advantages of gender-balanced leadership are numerous (Women Leaders in Global Health Initiative,2016; Downs,2014; Just Actions, 2016).

Utilizing gender-responsive training methodologies is essential for ensuring that capacity-building initiatives within any community or group can equally benefit all members. Across various contexts, women often find themselves underrepresented in leadership positions, particularly within business and political decision-making spheres. Increasing evidence indicates that fostering greater gender diversity and inclusion within companies, governments, and community settings not only benefits women individually but also yields extensive advantages such as enhanced innovation, satisfaction, efficiency, and the prevention of groupthink. In educational settings, incorporating gender-responsive training approaches can broaden and enrich the pool of ideas and perspectives accessible to all students, thereby preparing them to effectively navigate the diverse challenges they may encounter in their professional careers. Furthermore, gender-responsive training serves as a compelling example for future generations by showcasing strong role models of both men and women collaboratively working and learning together (Gender-Responsive Training Methods, 2021).

It is important to recognize that training represents only one of several possible capacity-building interventions available to support entrepreneurs. Specifically, female entrepreneurs may find additional benefits from mentoring, coaching, and peer groups tailored to address their unique needs. In certain situations, these alternative methods may prove more effective for female entrepreneurs compared to traditional course-based learning approaches. Thus, providers of training programs should consider a comprehensive array of capacity-building measures before determining the most appropriate option. While the customization of technical training content falls beyond the scope of this discussion, it's worth noting that the World Bank's Gender Innovation Lab has highlighted the efficacy of personal effectiveness training—focused on enhancing agency and soft skills—as a transformative tool for female entrepreneurs operating micro and small-scale businesses (Gender-Responsive Training Methods, 2021).

Gender-responsive training involves educational approaches and instructional materials that take into account the distinct learning requirements of both female and male participants, acknowledging potential differences in learning styles as well as the influence of gender dynamics, roles, and expectations on the learning process. It encompasses various aspects such as the content of instruction, the composition of participants, the instructors' characteristics and methods, the environment in which teaching occurs, and the timing and manner of instruction delivery, all to foster equitable learning experiences. Gender-responsive training transcends a superficial consideration of the demographics present in the classroom, training facility, or virtual learning environment, instead delving deeper to ensure that all participants have an equitable opportunity to actively engage and derive benefits from the learning process (Gender-Responsive Training Methods, 2021).

The provided research findings shed light on several important gaps and justify the need for further research on gender-responsive leadership training, particularly focusing on marginalized women and girls in Iligan City, Philippines, within the context of Strengthening Magna for Women (RA 9710). Here's an identification of the gap followed by its explanation:

Identified Gap

Lack of Gender-Responsive Leadership Training for Marginalized Women and Girls: The research highlights the importance of inclusive leadership in fostering inclusivity within diverse teams, challenging previous assumptions about the direct relationship between diversity and inclusion. However, it fails to address the specific needs and challenges faced by marginalized women and girls in leadership positions, particularly in the context of Iligan City, Philippines, and the implementation of Strengthening Magna for Women (RA 9710).

Justification for Further Research

Contextual Relevance: The study emphasizes the need for tailored strategies in response to varying team compositions, suggesting that leadership approaches may need to be adapted based on contextual factors such as ethnic and cultural diversity. Similarly, the dynamics within marginalized communities, especially in regions like Iligan City, may require unique approaches to leadership training that address specific cultural, social, and economic barriers faced by women and girls.

Intersectionality: While the research touches upon the influence of diverse team compositions, it does not explicitly address intersectionality, which considers how factors such as gender, ethnicity, socioeconomic status, and other identities intersect to shape individuals' experiences and opportunities. Marginalized women and girls often face compounded forms of discrimination and disadvantage, necessitating a nuanced understanding of their unique needs in leadership development initiatives.

Policy Implications: Strengthening Magna for Women (RA 9710) aims to promote gender equality and empower women in various spheres of society, including leadership roles. Further research exploring the effectiveness of gender-responsive leadership training within the framework of this policy can inform its implementation and identify potential areas for improvement to better serve marginalized women and girls in Iligan City.

Capacity Building: Gender-responsive training methodologies, as highlighted in the research, offer promising avenues for capacity building among marginalized women and girls. However, there is a need to assess the suitability and effectiveness of such training programs within the specific context of Iligan City, considering factors such as access to resources, cultural norms, and existing support structures for women's leadership development.

In conclusion, while the existing research provides valuable insights into the role of inclusive leadership in fostering inclusivity within diverse teams, there is a clear need for further investigation into gender-responsive leadership training tailored to the needs of marginalized women and girls in Iligan City, Philippines, under the framework of Strengthening Magna for Women (RA 9710). Addressing this gap can contribute to advancing gender equity and empowerment initiatives at the local level and inform broader policy efforts aimed at promoting inclusive leadership and women's leadership participation in the public sector.

The connection between strengthening Magna for Women (RA 9710) through gender-responsive leadership training for marginalized women and achieving gender equity in the health sector is inherently intertwined.

Firstly, by empowering marginalized women and girls through gender-responsive leadership training, initiatives like Magna for Women (RA 9710) are reinforced. These programs aim to challenge gender biases, empower women, and promote their rights, ultimately contributing to the broader goal of achieving gender equity. Through leadership training, marginalized women gain the skills, confidence, and opportunities necessary to participate in decision-making processes, including those related to health.

Secondly, the research findings highlighting gender biases in leadership roles within global health further emphasize the need for initiatives to promote gender equity, particularly in leadership positions. Women's underrepresentation in health leadership roles reflects systemic inequalities and reinforces gender disparities in health outcomes and access to healthcare services. By addressing these biases and promoting women's leadership in health, strides can be made towards achieving gender equity in the health sector.

Moreover, enhancing women's representation in leadership positions within the health sector can lead to more responsive and resilient health systems. Diverse leadership teams, inclusive of women, bring varied perspectives, experiences, and insights to decision-making processes. This diversity fosters innovation, promotes patient-centered care, and ensures that health policies and programs address the needs of all individuals, regardless of gender.

Hence, initiatives such as gender-responsive leadership training for marginalized women play a vital role in strengthening Magna for Women (RA 9710) and advancing the broader goal of achieving gender equity in the health sector. By addressing gender biases in leadership and empowering women to take on leadership roles, we pave the way for healthier lives and improved overall well-being for all individuals.

Simone de Beauvoir's existentialist feminist perspective serves as a crucial framework for comprehending the societal positioning of women as "the other." By delving into existentialist philosophy, this conceptual approach prompts an examination of the societal constructs that confine and define women, thereby laying the groundwork for challenging and redefining these limiting roles. Applied to the context of gender-responsive leadership training in Iligan City, this framework facilitates an exploration of how the program addresses and dismantles the existential "othering" experienced by marginalized women, empowering them to reshape their roles and assert their agency.

In parallel, Bell Hooks' concept of intersectional feminism enriches the discourse, highlighting the interconnected nature of various forms of oppression. In the context of Iligan City, this perspective enables a nuanced examination of the intersecting factors contributing to the marginalization of women, including economic status, ethnicity, and cultural heritage. By acknowledging and addressing these intersecting oppressions, gender-responsive leadership training can be tailored to address the specific needs and challenges faced by marginalized women and girls, thereby fostering a more inclusive and impactful empowerment program.

In workplaces characterized by diversity, the importance of inclusive leadership becomes apparent in facilitating the complete integration and engagement of all members from diverse backgrounds. Findings from the study indicate that inclusive leadership plays a beneficial role in mitigating the adverse effects of ethnic and cultural diversity on the inclusivity of the work environment. This research highlights that simply having a more diverse team does not inherently lead to a more inclusive climate. Instead, the presence of inclusive leadership is

pivotal in nurturing an environment where the contributions of all team members are valued and respected. Thus, the presence of inclusive leadership is essential for cultivating an inclusive atmosphere within diverse teams. The study also acknowledges its limitations and suggests avenues for future research in this area (Ashikali, Groeneveld, & Kuipers, (2020).

Simone de Beauvoir's concept of existentialist feminism is pivotal for understanding women's role as "the other" in society. By delving into the existentialist perspective, this concept encourages an exploration of the societal constructions that define and limit women, laying the groundwork for questioning and challenging these restrictive roles. Applying this lens to the gender-responsive leadership training in Iligan City allows for examining how the program addresses and dismantles the existential "othering" of marginalized women, empowering them to redefine their roles and assert their agency.

The extensive body of research in both public management and generic management literature delves into various leadership styles and their outcomes, as evidenced by studies such as those by Boekhorst (2015), Chrobot-Mason et al. (2016), Gotsis & Grimani (2016), and Randel et al. (2018). These studies elucidate the diversity of leadership approaches, each rooted in distinct conceptual frameworks and normative arguments regarding their intended impacts. Randel et al. (2018), in their thorough literature review, explore multiple leadership styles and highlight the significance of inclusive leadership. They emphasize that inclusive leadership, characterized by behaviors facilitating the full integration of team members and fostering openness to diverse social identities, is vital for effectively promoting inclusivity. Furthermore, they advocate for further theoretical and empirical investigations into the impact of inclusive leadership on fostering inclusiveness. This perspective aligns with the recognition in other studies, such as those by Chrobot-Mason et al. (2014, 2016) and Randel et al. (2018), that inclusive leadership plays a crucial role in shaping perceptions of equity among employees and in fostering actions necessary for establishing inclusiveness.

Simone de Beauvoir's concept of existentialist feminism provides additional insight into societal constructions that define and limit women as "the other." By adopting an existentialist perspective, this concept encourages a critical examination of these restrictive roles and calls for their interrogation and transformation. Applying this lens to gender-responsive leadership training in Iligan City enables an exploration of how such programs address and dismantle the existential "othering" experienced by marginalized women, empowering them to redefine their roles and assert their agency. Thus, by bridging insights from management literature with existentialist feminist theory, a holistic understanding of leadership, gender dynamics, and empowerment emerges, offering valuable insights for both academic inquiry and practical application.

Bell Hooks brings the concept of intersectional feminism to the discourse, emphasizing the interconnectedness of various forms of oppression. In the context of Iligan City, this lens allows for a nuanced examination of the overlapping factors that contribute to the marginalization of women, such as economic status, ethnicity, and cultural background. By recognizing and addressing these intersecting oppressions, gender-responsive leadership training can be tailored to marginalized women and girls' specific needs and challenges particular needs and challenges marginalized women and girls face, contributing to a more inclusive and effective empowerment program.

Amartya Sen's capability approach introduces a lens focusing on expanding individuals' opportunities and freedoms. In the Magna Carta for Women context, this concept prompts an

evaluation of the program's success in enhancing the capabilities of marginalized women. The training's impact should be assessed in terms of skills acquired and the broader freedoms and opportunities it provides, aligning with Sen's emphasis on enhancing the individuals' overall well-being and agency of individuals.

Judith Butler's concept of gender performativity is crucial for understanding how gender identity is constructed through repeated actions. Applying this to leadership training prompts an exploration of how the program imparts skill that influences participants' self-perception and how they perform their gender roles. This perspective underscores the importance of creating a training environment that encourages the authentic expression of one's gender identity, fostering a sense of empowerment.

Chandra Mohanty's concept of Third World feminism directs attention to women's experiences of women in the Global South. In the Philippines, understanding the unique challenges faced by marginalized women requires a perspective that considers the historical, cultural, and socio-economic contexts specific to the region. This concept encourages researchers to explore how the leadership training program addresses these contextual factors, ensuring it resonates with women's lived experiences in Iligan City.

Gloria Steinem's advocacy for feminist activism is pertinent in evaluating the program's impact on women's rights and gender equality. By adopting a lens of feminist activism, the research can assess how leadership training translates into tangible actions and advocacy efforts within the community. Steinem's emphasis on active engagement and advocacy aligns with the broader goal of strengthening the Magna Carta for Women by fostering a cadre of empowered women working towards societal change.

Audre Lorde's concept of Black feminism accentuates the importance of recognizing and addressing the intersection of race, gender, and sexuality. In Iligan City, acknowledging the diverse identities of marginalized women is crucial for effective empowerment. Lorde's perspective explores how the leadership training program considers and celebrates the intersectionality of participants, ensuring that it is inclusive and responsive to the diverse experiences of women and girls in the community.

Alice Walker's concept of Womanism, centering on the experiences and perspectives of Black women, encourages researchers to delve into the unique challenges and strengths of Black women in Iligan City. Applying this lens to the leadership training program ensures that it resonates with Black women within the broader marginalized population, fostering a more inclusive and practical approach to empowerment.

Nawal El Saadawi's Arab feminism provides a lens for addressing gender issues in the Arab world, prompting a nuanced examination of cultural factors that may influence the effectiveness of the leadership training program. This concept encourages researchers to explore how the program navigates and challenges cultural norms, ensuring that it aligns with the diverse perspectives within the Arab community in Iligan City.

Cynthia Enloe's feminist international relations concept prompts an analysis of how gender-responsive leadership training engages with global and local political dynamics. By considering the impact of broader geopolitical factors on the lives of marginalized women, the research can assess how the program equips participants to navigate and challenge

systemic issues beyond the local context, contributing to the broader goals of the Magna Carta for Women.

Raewyn Connell's concept of gender relations in the context of power and social structures underscores the importance of analyzing how power dynamics influence gender roles and opportunities. Applying this concept to the leadership training program allows researchers to evaluate how it addresses and challenges existing power structures, ensuring that it contributes to a more equitable power distribution among marginalized women in Iligan City.

Francesca M. Cancian's critical feminist anthropology concept encourages an examination of power dynamics and gender roles within the cultural and social context of Iligan City. By adopting a critical anthropological lens, the research can delve into how cultural norms impact the lives of marginalized women and how the leadership training program navigates these dynamics to promote empowerment.

Nancy Fraser's feminist theory on justice and the struggle for recognition prompts an evaluation of how the leadership training program addresses issues of justice and recognition for marginalized women. This concept encourages researchers to explore whether the program fosters a sense of dignity and agency among participants, aligning with the broader goals of the Magna Carta for Women.

Sandra Harding's feminist standpoint theory emphasizes the perspectives of marginalized groups, urging researchers to prioritize the voices and experiences of marginalized women in Iligan City. This concept encourages an approach that actively seeks input from participants, ensuring that their perspectives shape the design and implementation of the leadership training program.

Maxine Molyneux's feminist political economy concept calls attention to the intersection of gender and economic structures. By adopting this lens, the research can assess how the leadership training program addresses economic inequalities and empowers marginalized women to navigate and challenge economic barriers in Iligan City.

Michael A. Messner's critical studies on masculinity focus on direct attention to constructing male identity. This lens prompts researchers to explore how the leadership training program engages with and challenges traditional notions of masculinity, fostering an environment that encourages collaboration and shared responsibility between men and women in the community.

R.W. Connell's concept of hegemonic masculinity encourages an analysis of dominant forms of masculinity in society and how they intersect with the empowerment of marginalized women. Understanding and challenging hegemonic masculinity within Iligan City is essential for creating a more inclusive and supportive environment for women to exercise leadership.

Rosalind Gill's postfeminism concept explores how contemporary feminism influences gender roles. Applying this concept to the leadership training program allows researchers to assess how it navigates the impact of postfeminist discourses on the expectations and aspirations of marginalized women in Iligan City.

Laura Mulvey's concept of visual pleasure and narrative cinema, discussing the male gaze in media, encourages an examining how media representations influence the perceptions and

self-image of marginalized women. This lens prompts a critical analysis of the visual and narrative components of the leadership training program, ensuring that it counteracts harmful stereotypes and fosters positive self-perception.

Martha Nussbaum's capabilities approach to human development emphasizes freedoms and opportunities for all. Applying this concept to the leadership training program prompts an assessment of how it enhances the overall capabilities of marginalized women, ensuring that it goes beyond skill development to promote genuine freedom and agency within the community.

These authors and concepts provide a diverse and comprehensive theoretical framework for understanding the complex issues related to gender, women's rights, and empowerment in the context of Iligan City.

Synthesis

In the context of Strengthening Magna for Women (RA 9710) and the Gender-Responsive Leadership Training for Marginalized Women and Girls in Iligan City, Philippines, the synthesis of the authors' contributions underscores several key points:

Inclusive Leadership and Team Dynamics: The importance of inclusive leadership in addressing emotional responses within diverse teams is highlighted. The study emphasizes the need for tailored strategies to accommodate varying team compositions and challenges assumptions about the direct relationship between diversity and inclusion. This discussion aligns with the objectives of Strengthening Magna for Women, which aims to promote gender equity and inclusiveness in leadership roles.

Gender Equity in Leadership and Global Health: The authors stress the presence of gender biases in leadership roles within global health, underscoring the significance of enhancing women's representation in leadership positions. Strengthening Magna for Women seeks to address such disparities by providing gender-responsive leadership training tailored to the specific needs of marginalized women and girls in Iligan City, thereby contributing to broader efforts to advance gender equity in leadership.

Utilizing Gender-Responsive Training Methodologies: The importance of integrating inclusive leadership practices within gender-responsive training programs is highlighted. These methodologies recognize the distinct learning requirements of both female and male participants and aim to foster equitable learning experiences. By incorporating such approaches, the Gender-Responsive Leadership Training initiative in Iligan City promotes gender equity and inclusiveness in organizational settings, aligning with the objectives of Strengthening Magna for Women.

Link to Sustainable Development Goals (SDGs): The authors connect their discussion to the SDGs, emphasizing how initiatives aimed at enhancing gender equity contribute to achieving global priorities related to eliminating discrimination, promoting women in leadership roles, and addressing societal challenges. By aligning with the SDGs, initiatives like Gender-Responsive Leadership Training contribute to creating healthy and sustainable communities, supporting the broader objectives of Strengthening Magna for Women.

Overall, the synthesis underscores the importance of a comprehensive approach to promoting gender equity and inclusiveness in leadership roles, emphasizing the significance of inclusive leadership practices and gender-responsive training methodologies. By addressing gender disparities and fostering inclusive environments, initiatives like Gender-Responsive Leadership Training contribute to achieving the objectives of Strengthening Magna for Women and advancing broader goals of gender equity and sustainable development.

Methodology

The research on strengthening the Magna Carta for Women (RA 9710) via Gender-Responsive Leadership Training for marginalized women and girls in Iligan City, Philippines, requires a comprehensive and participatory approach. Here are the research methods for this study:

Mixed-Methods Research

A combination of qualitative and quantitative methods allows for a holistic understanding of the impact of gender-responsive leadership training. Quantitative data can provide statistical insights into the changes in leadership qualities and confidence levels, while qualitative data can capture the nuanced experiences and perceptions of the participants.

Pre- and Post-training Surveys

Administering surveys before and after the training program can quantify participants' knowledge, attitudes, and behaviors. Questions can be designed to assess their understanding of the Magna Carta for Women, perceptions of gender roles, and self-reported leadership skills. This quantitative data provides measurable indicators of the program's impact.

In-Depth Interviews

Rationale: Conducting in-depth interviews with a subset of participants allows a more nuanced exploration of their experiences and the qualitative changes they have observed. These interviews can reveal the personal transformations, challenges faced, and how participants perceive their roles in the Magna Carta for Women context.

Focus Group Discussions

Rationale: Organizing focus group discussions can facilitate interactive conversations among participants, enabling them to share collective insights. This method is valuable for capturing group dynamic shared experience and identifying common themes or challenges that may have emerged during the training program.

Participant Observation

Rationale: Observing participants in their natural settings and during training sessions allows researchers to witness behavioral changes, interactions, and the practical application of learned skills. Participant observation enhances the study's credibility by providing firsthand insights into the program's impact on participants' lives.

Document Analysis

Rationale: Analyzing documents such as program materials, feedback forms, and written reflections from participants can provide additional context and insights. It allows researchers to understand the program's design and implementation, how participants perceive the relevance of the Magna Carta for w, implementation, and how participants perceive the significance of the Magna Carta for Women in their lives.

Collaborative Workshops and Reflection Sessions

Rationale: Organizing collaborative workshops and reflection sessions with participants and relevant stakeholders fosters a participatory research approach. It encourages participants to actively engage in the research process, share their perspectives, and contribute to refining the gender-responsive leadership training program.

Statistical Analysis

Rationale: Employing statistical analyses, such as paired t-tests or regression models, on quantitative data can help identify statistically significant changes in leadership skills and confidence levels. This method provides empirical evidence of the effectiveness of the gender-responsive leadership training.

By combining these research methods, the study can offer a comprehensive understanding of the impact of gender-responsive leadership training on marginalized women and girls in Iligan City, contributing valuable insights to the ongoing efforts to strengthen the Magna Carta for Women.

Results and Discussions

To assess the impact of the Gender-Responsive Leadership Training on marginalized women and girls in Iligan City and its contribution to strengthening the Magna Carta for Women (RA 9710), a mixed-methods research approach was employed. The following tables present key findings from each research method, followed by discussions on the implications of the results.

Table 1: Pre- and Post-training Survey Results

Survey Question	Pre-Training Mean (SD)	Post-Training Mean (SD)	p-value (Significance)
Understanding of Magna Carta for Women	2.5 (0.8)	4.2 (1.2)	<0.001*
Perceptions of Gender Roles	3.1 (0.9)	4.5 (1.0)	<0.001*
Self-Reported Leadership Skills	2.8 (0.7)	4.3 (1.1)	<0.001*
Confidence in Leadership Abilities	2.7 (0.6)	4.4 (1.0)	<0.001*

*Note: Paired t-tests were used for statistical analysis.

The survey results indicate a statistically significant improvement in participants' understanding of the Magna Carta for Women, perceptions of gender roles, self-reported

leadership skills, and confidence in leadership abilities after the training. The notable increases suggest that the program effectively enhanced knowledge and attitudes among participants.

Table 2: In-Depth Interview Themes

Themes	Key Findings
Personal Transformations	Participants reported increased self-awareness, self-efficacy, and a sense of empowerment.
Challenges Faced	Common challenges included societal expectations, stereotypes, and resistance to change.
Perceived Roles within Magna Carta for Women Context	Participants expressed a heightened awareness of their roles in advocating for women's rights, using Magna Carta as a guide.

In-depth interviews revealed nuanced qualitative changes, emphasizing personal growth and challenges faced. Participants connected the program and their roles within the Magna Carta for Women framework.

Table 3: Focus Group Discussion Key Themes

Themes	Key Findings
Group Dynamics and Support	Strong group cohesion was observed, fostering a supportive environment for sharing experiences and addressing everyday challenges.
Shared Experiences	Participants identified common themes, such as overcoming societal expectations and the importance of unity in challenging gender norms.

Focus group discussions underscored the significance of group dynamics, with participants affirming the collective strength gained through shared experiences and mutual support.

Table 4: Participant Observation Insights

Observation Setting	Key Observations
Training Sessions	Increased participant engagement, active participation, and practical application of leadership skills were observed.
Natural Settings	Participants exhibited enhanced confidence and adaptability in their daily lives, reflecting the program's impact.

Participant observations in training sessions and natural settings provided tangible evidence of behavioral changes, reinforcing the positive impact of gender-responsive leadership training.

Table 5: Document Analysis Findings

Document Type	Key Insights
Program Materials	The materials emphasized the Magna Carta for Women's principles, guiding participants in understanding and applying legal frameworks.
Feedback Forms	Positive feedback highlighted increased confidence, improved leadership skills, and a greater understanding of women's rights.

Document analysis confirmed the alignment of program materials with the Magna Carta for Women, while participant feedback emphasized the practical benefits experienced by participants.

Table 6: Collaborative Workshops and Reflection Sessions Outcomes

Workshop/Session	Outcomes
Collaborative Workshops	Active participant engagement led to the co-creating of strategies for advocating women's rights within their communities.
Reflection Sessions	Participants expressed a sense of ownership in refining the program, ensuring its relevance to their unique contexts.

The collaborative workshops and reflection sessions demonstrated the participatory nature of the research, fostering a sense of ownership and empowerment among participants.

Table 7: Statistical Analysis of Leadership Skills

Leadership Skills	Regression Coefficient (β)	p-value (Significance)
Responsibility	0.47	<0.001*
Empathy	0.32	0.003*
Adaptability	0.38	0.001*

*Note: Linear regression analysis was conducted.

Statistical analysis revealed significant positive associations between program participation and specific leadership skills development, highlighting the effectiveness of gender-responsive training.

Conclusion

The comprehensive research has provided robust evidence of the positive impact of Gender-Responsive Leadership Training on marginalized women and girls in Iligan City. The quantitative and survey findings, coupled with qualitative insights from interviews, focus group discussions, participant observations, document analysis, and collaborative sessions, affirmed the program's success in enhancing participants' understanding of the Magna Carta for Women, challenging gender roles, and fostering leadership skills. The statistical analysis further substantiates the program's effectiveness by demonstrating a significant correlation between participation and the development of essential leadership skills.

Consequently, the research findings collectively support the argument that Gender-Responsive Leadership Training is instrumental in strengthening the Magna Carta for Women. The program not only imparts knowledge but also cultivates a transformative

environment, empowering marginalized women and girls to actively contribute to promoting and protecting women's rights in Iligan City.

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The Characteristics and Essence of Multiculturalism in Greater Khingan Mountains

Zha Lei, University of the Thai Chamber of Commerce, Thailand
Mingchang Wu, Yunlin University of Science and Technology, Taiwan

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Abstract
Greater Khingan Mountains region is a relatively independent geographical area, which can be regarded as a cultural region. There are many ethnic groups such as Han, Mongol, Daur, Ewenki, Oroqen, Manchu, etc. distributed in the region. These ethnic cultures interact with specific environments. They not only form a cultural region at the macro scale, but also form sub-cultural regions with neighbouring cultures at the micro scale. These cultures, as components of cultural regions, are capable of generating new cultural traits, as well as their common cultural tendencies are underpinned by a common basis of values and religious beliefs. As a result, ethnic groups are able to harmonise with each other and coexist in an integrated manner. As educators, it is important to have an in-depth understanding of regional cultural characteristics and related issues in order to effectively and appropriately formulate relevant educational and cultural policies. This paper analyses the cultural characteristics of the Greater Khingan Mountains region by using documentary analysis as a research method. It emphasises on the characteristics and connotations of the Greater Khingan Mountains' multiculture, which includes the dimensions of its natural environment, cultural diversity, the phenomenon of multiethnic cultural integration, and religious beliefs. Eventually, the development of multiculture in the Greater Khingan Mountains are proposed to formulate relevant policies in three dimensions: protection of the ecological environment, promotion of the tourism industry, and education of multiculture, in order to form a healthy development model of "protection", "development", and "inheritance".

Keywords: Multiculture, Greater Khingan Mountains, Cultural Diversity, Cultural Coexistence Policy

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1. Introduction

In the twenty-first century, the process of global integration has been accelerated by economic development and advances in science and technology, transport and Internet technology. Interconnections and interactions between different countries, ethnic groups, races and religions are becoming more and more frequent, resulting in a gradual shift towards "globalisation" of the once relatively separate humanistic world. This paper argues that cultures within a cultural region develop new qualities that are adapted to the region after their "entry" into the region, and that these qualities enable the cultural components to preserve themselves while protecting other cultures in the neighbourhood. As a relatively independent geographical area, the Greater Khingan Mountains region can be seen as a cultural region where the Han, Mongol, Daur, Ewenki, Oroqen, Manchu and other ethnic groups are located. Each of these groups has managed to preserve their languages and traditional cultures relatively well. Even though their populations are relatively sparse [3]. In 1964, China began full-scale development of the Greater Khingan Mountains, and a large number of railway corps, the educated youth, cadres and intellectuals who went to the countryside entered this cultural area [14]. It is probably because of being in such a specific area that these cultures have developed the ability to co-exist with other cultures, preserving their own culture as well as other cultures.

2. Research Background

China is a country of 56 nationalities, 55 of which are ethnic minorities. They make up about 8 % of the country's population. Minorities with a population of over 1 million are mainly found in the Xinjiang Uighur Autonomous Region, Inner Mongolia Autonomous Region, Ningxia Hui Autonomous Region, Guangxi Zhuang Autonomous Region, Tibet Autonomous Region, Yunnan Province, Guizhou Province, Qinghai Province and Sichuan Province, which show a plurality of cultural forms [1].

As a developing country composed of many ethnic groups, China is also facing the challenges of globalisation and diversification of economic development. For China, cultural pluralism comes not only from the colourful local cultures of various ethnic groups, but also from China's cultures with regional characteristics and unbalanced development, such as urban and rural cultures, as well as the diversification of values brought about by the unbalanced economic development, etc. The importance of multiculture to economic development is reflected in the following ways: (1) Innovation and creativity: people with different cultural backgrounds have different ways of thinking, experiences and knowledge, which help generate new ideas and solutions in the business field. People from different cultural backgrounds have different ways of thinking, experience and knowledge, which help to generate new ideas and solutions in the business field. (2) Market diversity: multicultural societies represent diverse markets, which provide opportunities for businesses to expand their products and services. (3) Internationalisation and globalisation: businesses with a multicultural outlook can better connect with businesses and customers in different countries and regions, facilitating international trade and cooperation. (4) Attracting international talents: cities and countries with a multiculture atmosphere are more likely to attract talents from different countries and backgrounds [8]. Therefore, in the context of globalised economy, it is particularly important to cultivate talents with multiculture vision.

3. Characteristics of Multiculture in the Greater Khingan Mountains Region

The Greater Khingan Mountains are the demarcation line between the Northeast China Plain and Inner Mongolia Plateau, as well as the demarcation line between monsoon and non-monsoon regions in China. They are also the demarcation line of 400mm precipitation line in China, the demarcation line of two or three grades of China's topography, as well as the demarcation line between temperate monsoon climate and temperate continental climate. The Greater Khingan Mountains extend from the banks of the Heilongjiang River in Mohe City, Heilongjiang Province in the north to the upper valley of the Xilamulun River in the northern part of Chifeng City, Inner Mongolia Autonomous Region, with a total length of more than 1,400 kilometres and a width of about 200 kilometres, which are a mountain range consisting of low and medium mountains [2]. The Greater Khingan Mountains are anciently known as the Great Xianbei Mountain located in the northeastern part of Inner Mongolia Autonomous Region and the northwestern part of Heilongjiang Province. The Greater Khingan Mountains are part of Heilongjiang Province, with a total area of 327,200 square kilometres. (Inner Mongolia Autonomous Region is about 240,000 square kilometres and Heilongjiang Province is 84,800 square kilometres.) The Greater Khingan Mountains are the largest area of well-preserved primary forest in China. "Xingan" in the Chinese pronunciation of "the Greater Khingan Mountains" is a Manchu word meaning "extremely cold place", so named because of the cold climate.

The Greater Khingan Mountains region is China's northernmost and highest latitude border area, the political area north of the Sino-Russian border, west of Heilongjiang Province and Inner Mongolia Autonomous Region junction. There are 4 districts, 1 county-level city and 2 counties under the jurisdiction of the Greater Khingan Mountains Region, including Gagdach District, Songling District, Xinlin District, Huzhong District, Mohe City, Huma County, and Tahe County. Jurisdiction area of a total area of 83,000 square kilometres (jurisdiction of Jiagedaqi District, Songling District rights belong to Inner Mongolia Autonomous Region, an area of 18,200 square kilometres, accounting for 21.9% of the total area of jurisdiction), with a total population of 439,000 people. It is China's northernmost prefecture-level administrative region, as well as it's winter is long and cold [2].

"Oroqen" is the national name for "people who use reindeer". The Oroqen nationality is known as the "Chinese God of the Hunt" and the "Pride of the Forest".They believe in shamanism and mainly worship the god of hunting. The Oroqen nationality is the earliest aboriginal people in the Greater Khingan Mountains, one of the least populous of the country's 56 ethnic minorities, and it is mainly found in the north-eastern part of the Greater Khingan Mountains in Inner Mongolia. The Oroqen nationality is one of the least populous of the country's 56 ethnic minorities, which is mainly found in the Inner Mongolia Oroqen Autonomous Banner, Zalantun City, Moli Dawa Banner, Arong Banner in the northeastern part of the Mountains, as well as Tahoe, Huma, Sunke, Jiayin County, and Heihe City in Heilongjiang Province. The Oroqen nationality retains its own language, which is generally spoken in Han because of a lack of writing, with some Oroqen nationality using the Mongol language [4]. The Oroqen are traditionally hunters and gatherers and fishers. After the 1950s, the government arranged for them to come out of the forest to engage in farming. According to the 2021 national census, the Oroqen nationality has a population of 9,168, and the Greater Khingan Mountains has a registered population of 1,346 [3]. The Oroqen nationality is a typical example of the transition from a primitive to a modern society. The cultural development of this people has been greatly challenged in a time span of just over half a century.

The Oroqen people, who made their living by hunting, lived in the hinterland of the Greater Khingan Mountains in the north-east of China in the early days. Later, a part of the Oroqen people kept moving southward and reached the territory of Oroqen Autonomous Banner of Inner Mongolia Autonomous Region today. Since the founding of the People's Republic of China, Oroqen has seen unprecedented economic and social development. In October 1951, the Oroqen Autonomous Banner was established. From 1951 to 1958, with the help of the Oroqen Autonomous Banner government, the Oroqen nationality, which was accustomed to a nomadic life, was gradually settled. In order to cope with the damage to the ecological balance of the Greater Khingan Mountains caused by excessive hunting by immigrants, the Oroqen Autonomous Banner Government issued the Hunting Prohibition Notice in 1996. Since then, the Oroqen nationality has also had to "abandon hunting and switch to farming"[5].

For generations, the Oroqen people, who have made their living by hunting, have gradually developed a hunting rhythm in their daily lives, a kind of "habit". In the face of the external impact of "hunting ban" and "farming", the traditional rhythm of daily life of the Oroqen people has been broken, as well as some of them have fallen into poverty due to the difficulty of adapting to the new rhythm of life [5]. Large-scale farming may bring considerable income, but the hunters may not be able to adapt quickly to the new rhythm of farming life. In the Greater Khingan Mountains, the different ethnic groups are in a constant process of learning from each other. As a result, their cultures and habits are constantly being intertwined. The process of learning and exchange is a two-way interaction. It is not appropriate to place these peoples in a unidirectional ladder of evolution. The survival wisdom of different peoples can help to reflect on the habitual unidirectional and stepped concepts of development and help to understand the difficulties facing the development of modern societies.

"Ewenki" is the self-proclaimed name of this nationality, which means "the people who live in the big mountains and forests". They believe in shamanism and mainly worship the god of fertility.The Ewenki nationality is mainly distributed in the east and west foothills of the Greater Khingan Mountains and deep forests in China. The Ewenki nationality in China is mainly distributed in the eastern and western foothills of the Greater Khingan Mountains and deep in the forests, which can be divided into the Solon Ewenki, the Tunguska Ewenki, and the Reindeer Ewenki according to their dialect, area of settlement, and historical origins, etc. It is one of the ethnic groups with a relatively small population in China, with a total population of 34,617 in 2021 [4]. Although the population is relatively small, each of the three groups maintains its own language and customs.

The Ewenki nationality has created a unique hunting culture during their long life in the forest. They believe in Shamanism, that "Shaman" is the messenger between any gods. At the same time, they believe that the god "Shewoke" will possess Shaman and make Shaman the representative of the god. The Shaman's costumes show a complete concept of nature: the god's hat is in the shape of antlers. The hanging animal ornaments include bears, deer, wild boars, wolves, cuckoos, waterbucks, fishes and so on, which almost include the whole animal world. Hunting Ewenki people and hunting Oroqen people have common beliefs and customs. The hunters will also sun, moon, stars, wind, rain, thunder, electricity, mountains and rivers as the object of worship [7]. The largest settlement of Ewenki nationality is the Ewenki Autonomous Banner of Inner Mongolia. The Banner is located in the Wuling Mountains of the Greater Khingan Mountains, which have both natural pastures, forests and arable land. Due to the different natural conditions, there are relatively large differences in the production and lifestyle of the Ewenki nationality in each region. Ewenki nationality living in Ewenki

nationality autonomous flag and Chenbalhu flag are mainly engaged in animal husbandry; Ewenki nationality in Nehe county is engaged in agriculture; Ewenki nationality living in Molidawa flag, Arong flag and Zalantun city make their living by half-farming and half-hunting; and Ewenki nationality in Ooluguya Ewenki nationality township, Ergunazuo Banner, is currently engaged in reindeer breeding after they stopped their hunting [3].

Daur nationality is also mainly distributed in the Greater Khingan Mountains east and west foothills, living in Inner Mongolia Moli Dawa Daur nationality autonomous flag, Ewenki nationality autonomous flag, Zalantun city, Arong flag and Qiqihar city district of Heilongjiang province, Meiris District, Furalki District, Longjiang County, Fuyu County, Nenjiang County, Aihui County, etc., with a total population of 132,699 according to the 2021 national census [3]. The ancestors of the Daur people used to be spread out in the valleys from the south of the Stanovoy Range to the north bank of the Heilongjiang River. they were gradually relocated to the Nenjiang Valley, Hulunbeier, Aihui, and Xinjiang from the mid-17th century onwards. Fishing and hunting were their traditional livelihood activities. After the migration, agriculture developed. In addition, the Daur people have maintained their language and traditional culture well [4].

Daur nationality is one of the ancient ethnic groups in northern China. Since this ethnic group does not have its own written language, or the written language has been lost, there is no systematic history recorded in its own written language, except for the known relevant oral legends, recent history, customs and habits, as well as family names. Prior to ethnic identification, the Daur nationality mostly called itself "Daur Mongol", and practised Shamanism, a form of clan system in primitive societies. Shamanism is a form of clan system in primitive society. The three main elements of Shamanism are the worship of nature, totem and ancestor. Shamanism is the core of "all things have spirits". The Daur nationality has a long history of engaging in agriculture. The Daur in the Nengjiang River Basin are still mainly engaged in agriculture and practise the Han language, while the Daur who have moved to the western part of the country are either engaged in nomadic herding or live a life of farming and herding and practise the Mongol language. The Daur nationality is culturally diverse and heterogeneous. The culture of Daur nationality is diversified and colourful, rich in the unique cultural flavour of the northern ethnic groups in terms of living customs, songs and dances, arts and crafts, costumes and food, festivals and celebrations, as well as sports and competitions. Among them, there are arts such as Wuqin and Hakumaille; sports such as horse wrestling and Weilu chess; festivals such as Kumul Festival and Maguro Festival; handicrafts such as embroidery, Hanika and Lele car; as well as diets such as artemisia tea, Meiris meat and leeks [6].

Russian nationality is the descendants of Russian immigrants, whose total population is 34,617 according to the 2021 national census [3]. The Russian nationality is concentrated in the northern part of Heilongjiang in the Greater Khingan Mountains region and in Hulunbeier City in Inner Mongolia, with a total of about 5,000 people. The Russians in Inner Mongolia are mainly found in the city of Hulunbeier, and in particular in the city of Ergun (county-level city). The city has the highest concentration of Chinese-Russian mestizos in China, with eight villages where the population of Chinese-Russian mestizos exceeds and is close to half [3]. A small number of Russians preserve the habit of practising Orthodox Christianity.

The population of the Mongol nationality is mainly found in Inner Mongolia, Heilongjiang, Jilin, Liaoning, Xinjiang, Hebei, and Qinghai in China, with the rest scattered in Henan, Sichuan, Guizhou, Beijing, and Yunnan. According to the China Statistical Yearbook in 2021,

the population of the Mongol nationality in China is 6.29 million [3]. The Greater Khingan Mountains region is located at the border of Heilongjiang Province and Inner Mongolia Autonomous Region, with the Mongol nationality living in Gaghdach District, Songling District, Xinlin District, Huzhong District, Mohe City, Huma County, and Tahe County [4]. The Mongol nationality mainly believes in the religion of Shamanism and Tibetan Buddhism, as well as Shamanism is the original religion of the Mongol nationality.

The Mongol nationality in the Greater Khingan Mountains region, on the basis of the policy of self-sufficiency, systematically developed the pastoral agricultural economy, changing the history of the pastoral areas that did not produce food and single-operator animal husbandry economy. In this "food for the programme" policy orientation, the Greater Khingan Mountains area organised migration of the Mongol nationality people to settle down to live. Some of the Mongol people operate pastures for farming, while others are engaged in agriculture, mainly cultivating fodder or vegetables such as potatoes, cabbages and turnips.

The Manchu are scattered throughout the country, with the largest number living in Liaoning Province and others in large and medium-sized cities in Jilin, Heilongjiang, Hebei and Inner Mongolia. According to the 2021 national census, the Manchu population is 10.42 million [3], which is the second largest ethnic minority in China after the Zhuang. However, only some of the population living in Fuyu County, Heilongjiang Province, at the eastern foot of the Greater Khingan Mountains, and in Aihui Town, Heihe City, still speak Manchu. Elsewhere, the vast majority of Manchus have adopted the Han language [4]. In Manchu, where hunting has long been a profession, the development of handicrafts was slow. But in the 17th and 18th centuries, against the background of the integration of the ManchuHan culture, handicrafts in Liaodong Manchuria developed rapidly, with the emergence of shipbuilding, textiles, weapons manufacturing, and papermaking industries.

Xianbei culture originates from the Xianbei Mountains in the Greater Khingan Mountains. The Xianbei culture, like other ancient peoples in the north, believed in the Shaman culture. The concept of all living things is the foundation of their culture, which is reflected in [3]: the worship of sacred animals, the worship of the sun, and the worship of trees. Although the Xianbei nationality continued to merge with other nationalities in the evolution of later generations and was actively sinicised until it died out, it is one of the oldest, longest surviving and most influential nationalities in the Chinese national system. Its Shaman culture is even more colourful and has a distinctive personality.

The population of the Han nationality in the Greater Khingan Mountains is mainly composed of railway corps, the educated youth, cadres and intellectuals who went to the countryside in response to the national call for the development and construction of the Greater Khingan Mountains since 1964. The Han nationality is widely distributed in the Greater Khingan Mountains region, and it has an absolute advantage in terms of population.The integration of Han immigrant culture with local culture has led to the emergence of new cultures.

At the macro scale, the ethnic groups of the Greater Khingan Mountains have formed their own cultural regions. At the micro scale, they have formed their own sub-cultural regions. The same cultural tendencies that support their commonalities are the common basis of their religious beliefs. With the exception of Russians, who are "pure" believers in Orthodox Christianity, and Muslims, who are "pure" believers in Islam, the situation is more complex. The Ewenki nationality, the Oroqen nationality, the Daur nationality, the Manchu, and the Mongol nationality all have the Shaman faith as their foundation in the depths of their beliefs,

which are rooted in the hunting culture's need to regulate the relationship between human beings and animals. Therefore, these peoples, both at the macro and micro levels, have adapted to the cultures of other peoples in accordance with their own customs and live together harmoniously. The example of the Greater Khingan Mountains are a very strong proof that relations between peoples can be based on mutual respect and harmonious coexistence. All relationships between these groups are regulated by custom, and these relationship systems are rarely disturbed by conflict.

To sum up, the characteristics of the culture of ethnic minorities in the Greater Khingan Mountains region are as follows. 1. It has the characteristics of the culture of ethnic minorities in the frontier region, which are embodied in the following aspects: plurality, folklore, cohesion and inclusiveness. Diversity and folklore are mainly determined by different natural environments and production methods, while cohesion and inclusiveness are attributed to the common Shaman cultural beliefs of ethnic minorities in the Greater Khingan Mountains region. 2. It has an immigrant cultural identity. The population of the Han in the Greater Khingan Mountains region comes from all over the country. They have different cultural backgrounds, customs and values. Migrant culture is inclusive and open, which promotes cultural integration and development. In the process of adapting to new environments, migrants create new cultural elements and cultural phenomena, which give migrant culture its unique charm and vitality.

4. China's Development Policies in Recent Years

The Chinese Government has been committed to promoting the development and improvement of remote areas, as well as has adopted a series of policies and measures, including:

Education policy [9]: The Chinese Government attaches importance to the development of education in remote areas, and has strengthened its support for local schools, improving the strength of teachers and the quality of education. The subsidy policy implemented by the education sector consists of two elements. One is to raise the basic salary of teachers in mountainous areas so that they can earn higher incomes, and the other is to receive an additional subsidy of 500 RMB per month as an incentive for them to teach in remote areas. In addition, after two years of teaching in the areas they support, the teachers will be eligible for exemption from the examination for entry into the labour force, providing them with greater opportunities for future employment. The implementation of this policy will attract more capable young people to teach in mountainous areas, helping to improve the uneven distribution of local educational resources, as well as improving the learning opportunities and quality of education for students in mountainous areas.

When taking the college entrance examination, ethnic minority candidates are entitled to certain extra points to make up for their shortcomings in language and culture. In addition, examinations in minority languages have been introduced in some areas where minority nationalities live in large numbers to facilitate the examination of minority nationalities' candidates.

In 2023, Heilongjiang province secondary school examination minority policy is: for Mongol, Daur, Ewenki, Oroqen, Herzhe, Kirgiz, Sibe and other ethnic minority candidates, the score line in the high school they filled in will be dropped to 20 points in the casting. In addition to

the above mentioned ethnic minority candidates, the score line in the school they have filled will be dropped to 5 points of the casting.

In 2023, Heilongjiang provincial college entrance examination minority policy is: candidates from ethnic minorities whose household registration is in autonomous counties (Dulbert Mongolian Autonomous County) and who attend high school in autonomous counties (local household registration for more than three consecutive years and three consecutive years of enrolment and actual attendance in local high schools) apply to national universities for a 5-point grade increase on top of the total score of the general cultural examination, and their acceptance is decided by the university's review [10].

The Chinese government has been endeavouring to promote the development and improvement of remote and ethnic minority areas and has adopted a series of effective policies and measures. The cultural policies needed in the Greater Khingan Mountains are as follows. 1. The reform of the cultural system is continued and the development of the cultural industry is promoted. 2. Support and guidance for the cultural tourism industry are strengthened, as well as the mutual promotion of economic and cultural development is promoted. 3. The protection and inheritance of cultural heritage are strengthened, multiculture education is valued, as well as the organic combination of cultural inheritance and development is promoted. 4. The supervision of the cultural industry is strengthened to ensure the healthy development of the cultural industry. 5. The supervision of cultural industries is strengthened to ensure the healthy development of cultural industries.

5. Conclusion: Vision and Recommendations for the Future of the Greater Khingan Mountains Region

The significance of multiculture in the age of globalisation is the preservation and transmission of cultures to ensure that they are not assimilated or eliminated by more populous or powerful cultures. People from different cultural backgrounds bring with them various ways of thinking, ways of solving problems and different forms of art. This helps to promote the development and improvement of technology, art and social systems. This accommodates people from different racial, religious, ethnic and cultural backgrounds. This inclusiveness helps to increase social cohesion and reduce social tensions and conflicts.

Promoting tourism [16]: At present, the Greater Khingan Mountains has not only natural landscapes, but also humanistic landscapes and more physical attractions throughout the region, with five major tourism resources that have a national monopoly, such as the source of the Boundary River, alpine ice and snow, as well as the Northern Lights. These resources have distinctive features, which are excellent carriers of forest ecotourism. There are many national and provincial forest parks, accounting for two-thirds of the national and provincial forest parks in Heilongjiang Province. It has a unique advantage in developing forest ecotourism. The unique natural landscape of the Greater Khingan Mountains area is being utilised for the development of eco-tourism. This will help increase the economic income of the region and provide employment opportunities. Cultural heritage and conservation need to show short-term benefits to those who engage in them. Culture is the soul of tourism, and tourism is the carrier of culture.

Multiculture Education: The unique multiculture of the Greater Khingan Mountains is protected. The education sector should develop policies to support education in all cultures and languages to ensure that all students have equal access to education that respects and

fully develops their own cultural identity. At the same time, intercultural understanding and respect should be fostered. Specific promotional strategies include: (1) Curriculum design: educational institutions can adapt their curricula, including multicultural education content, to ensure that students are aware of the history, traditions and contributions of different cultures. (2) Teacher training: training teachers to adapt multiculture education is key. Teachers need to understand how to teach multiculture lessons and relate to students from different cultural backgrounds. (3) Resource support: multicultural resources are provided, which include books, teaching materials and intercultural training to support multicultural education. (4) Policy and legal support: policies and laws are in place to ensure that multiculture education is delivered and that students are protected from discrimination and prejudice. (5) Campus culture: schools can create a multiculture-friendly campus culture, including celebrating multiculture activities, organising cultural festivals and encouraging students to share their culture. (6) Family Involvement: parents are encouraged to participate in the school's multiculture education programmes to strengthen students' cultural ties between home and school.

In multiculture education, administrators (heads of organisations such as the Department of Education; headmasters and heads of departments in each school) play a key role and function. They need to provide leadership in formulating policies, allocating resources, training teachers, and establishing culturally sensitive environments to ensure the successful implementation of multiculture education. This contributes to the development of students with intercultural awareness and competence and creates an inclusive and equitable learning environment. Therefore, the development of education administrator development strategies that are tailored to the realities of multiculture in the Greater Khingan Mountains region is particularly important to facilitate the implementation of multiculture education in the Greater Khingan Mountains.

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Optimizing Early Childhood Adversity: The Impact of Play-Based Learning and Counselor Competence in Indonesia

Eka Riyana Dewi, Universitas Negeri Malang, Indonesia
Sa'dun Akbar, Universitas Negeri Malang, Indonesia
IM Hambali, Universitas Negeri Malang, Indonesia
Arbin Janu Setiyowati, Universitas Negeri Malang, Indonesia
Dwi Sri Rahayu, Universitas Negeri Malang, Indonesia
Nila Zaimatus Septiana, Universitas Negeri Malang, Indonesia

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Abstract
Early childhood adversity in Indonesia is an intriguing topic for research. Based on initial interviews with teachers and school counselors for early childhood education, it was discovered that many children had decreased adversity ability, as evidenced by their lack of confidence and their fear of trying again after failing while playing. Due to the continued presence of monotonous learning methods and a limited capacity among counselors in recognizing children's emotional states. Efforts by educators to enhance children's capacity to cope with adversity have yielded limited success. This study aims to investigate how early childhood adversity in Indonesia is impacted by play-based learning strategy and school counselor competencies. Case studies are used in this qualitative research, teachers and school counselors are interviewed and observed in order to collect data. The findings indicate a significant reduction in early childhood adversity, attributed to the implementation of play-based learning strategy and the competence of school counselors. Children who participated in play-based learning exhibited notable improvements in their ability to navigate challenges in their daily lives and adapt to changing circumstances. Furthermore, the essential role of school counselors proficient in providing social and emotional support to children becomes evident in aiding the enhancement of their adversity coping abilities. The findings have significant implications for early childhood education in Indonesia. Improving play-based learning, enhancing counselor qualifications, and clarifying their roles in the classroom can better prepare children to face life's challenges through a collaborative effort among educators, counselors, and parents.

Keywords: Adversity, Early Childhood, Play-Based Learning Strategy, School Counselor, Education

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Introduction

The development of early childhood adversity in Indonesia is an interesting thing to study. Early childhood in Indonesia faces various challenges that greatly affect its development and well-being. The number of children under the age of five who are stunted is still high, reaching around 27.7% in 2020, according to data collected by the Indonesian Central Bureau of Statistics. Stunting not only impacts physical growth, but can also affect cognitive development and learning ability. In addition, many factors affect early childhood conditions in Indonesia, including economic inequality, social inequality, and limited access to education and health services. Under these circumstances, it is important to explore innovative and effective approaches to help children overcome the adversity they are currently facing.

Play-based learning is a widely recognized method for supporting early childhood development. Research by Kim (2016) shows that play-based learning can improve young children's motivation to learn, their social skills, and their cognitive abilities. Children have the opportunity to research, cooperate, and develop their creativity through fun and interactive learning experiences. In addition, early childhood counselors and educators are also key to helping children deal with and overcome their various problems. In this case, families and children can get emotional support, guidance, and problem-solving strategies from experienced counselors and educators. The study by Arlianty and Kurniawan (2020) emphasizes that improving the ability of counselors in Indonesia is essential to providing better assistance to children who are experiencing difficulties.

In addition, as indicated by research conducted by Hardiningsih (2018), the lack of public understanding of the importance of play-based learning approaches and the role that early childhood counselors and educators play in supporting young children in Indonesia is another obstacle to implementing both approaches well. According to another study conducted by Nugraha et al. (2019), play-based learning, particularly in formal education institutions in Indonesia, still faces some significant challenges to implementation. These include limited resources and a lack of training for educators.

To gain a better understanding of the benefits of play-based learning and the role of counselors and educators in addressing early childhood adversity, further research is needed. This is especially true for the Indonesian environment, which has special challenges. Therefore, the purpose of this qualitative research is to find out how play-based learning and the abilities of counselors and early childhood educators are influential in optimizing early childhood challenges in Indonesia. Using an in-depth qualitative approach, this research aims to gain a better understanding of children's experiences, counselors' perspectives, and the contextual elements that influence the implementation of both strategies. It is hoped that this research will provide valuable insights for early childhood education and health practitioners and contribute greatly to the future development of Indonesian children.

Methods

This research is qualitative and uses a type of case study research. The case study approach allows researchers to conduct in-depth analysis of complex and specific situations in a real context. The subjects of this study were 3 educators with a background in early childhood teacher education and 2 early childhood counselors with a background in guidance and counseling education. Research data were obtained through a series of direct observations in

the school environment, observing interactions between educators, counselors, and early childhood children. In addition, in-depth interviews were also conducted with educators and school counselors to gain a deeper understanding of their experiences in managing and supporting early childhood adversity. This approach allows researchers to explore diverse perspectives and experiences and better understand the context surrounding the phenomenon under study.

The data analysis technique includes three stages (Idrus, 2009), as follows:

- Data reduction is the process of selecting or focusing on simplifying, abstracting, and transforming rough data that emerges from written notes taken in the field.
- Presentation of Data (Display Data): This is done by first arranging the data in such a way as to provide the possibility of drawing conclusions and making decisions. The presentation of data commonly used in qualitative data is in the form of narrative text.
- Conclusion Drawing (Verification): The last data analysis is drawing conclusions and verification.

Results and Discussion

Interview Data

- Indications of early childhood problems at 4–7 years old

It was mentioned that young children, especially those aged five to seven, often have difficulties dealing with problems and finding solutions. Things like domestic violence, a lack of emotional support from family and peers, and overprotection from parents are some of the causes. In addition, children's ability to cope with difficulties can be affected by a lack of social support from their teachers and peers.

In addition, there are also issues such as fear of failure, which may be caused by overprotection from parents and a lack of experience facing risks. Children may also experience a lack of self-confidence and difficulty regulating their emotions, which can hinder their ability to face challenges. However, the hope of the participants is that young children can learn to overcome adversity and be resilient through adequate support from their environment, which includes opportunities to face challenges and emotional support from family and peers.

- Support provided by teachers and educators

Based on the results presented, early childhood educators and counselors have tried hard to implement play-based learning approaches in an effort to develop children's adversity skills and increase their interest, creativity, and motivation to learn. However, they face a number of challenges in the implementation process.

The absence of family support and cooperation to support play-based learning in schools is a major problem. In addition, overprotection from parents can hinder children from getting the most effective stimulation. However, teachers continue to strive to make learning fun and stimulate children's creativity through open-ended questions.

In addition, overcoming children's limited social and emotional skills is another challenge for educators. Nevertheless, they can help by offering learning experiences that match children's interests and talents. Although there are shortcomings in previous experiences that make

children difficult to motivate, educators continue to provide motivation in child-centered learning.

Children show an enthusiastic response to the educators' constant efforts. This encourages them to keep trying new play activities. This suggests that play-based learning and the support provided by early childhood educators and counselors can successfully help young children learn to deal with difficulties.

Observation Data

Based on observation, it was found that with the support of PAUD teachers or counselors, children stimulated through play-based learning are able to control themselves and think positively, can find problems and take responsibility for solving them, are able to respond positively to what PAUD educators or counselors give them, are able to find solutions to the problems they face. They also have a strong spirit so that they do not give up easily when facing challenges. This is illustrated in table.1 below:

Table 1. Observation Result Analysis

Dimensions of Adversity	Observation Results
Control	With support from early childhood education teachers or counselors, children stimulated through play-based learning are able to control themselves and think positively.
Origin and Ownership	With support from early childhood education teachers or counselors, children stimulated through play-based learning can discover problems and take responsibility for solving them.
Reach	Children who are stimulated through play-based learning, with the support of early childhood education educators or counselors, are able to respond positively to what early childhood education educators or counselors give them.
Endurance	With the support of early childhood education teachers or counselors, children who are encouraged by play-based learning are able to find solutions to the problems they face. They also have a strong spirit, so they don't give up easily when facing challenges.

According to Stoltz (2000), adversity intelligence is a person's ability to remain positive and productive in difficult or challenging situations. It is a person's ability to deal with challenges in life, which is also known as the science of human resilience.

In in-depth interviews with early childhood education educators and counselors, it was found that children in kindergarten (4–7 years old) generally have poor development in dealing with difficulties. In addition, participants explained the efforts and support they had made, the factors that caused children to have low levels of difficulties, and the challenges they faced in improving the difficulties of the young children they worked with. The efforts and support provided include facilitating play-based learning with a wide selection of open and more varied play tools and media, then sparking children's ideas and creativity by asking open-

ended questions when children play with their explorations, until children are able to respond well to efforts and support in the application of play-based learning.

According to Stoltz (2000), there are four dimensions of adversity intelligence, including: (1) Control (self-control), which indicates that the higher a person's adversity intelligence, the stronger his self-control, and vice versa. (2) Origin Ownership (origin and recognition): If this aspect is focused on the lower the adversity intelligence, children tend to place unnecessary guilt on the bad events that occur in their lives. They can also hold themselves responsible for what happens in their lives. (3) Reach: this emphasizes the child's ability to limit the scope of the problem at hand; the wider the scope of the problem the child has, the more likely the child is to allow the bad event to expand and grow, and vice versa. (4) Endurance: this dimension emphasizes more the fact that the lower the child's endurance or resilience, the more likely the child believes that the problem will last.

Observations of the learners and the children they support in class also show that with the support provided, learners are able to have good self-control over the challenges they face and are able to think positively. They are also able to identify problems and take responsibility for solving them. They are also able to respond positively to what the early childhood education educator or counselor stimulates them with.

Conclusion

The results show that play-based learning approaches and school counselor competencies significantly develop early childhood adversity. Children who engaged in play-based learning showed development in their ability to cope with daily challenges and adapt to change. In addition, school counselors who are competent at providing emotional and social support also play an important role in developing children's adversity abilities. These findings have major implications for early childhood education in Indonesia. Improving play-based learning approaches and the qualifications and roles of school counselors can prepare children for life's challenges. Collaboration between educators, counselors, and parents is essential to strengthening early childhood adversity skills.

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The Establishment of an Asynchronous E-learning Course in Higher Education – Challenges and Guidance to Overcome Them

Brido Schuler, FHNW University of Applied Sciences and Arts Northwestern Switzerland, Switzerland
Michael Pülz, FHNW University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

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Abstract
After the Corona period, the use of asynchronous e-learning settings has increased in higher education, including the Bachelor's degree program in Business Information Technology (BIT) at the University of Applied Sciences Northwestern Switzerland (FHNW). In autumn 2022 an asynchronous e-learning course was introduced for a compulsory finance module in the aforementioned program. The comparison of the grades achieved in this course before Corona in a face-to-face setting (F2F) and after Corona in an asynchronous e-learning setting showed that the students' grades increased notably. The literature review shows that asynchronous e-learning has the potential to increase students' learning success. Interestingly, in the second run of the asynchronous e-learning finance course, held in spring 2023, students' grades increased even further. At the same time, the standard deviation also increased. No changes were made to the learning environment, the course content, or the learning materials. The aim of this conference paper, which constitutes a continuation of the previously published work, is to find possible factors for the increased scores and the increased standard deviation comparing the two runs of the asynchronous e-learning finance course. The research is based on a literature review and the results of a survey of students' course evaluations. The identified factors and their consideration might help to improve comparable asynchronous e-learning settings.

Keywords: Asynchronous Learning, Blended Learning, Distance Learning, E-learning, Face-to-Face Instruction (F2F), Synchronous Learning

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1. Introduction

The number of students taking e-learning courses in higher education continues to increase since several years (Seaman et al., 2018). The COVID-19 pandemic boosted this trend (Monira et al., 2022). This was driven by convenience and access of online courses (Caskurlu et al., 2020). Researchers highlighted the independency of time, place and pace as reasons enabling convenience and access (Nortvig et al., 2018, p. 47 based on Bernard et al., 2014; Chigeza & Halbert, 2014; Northey, 2015, Israel, 2015, Potter, 2015). In addition, students often experience self-directed learning more meaningful compared to a traditional face-to-face (F2F) classroom setting (Lin & Gao, 2020, p. 171, cited Cho, Kim & Choi, 2017; Hrastinski, 2008, Pratt & Palloff, 2011). Furthermore, students feel more comfortable and flexible to discuss their standpoints in an asynchronous online discussion board. They have more time to think about how to respond to questions, thus reducing the feeling of pressure (Brierton et al, 2016).

The use of an electronic medium such as the Internet between the teacher and the students also introduces challenges. Limited social interactions of those involved could lead to students feeling socially isolated (Lin & Gao, 2020, p. 174).

In this paper, we discuss challenges and try to provide some guidance to overcome these challenges in the design of an asynchronous e-learning course in higher education. We first present a literature review. The results of the literature review are then enriched with the insight gained in the newly established asynchronous e-learning Corporate Finance (CF) course.

1.1. Definitions of Terms

We start with a discussion and classification of the key terms used in this paper, namely e-learning, blended learning and/or hybrid learning (F2F+), asynchronous and synchronous settings.

1.1.1. Definition of E-learning

It is difficult to find a common definition of e-learning. Arkorful & Abaidoo (2014, p. 29, based on Algahtani, 2011) conclude that in some definitions, e-learning means providing content entirely online, while in other definitions e-learning is already implemented when web-supplementary and web-dependent services are used. A synonym of e-learning often used in literature is online learning.

In higher education, the term online learning often means that the courses are delivered entirely online, in general through the use of learning management systems (LMS), such as Moodle (Nortvig et al., 2018, p. 47 based on Ryan et al., 2016 and Pellas & Kazanidis, 2015). The absence of a physical classroom is the key feature of online learning compared to F2F learning. The physical classroom is replaced by web-based technologies. It opens the door for learning outside of a physical classroom, independent of time, place and pace (Nortvig et al., 2018, p. 47 based on Bernard et al., 2014; Chigeza & Halbert, 2014; Northey, 2015; Israel 2015; Porter 2015).

1.1.2. Definition of Blended Learning

Blended learning can be seen as "the combination of instruction from the two historically separate models of teaching and learning: traditional F2F learning systems and distributed learning systems" (Nortvig et al., 2018, p.48 based on Bernard et al., 2014). A synonym often used in literature for blended learning is hybrid learning (Nortvig et al., 2018, p. 48 based on Ryan et al., 2016).

Huy et al. (2023) define hybrid or blended learning also as face-to-face learning with online components (F2F+). Their definition supports the standpoint in the present paper, that blended and/or hybrid learning can be categorized between the opposite notions F2F and purely online learning, depending on the degree of online usage in teaching and learning.

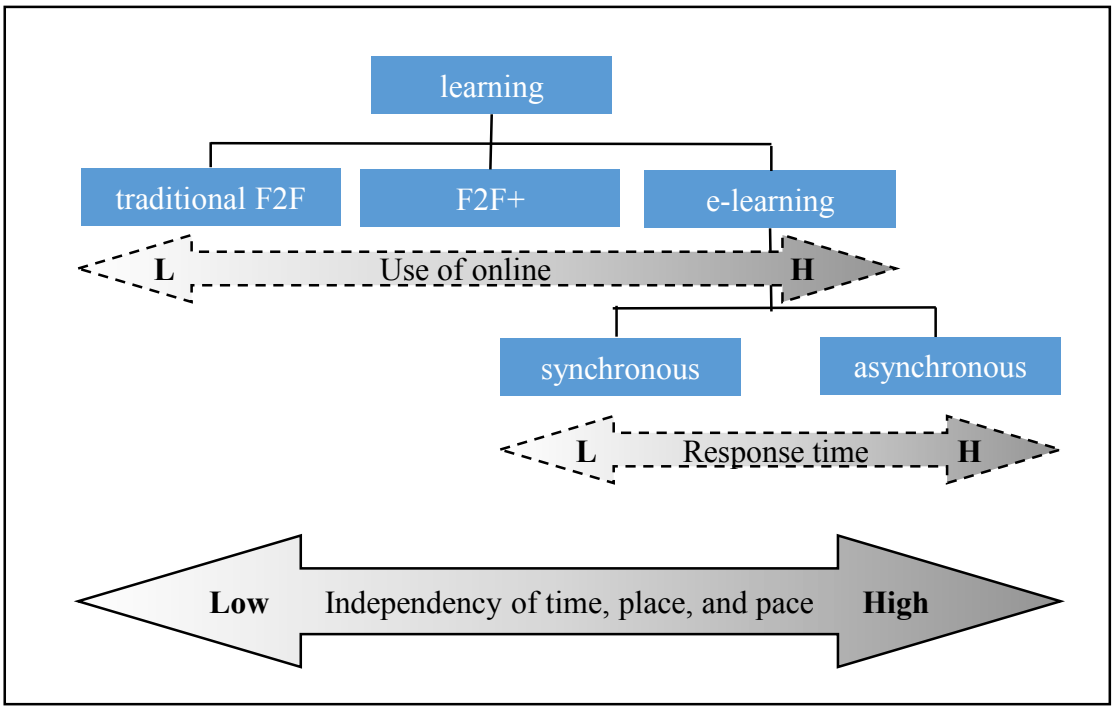
1.1.3. Definition of Synchronous and Asynchronous

Asynchronous e-learning supports teaching and learning relationships between teachers and students when the participants are not online at the same time (Hrastinski, 2008, p. 51). Asynchronous e-learning is online or distance learning that does not take place in real time, and the instructor provides chat, e-mail and online discussion boards to enable interaction (Lin & Goa, 2020, p. 170, based on Ruiz et al., 2006).

In contrast, synchronous e-learning indicates that the participants are online at the same time and therefore are in direct interaction. That means that the difference between asynchronous and synchronous e-learning is often a matter of the response time (Hrastinski, 2008, p. 52). In some instances, e-mail or chat is used near-synchronous when users remain logged in and monitor their e-mail/chat continuously (Hrastinski, 2008, p. 52).

Asynchronous e-learning implies that a high degree of independency of place and time exists for the majority of the course duration. This can for example be achieved by making a majority of the learning-material available online, using a LMS. The course may have synchronous elements such as synchronous assessments and/or synchronous sessions (online and offline). The course design can even include some traditional F2F sequences.

Figure 1 summarizes the terms mentioned above and serves as a scaffold for the rest of the paper.



Note: The difference between the various terms is often a matter of degree. E.g. for asynchronous and synchronous (Hrastinski (2008), p. 52), or the use of online for traditional F2F versus e-learning, and the response time for synchronous and asynchronous (Huy et al., 2023).

Figure 1: Visualization and classification of relevant terms

1.2. Literature Review

Around the turn of the millennium the community of inquiry (CoI) model as a framework concept emerged (Garrison et al., 2010, p. 6). The frameworks' aim is to define the elements of a collaborative and meaningful learning experience in the context of text-based, asynchronous online university teaching (Garrison et al., 2010, p. 5). The authors proposed that learning happens in a community of inquiry because of the interactions of three essential elements: cognitive presence, social presence, and teaching presence (Lee, 2014, p. 41).

In more detail, the three elements of the framework developed by Garrison et al. (2016) are:

- Cognitive presence means that a worthwhile educational model should be based on process of reflective inquiry (Garrison et al. 2016, p. 6 based on Swan et al., 2009). According to Loy (2021, p. 403), cognitive knowledge is gained in a social process of asking questions, searching for solutions and negotiation decisions.
- The essence of social presence is that some form of social presence needs to be developed (Garrison et al., 2009, p. 7). Kreijns et al. (Loy, 2021, p. 403, based on Kreijins et al. 2014, 7) argue that social presence involves two constructs: First, there is the aspect of "social space", by which the authors mean a sense of community and an open atmosphere. Secondly, it is about the actual construct of social presence as the feeling that others are present and perceptive, even if it is a virtual space.
- Teaching presence is about the design and moderation of the learning environment (Loy, 2021, p. 395 based on Anderson et al. 2001). Teaching presence is made up of three categories: design and organization, facilitating discourse, and direct instructions (Anderson et al., 2001, p. 1).

Figure 2 illustrates the community of inquiry framework.

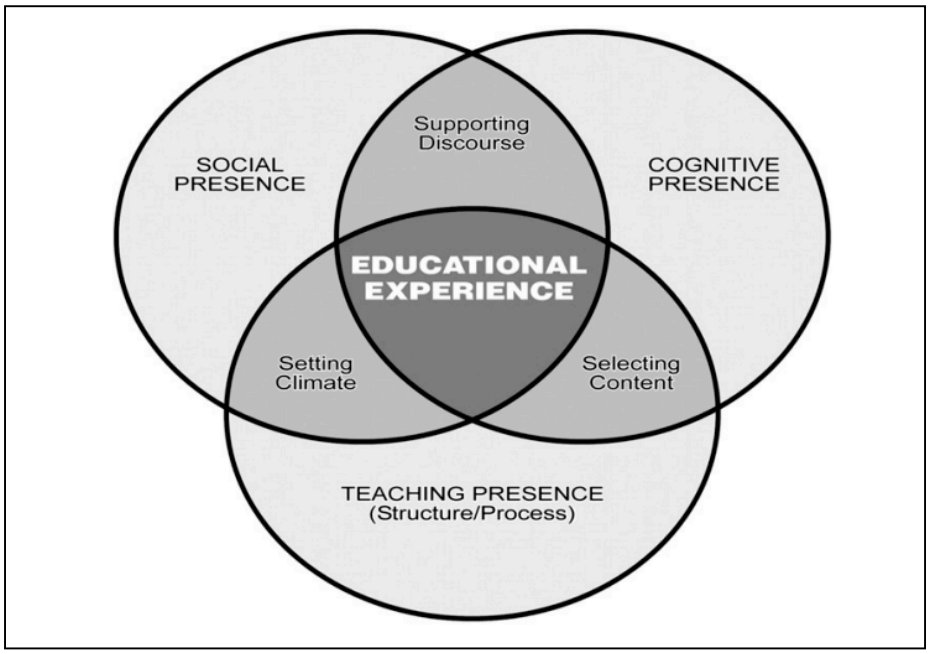


Figure 2: Community of inquiry framework (Garrison et al., 2010, p. 6)

According to Garrison et al. (2010), the sense of community increases not only student's classroom participation and develops deep learning, but it also enhances students' ability to handle stress and emotional well-being. Those factors contribute to higher grades. It is therefore key to build a sense of community for students in the e-learning environment.

Loy (2021, p. 392) beside many other researchers supports Garrisons' framework: "In addition to the technical and spatial challenges posed by online courses, university teaching should also consider the socio-emotional effects of digital teaching formats as students depreciate in particular their lack of physical presence."

Based on Yang's research (2016, p. 162), teaching presence reinforces and sustains cognitive and social processes in the virtual community. In order for this to work, teachers need to learn to serve as subject matter experts. In a study investigating students' learning of a foreign language, the researcher concluded that "teacher's written feedback play a significant role in improving students' writing and supporting their text development. Students often require feedback from knowledge authority so they can learn how to develop their writing skills, in order to write a well-structured and grammatically correct essays as part of their studies" (Yang, 2016, p. 162 based on Ferris & Roberts, 2001; Lockhart & Ng, 1995). Varkey et al. (2022) also highlight the importance of clear and concise feedback from teacher to student. High quality feedback to students enables learning and changes behavior.

Lee (2014) investigates among other things the relationship between cognitive and social presence. She summarizes that "the higher the social presence, the better the quality of cognitive presence". Social presence is positively correlated with cognitive presence (Lee, 2014, p. 49). The single most important element of successful distance learning is the "formation of a learning community through which knowledge is imparted and meaning is co-created" (Lee, 2014, p. 49 based on Palloff and Pratt, 2007).

Alvarez and Palmero (2022) revealed three types of learning engagements in a study using a phenomenological research design, namely: student-content-, student-teacher- and student-student-engagement. The student-content-engagement of Alvarez and Palmero's study is similar to the cognitive presence from Garrison et al. (2010), as Alvarez and Palmero define content-student-engagement as learning through the interaction of students with learning materials. Alvarez and Palmero conclude that this type of learning is highly present in an asynchronous online learning environment while the other two forms of engagement are described as limited or lacking (Alvarez & Palmero, 2022, p. 148).

Caskurlu et al. (2020, p. 4) stress that a sizable number of studies provide quantitative evidence that teaching presence supports learning outcomes in online learning environment. They say, however, that it is difficult to synthesize those findings and to derive generalized conclusions. They found nevertheless moderately strong positive relationships between teaching presence and both student satisfaction and perceived learning. This suggests that teaching presence is a good predictor of learning outcomes and indicates the importance of considering teaching presence when designing and implementing online courses (Caskurlu et al., 2020, p. 11).

In another study, college students reported that they can express themselves better and in more detail and that they interact more efficiently with others when in an asynchronous setting. (Brierton et al., 2016; Sun et al., 2008). This may result in a deeper learning and eventually in higher grades.

Another study, conducted by Lin & Gao (2020, p. 174), describes two benefits of asynchronous distance settings: self-controlled and self-directed learning. Students learned at home, and arranged their learning according to their own schedules. Asynchronous learning allowes students to watch course videos as many times as needed. Another advantage of asynchronous learning is self-directed learning. Lin & Gao conclude that students were better focused on learning when they were studying on their own. Students develop a deeper learning by repeatedly watching the course videos. They can stop the video when they had problems with the lecture and search for resources to dissolve their confusion, or they can increase the video speed in order not to get bored. The access to a wide range of learning materials and resources supports students' learning. However, the researchers also found that students can get overwhelmed by too much content. In the same study, Lin & Gao also found that students might experience social isolation, as they had less opportunities for class communication and discussion. They were unaware of their peers' learning progress, which lead to students feeling distant from others, thus lowering their passion for learning. Previous studies have already mentioned that most of the statements in an asynchronous learning environment are content related, which might indicate that students feel isolated (Hrastinski, 2008, p. 51).

Not all students are able to fully understand the learning content through self-study. Not getting immediate feedback from the teacher in case of questions and not having the opportunity to interact with peers in real time classroom communication (Francescucci & Rohani, 2019, p. 61) is a challenge.

As described in our previous paper (Schuler et al., 2023), students learning can be supported by adapting Mayer's 12 multimedia principles listed in figure 3.

The principle	What it means
Coherence Principle	Learning is improved when additional words, sounds and pictures (noise) are removed
Signaling Principle	Learning is improved when there are cues highlighted in the essential material
Redundancy Principle	Learning is improved when graphics and narration are utilized rather than utilizing graphics, narration and on-screen text
Spatial Contiguity Principle	Learning is improved when related words and pictures are presented near to each other
Temporal Contiguity Principle	Learning is improved when related words and pictures are presented at the same time rather than one after the other
Segmenting Principle	Learning is improved when the material is presented in user-paced segments rather than as a singular and continuous unit
Pretraining Principle	Learning is improved when students know the names and characteristics of the main teaching points or concepts
Modality Principle	Learning is improved with graphics and narration as compared to animation and on-screen text
Multimedia Principle	Learning is improved with both words and pictures rather than just words alone
Personalization Principle	Learning is improved when the teaching is written conversationally rather than formally
Voice Principle	Learning is improved when the narration is spoken with a human voice rather than with a mechanistic voice
Image Principle	Learning is not necessarily improved when the speaker's image is added to the screen

Figure 3: Mayer's 12 principles (Varkey et al. 2022 adapted from Mayer and Moreno, 1998; Mayer, 1997)

2. The Establishment of the Asynchronous E-learning Course in CF

The significant increase in student performance when comparing the first run of the asynchronous e-learning course held in autumn 2022 to the F2F course held in spring 2022 (Schuler et al. 2023) contributed to the firm establishment of the asynchronous e-learning course in the curriculum. The course design for the spring 2023 course remained the same as for the autumn 2022 course.

The CF course teaches fundamental concepts of valuing and financing a corporation. The main features of the learning design are summarized in figure 4 below. Two textbooks with an extensive number of exercises and questions form the basis of the course. Each topic is supported by a presentation of approximately 30 slides building the theoretical basis of the topic. Explanatory videos provide students with a first taste of each topic. They highlight and explain the most important aspects of each topic. The videos are between 8 and 15 minutes long and use voice-over on MS Powerpoint slides.

Criteria	F2F	Asynchronous e-learning	Asynchronous e-learning
Semester	Spring 2022	Autumn 2022	Spring 2023
Time period	February 2022 to June 2022	September 2022 to December 2022	February 2023 to June 2023
Content	12 Topics	The same 12 topics as in the semester before	The same 12 topics as in the semester before
LMS	Moodle	Moodle	Moodle
Learning material	Discussion in classroom	Explanatory videos Discussion board On-demand tutorial	Explanatory videos Discussion board On-demand tutorial
	Two textbooks	The same two textbooks as in the previous semester	The same two textbooks as in the previous semester
	Presentation slides for each of the 12 topics	The same presentation slides for each of the 12 topics as in the previous semester	The same presentation slides for each of the 12 topics as in the previous semester
Bonus points	Possibility of 9 bonus points Limited to 10% (= 9 points) of max. points achievable in final the examination Rewarding the correct solution of the case study with a group Weekly quizz questions; not rewarding the successful solving	Possibility of 21 bonus points Limited to 10% (= 9 points) of max. points achievable in the final examination Rewarding the correct solution of the case study with a group Weekly quizz questions; rewarding the successful solving	Possibility of 21 bonus points Limited to 10% (= 9 points) of max. points achievable in the final examination Rewarding the correct solution of the case study with a group Weekly quizz questions; rewarding the successful solving
Final exam date	June 23rd 2022	January 31st 2023	June 22nd 2023
Form	Paper and pencil	Paper and pencil	Paper and pencil
Duration	90 minutes	90 minutes	90 minutes

Figure 4: Comparison of the CF course for three semesters (spring 2022 to spring 2023)

A discussion board was installed on Moodle. Students could post questions up to 36 hours before the topic was covered in predefined course program. Other students or the teacher could answer the question(s) or add another aspect to the discussion. If the level of activity was high, as measured by the complexity and number of questions in the discussion board, the instructor invited students to a synchronous online session to clarify the questions.

Students were provided with a large number of exercises and questions with corresponding solutions. The aim was to allow students to apply the theory they had learned, to test their knowledge and to enhance their solutions.

In addition, quizzes gave the students the opportunity to earn weekly bonus points for each topic. Each quiz had to be completed by a certain date and time. If students answered seven out of ten multiple-choice questions correctly (per quiz), they were rewarded with a bonus point. Bonus points were added to the points earned in the final exam.

3. Analysis

As the curriculum of the BSc-program had changed, the number of students taking the CF course in autumn 2022 was significantly higher than in the semester before and after. Comparing the two asynchronous e-learning courses held in autumn 2022 and spring 2023 the average grade increased notably by 0.2 from 4.6 to 4.8.

Course design	F2F	Asynchronous e-learning	Asynchronous e-learning
Period	**Spring 2022**	**Autumn 2022**	**Spring 2023**
Number of students (=N)	14	46	21
Passed	12	40	19
Succesion rate in %	85.70	86.96	90.48
Max. exam points possible	90	90	89
Average points achieved in the final exam	58.0	62.2	66.93
Average bonus points achieved	7.3	8.8	8.5
Average grade	4.2	4.6	4.8
Standard deviation	0.818	0.848	0.881

Note(s): The grading scale ranges from 1 (very poor) to 6 (excellent). A minimum grade of 4.0 is required to pass the exam. Tenth marks have been mathematically rounded to half marks. Tenth of grades have been calculated from the points obtained in the exam as follows: (points achieved including bonus points / maximum possible points) * 5 + 1.

Figure 5: Figures comparing asynchronous e-learning for the first course held in autumn 2022 and the second course held in spring 2023.

The authors suspect that the teacher's and students' previous Covid-related experience with asynchronous e-learning contributed to the grade increase. They already had an image of the upcoming asynchronous e-learning course, this reducing uncertainties, anxiety, and perceived stress level. Reduced perceived stress level contributes to the learning success (Lazarevic & Bentz, 2021, p.9).

Interestingly, students achieved slightly less bonus points (8.5 instead of 8.8) but performed better in the final exam (increased from 62.2 to 66.93 points). Bonus points could be achieved through the solving of quizzes and/or solving a case study in a group (in written form). The quizzes have been scheduled at a predetermined time interval. The slight decrease of bonus-points through quizzes might indicate that students followed their own learning pace by taking advantage of the asynchronous e-learning. This might indicate that students reached their knowledge peak around the time of the final exam. This supports the results of other researcher that self-paced online courses can contribute to learner's effectiveness (Southard et al. 2015). In a feedback survey, some students mentioned that one of the strength of the course is that it can be learned in one's own speed.

The authors conclude that students' perceive the quizzes as helpful. Students appreciate clear instructions, meaningful guidance and motivations for working through the asynchronous e-learning course. This includes the opportunity to repeat the course content several times, which is not possible in a traditional F2F classroom setting. The quizzes are an important tool to keep students on track, as the weekly quizzes covered the topic of the respective week. The interpretations of students' appreciation of the quizzes can be seen in-line with the before mentioned teaching presence (Garrison et al. 2010, p. 6; see section 1.2) that consist of the three characteristics design and administration, facilitating discourse, and direct instruction (Anderson et al., 2001, p. 3).

The students' quiz results act as a milestone to check their individual learning progress. In addition, the quiz results are used by the instructor to provide students with overall feedback. The disclosure of the quiz results gives students an insight into the learning progress of their peers. This feedback had the potential to motivate students (Varkey et al., 2022; Lin & Gao, 2020).

Each student received an individual quiz summary showing the result of each of the 12 quizzes. It showes which questions were answered correctly or incorrectly and allows them to monitor their individual learning progress.

Standard deviation of the grades increased from 0.848 to 0.881 comparing the course runs in autumn 2022 to spring 2023, thus reflecting a higher dispersion of grades. We suppose that self-directed learning with little or no connection to peers and the instructor, compared to group learning (F2F), might lead to more heterogeneous results in terms of grades (Schuler et al., 2023).

We thus conclude that self-directed learning can contribute to higher grades. It is very important to provide high-quality learning material to support students in their self-directed learning. In the finance course under investigation this includes for example short videos, many exercises with detailed solutions, the previously mentioned quizzes, etc. In a survey one out of 21 student answered the question "What is in your opinion the strengths of the module?" with "The high amount of exercises and possibilities to review ones knowledge". Mayers 12 principles (see figure 3) were taken into consideration while producing the explanatory videos. This may have contributed to the teaching presence according to Garrison's CoI framework (Garrison et al., 2010; see also figure 3 before).

The only fixed date for the students who took this course was the date of the final exam. The content could be studied at any time during the course of the semester, thus enabling self-directed learning to a maximum degree.

The course also includes discussion boards and on-demand tutorials. However, these additional tools where not used heavily by the students. We interpret the low usage by the clear content, which could be learned by self-study, the logical structure of the course, the quality of the learning material and the student's confidence in their self-learning abilities (Schuler et al., 2023).

To summarize the analysis we conclude that in the asynchronous e-learning CF course the focus was on teaching presence, with its three sub-categories: design and organization, facilitating discourse, and direct instructions (see section 1.2). Caskurlu et al. define teaching presence as the binding-element together with social presence and cognitive presence (Caskurlu et al., 2020 based on Garrison et al. 2000). Thus, helping further establishing the asynchronous e-learning CF course.

4. Conclusion: Lessons Learned and Limitations

To unlock the full potential of an asynchronous e-learning setting a university has various areas to take into consideration. Teaching presence in the course appears to be a key aspect, which can be influenced from all the elements of the CoI (teaching presence, cognitive presence, and social presence) best by the teacher. Or as one students answer the question

"What was most helpful so support your learning?" with "The way the module is structured fits the content perfectly."

Social presence (Swan & Sihl, 2014, p. 114) and cognitive presence are other important aspects for successful learning in an asynchronous e-learning environment. The facts that students can take the CF course in their second or third year at the earliest and that they study in class environment, helped to build up social presence. Students know each other, thus maintaining social presence. Social presence is seen as an important element of students' learning success. Developing a sense of community requires additional work (Moore, 2014, p.). This work not only can be done in the asynchronous e-learning course but ideally already before the course starts, e.g. in the curriculum design.

Anderson et al. (2001, p. 14) contribute an additional area of concern. Part of the challenge in asynchronous e-learning environment is to develop compensatory behaviors for the relative lack of non-verbal and paralinguistic communication in a text-based medium such as computer conferencing. It appears that the explanatory videos, quizzes, discussion boards and the case study contributed to close the mentioned lack in the course under investigation.

The lessons learned from the authors of this paper are well summarized by Caskurlu et al. (2020, p. 11): "(…) course designers should consider the following when designing online courses: being clear, transparent, and consistent in course design. Instructors should consider being active participants in their courses, providing subject matter expertise knowledge, giving direction to course discussions, and providing timely and detailed feedback (…) Moreover, as teaching presence is distributed between students and instructor (Garrison et al., 2000), these findings also provide students practical insights on how to be actively involved in the course thereby constructing their knowledge through collaboration, interaction with others, and experiencing others' points of views."

Our findings are limited by several factors. The grade achieved in a course is not the only indicator to measure students' learning success. Other measures such as student satisfaction may have different results.

The subjects of interest are students in a BSc-program in business information technology, therefore they have a higher compute literacy than students from other disciplines. The subjects are members of (smaller) classes, consisting of 21 and 46 students. For larger classes, the lessons learned may not be useful as it is more challenging to build social presence. Finally, learning and teaching is complex and differs from person to person. What works for one person may not work for another.

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Contact email: brido.schuler@fhnw.ch

Community College Instrumental Faculty Using Technology to Engage Remote Learners During a Pandemic

Faith Vietti, University of Hawai'i at Mānoa, United States
Michael P. Menchaca, University of Hawai'i at Mānoa, United States

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Abstract
Instrumental faculty include music instructors and directors focusing on teaching specific instrumentation, often in ensemble or orchestra settings. During the pandemic, community college instrumental faculty relied heavily on technology to engage remote learners. Research regarding their experiences currently exists, and a better understanding of what transpired will inform both pitfalls and best practices for using technology in online settings. This study explores how community college instrumental ensemble faculty use technology to engage remote learners during the pandemic years 2020 to 2021. To better understand their experiences when pivoting to remote instruction, the conceptual framework that will be used to analyze the data includes the Unified Theory of Acceptance and Use of Technology (UTAUT) and Kolb's Experiential Learning Model (ELM) to understand how instrumental ensemble faculty overcame their concerns about using the various tools and technology to engage remote learners during the pandemic. The research will address four broad questions: (a) How do community college instrumental ensemble faculty describe their experience transitioning from Face-to-Face (F2F) teaching to an online environment; (b) how do they describe their experience adopting technology; (c) how do they describe their professional development experience supporting their transition to an online environment; and (d) how do they describe the technologies used in their practice? This research aspires to gain and contribute a better understanding of community college instrumental ensemble faculty transitioning from F2F to online instruction, the tools that support them, and potential insights into the types of professional development support needed to help faculty in such transitions.

Keywords: Instrumental Faculty, Community College Ensembles, Technology, Online Instruction, Virtual Learning, Distance Education, Remote Teaching, COVID-19 Pandemic, Professional Development

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Introduction

This study explores how community college instrumental ensemble faculty use technology to engage remote learners during the pandemic years 2020 to 2021. A paradigm shift in online learning has impacted the United States and the world because of COVID-19 (Li & Lalani, 2020). While many disciplines have been affected, this shift has rapidly thrust instrumental ensemble faculty, meaning ensemble directors and performance ensemble directors, into an online learning environment where remote learning is vastly different from teaching in the traditional ensemble classroom space. The former requires distinctive pedagogical practices and technical skills, which involve understanding the most effective elements for teaching instrumental ensembles. Moving performance ensembles online requires a teaching philosophy that supports adoption (Johnson, 2016). Johnson (2016) stated that online music pedagogical practices included four essential elements for online music courses:

- Online music pedagogy, including teaching philosophies, authentic music learning, openness to online music learning, institutional support, and online approaches;
- Course design, such as planning, organization, multimedia use, and the design process;
- Assessment, which exemplifies meaningful opportunities to demonstrate music learning; and
- Communication, including methods for exploring subject content and technology tools.

The unique technical skills identified include but are not limited to using a synchronous tool's audio and video conferencing capabilities, uploading slideshow presentations, or an interactive web tour. Using asynchronous tools to demonstrate specific performance techniques or skills would include the technical ability to use audio recording devices such as smartphones, Audacity (Digital Audio Workstation software) that has a click track for recording, Band Lab (online collaborative DAW software), Garage Band, Logic Pro X (DAW software), Abelton Live, Mixcraft, Upbeat Music App, ProTools, and audio Jamulus platform. This open-source networked music performance software enables live rehearsing and performing for musicians in different locations using the Internet (Volker, 2020). Soundtrap is a cloud-based audio recording studio that allows the user to collaborate in a learning environment using any device, at any time, from any location (Soundtrap, 2023); JamKazam is an online platform and app that facilitates playing music live and in sync with others over the internet (Richardson, 2020); and JackTrip is an open-source software developed at Stanford University in 2010 which allows low-latency connections over wired networks (Mall & Kilian, 2021). SonoBus is a free and open-source network audio streaming application. It is an online rehearsal platform, multi-user, multi-platform, used to stream peer-to-peer audio between devices over the internet or a local network (SonoBus, 2023). iMovie, a video-recording application, provides helpful visuals and demonstrations. Moreover, the technical skills needed to navigate a learning management system (LMS) are equally important. Johnson (2017) argued that LMS tools often used in academic online courses could be helpful in online music performance courses. The tools within an LMS that one would need the skills to navigate are the content pages with text, video and audio, graphics, announcement boards, discussion forums, quiz tools, the drop box, and the calendar.

The notion of online learning is a concept that has been introduced previously; it has been present in various forms since its inception. McIsaac and Gunawardena (1996) state, “The United States was slow to enter the distance education marketplace, and when it did, a form of distance education unique to its needs evolved” (p. 405). Over the past twenty years, the

development of online learning in the United States has accelerated with the use of online technologies to deliver educational content. However, during the past two decades, user access to the Internet has become more available, and innovative platforms have been developed. Thus, the availability of the Internet and the development of new platforms influenced the growth of online learning in higher education.

Since COVID-19, and perhaps more than ever, there has been a need for instrumental ensemble faculty to use appropriate technology in online learning (Rice & Kipp, 2020). However, a better understanding is needed to see how some community college instrumental ensemble faculty have addressed the following challenges:

1. Adopt new technology;
2. Adjust their instructional practices; and
3. Apply technology in instrumental ensemble performance instruction to engage music performance students.

Instrumental ensemble performance is live interaction in the performance of multiple pieces by an ensemble, which is collaborative, as in the case of a symphony or band. Instrumental ensemble performance learning in this context is "an artistic subject that is individual in expression" (Johnson, 2017, p. 7); it is interactive and "revolves around the need for the authenticity of apprenticeship under an expert musician" (Johnson, 2017, p. 8). Many studies have been published regarding remote learning, yet inquiry into music performance ensemble education, particularly that of community colleges, is limited.

The focus of this study is on community college performance ensemble directors, such as music directors, directors of bands, conductors of wind ensembles (30-50 musicians), concert bands (40-70 members), conductors of jazz bands which vary in the number of its member, chamber orchestra (40-50 musicians), an orchestra (50-100 members), and percussion ensemble. This study will exclude vocal music (chamber choirs, concert choral, jazz vocal, music theatre, and opera singers). The choice for instrumental ensembles and not vocal music is that such ensembles typically perform from the Western classical tradition on string, bass, woodwind, and percussion instruments. Meanwhile, vocal music is generated by voice without external musical instruments, and the outcome of vocal music is contingent upon the singer's voice type. Another point of differentiation is that the challenges vocal singers faced during COVID-19 had an extra layer of concern compared to instrumental performance ensembles, as they were at high risk for vocal health problems, increased voice impairment, and vocal fatigue, which was not the case for instrumental ensemble performance (Ribeiro et al., 2020).

This basic interpretive study aims to explore the perspective of community college ensemble faculty experiences during COVID-19 as they were swiftly forced to transition from face-to-face to online teaching.

With these nuances under consideration, this research aims to answer four main research questions:

RQ1: How do community college instrumental ensemble faculty describe their attitudes when they heard about transitioning from Face-to-Face (F2F) teaching to an online environment?

RQ2: How do they describe their experience adopting technology?

RQ3: How do they describe their professional development experience supporting their transition to an online environment?

RQ4: How do they describe the technologies used in their practice?

Literature Review

The Pandemic and California Community Colleges

The importance and impact of the pandemic on community colleges are most significant as community colleges enroll almost fifty percent of the students who attend California public institutions. And more than half of all students are students of color. California community colleges are a pathway to four-year colleges and universities. They are viewed as a significant part of California's post-secondary educational system and the United States. In California, almost fifty percent of students who attend a four-year institution previously attended a community college (Bulman & Fairlie, 2022). Bulman and Fairlie (2022) stated that the impact of COVID-19 on community college enrollment was unclear, particularly in comparison to four-year institutions.

Transition to Remote Instruction

The transition to remote instruction likely reduced enrollment among community college students compared to four-year college students. This was partly because of the community college student's more "tenuous patterns of attachment" (p. 1) and a focus on more pragmatic technical training in vocational programs. Howell et al. (2021) posited that at the beginning of public two-year enrollment for the 2020 high school cohort, there was a 12 percent reduction. From fall 2020 to fall 2021, public two-year and four-year colleges declined by 3 percent (Bulman & Fairlie, 2022).

What was also unclear with community college students was the effect of COVID-19 on "course loads, pass rates, and grades" (p. 2). Bulman and Fairlie (2022) argued that "students might have struggled with online learning" (p. 2) because of what appeared to be a lack of structure, as well as the need for self-discipline and issues with technology and various types of disruption. Community college faculty were seen as possibly being more lenient in their grading. Options for pass/no pass in courses increased (Bulman & Fairlie, 2022).

Music Education Changes During the Pandemic

Pre-pandemic state of music education at California community colleges. Before COVID-19, the pre-pandemic state of music education at California Community Colleges was robust. Many California Community Colleges had a wide range of curricula available that provided a pathway to various music careers. Programs most often included fundamental courses in music theory, history, performance, and, in some cases, music technology. Ensembles, choirs, orchestras, and concert bands were integral components, providing students with practical experience and opportunities to perform.

Notably, California has the most extensive independent two-year colleges in the United States (Luster, 2010). The Foundation for Community Colleges (FCC) (2021) stated that the California community college system has 73 districts and 116 colleges and is "the gateway to higher education for over 2.1 million students per year" (p. 1). These two-year colleges were called junior colleges and evolved to serve several populations. California junior colleges developed as extensions of high schools. California community colleges have remained

independent of K-12 districts with a distinct mission that has adapted to change over time (FCC, 2021).

Early research conducted by Kaplan (1941) focused on creating successful music education programs at junior colleges by hiring talented and versatile instructors and integrating the college into the musical life of the surrounding community. After World War II, music education at junior colleges expanded and included vocational programs in music therapy, jazz, and audio recording (Kaplan, 1943).

Daniels' (1946) research led to a contrasting view of music education at two-year colleges. He believed junior colleges were an essential and integral link between secondary and tertiary education. Therefore, he recommended that community colleges offer courses aligned with four-year lower-division courses, vocational training in music, and a trial music major (Daniels, 1946). Taking these priorities a step further, Reiss (1950) posited that music education programs at junior colleges should serve the local community, provide vocational and further liberal education at the collegiate level, and prepare students for entrance into four-year universities.

State of musicianship in music education. Anderman (2011) focused on the transfer aspect of the music education curriculum when he assessed the state of musicianship instruction at community colleges in California. He presented a detailed analysis of musicianship pedagogy, textbook and materials employed, and time spent on sight-singing, dictation, and keyboard skills. Anderman (2011) observed that California community college students came from diverse backgrounds, and many needed to prepare for community college musicianship programs, so remedial education was often necessary.

Mark and Gary (1992) described the 1960s and 1970s as a real-time of radical changes within music education. One of the most notable shifts within these changes was the implementation of comprehensive musicianship. First introduced around 1965, comprehensive musicianship radicalized and reinvigorated the American education system's music curriculum. This development was founded and based on incorporating "music history and theory" (p. 361).

In the 1970s, community college music education expanded and included music theory and ear training (Belford, 1970). Like Kaplan's early research on junior colleges, Stanton (1972) drew his attention to how music education was a distinguished aspect of the community service programs and consequently identified three California community college districts. The research included the Foothill District, which includes De Anza and Foothill Colleges in Cupertino and Los Altos Hills (near San Jose, California), El Camino College in Torrance (Los Angeles area), and Cabrillo College in Aptos (near Santa Cruz, California) [Stanton, 1972]. The focus was on music performance at these community colleges, including professional musicians like the Los Angeles Philharmonic. They were among notably high-profile music groups (Stanton, 1972). There was also an array of community-sponsored programming that encouraged college ensembles' performances and performances sponsored by student organizations. Stanton (1972) posited that having state-of-the-art facilities allowed community colleges to present a wide variety of music to the community. The colleges' community service function enhanced academic training. Involvement in the arts is an integral part of a liberal arts education. Therefore, training in this context meant students would have access to performance space for various college and community performances, inspiration garnered from professional musicians and performances, and rehearsal spaces that emulated the acoustics of premier venues.

This community-sponsored programming is representative of Santa Monica College (SMC) in its partnership with Broad Stage. "The Broad Stage provides Santa Monica College students with exposure to artists at the height of their craft" (The Broad Stage, 2021, p.1). This facility is a highlight of the Performing Arts Campus. It is an "acoustically outstanding 499-seat auditorium" (SMC, 2021, p.1), which serves as an "ideal venue for music students to develop their performing abilities" (SMC, 2021, p.1). Another feature of the Broad Stage is the Edye Second Space, which is "an effective area for music students to develop their skill before going on to the big stage. Smaller performing groups give their performances in this 100-seat space" (p.1).

Los Angeles City College (LACC) is yet another example of a community college with state-of-the-art facilities that facilitate a wide variety of music to the community and where the community service function of the college enhances academic training. LACC's facilities have a 200-seat Herb and Lani Alpert Recital Hall, a 150-seat David Alpert Lecture Hall, a full-size band and orchestra rehearsal room, and a dedicated music library and ear training lab that enhances academic training (LACC Music, n.d.) Like other community colleges in California, the state-of-the-art learning environments enhance academic training through rehearsal spaces that emulate the acoustics of premier venues, where students can develop their performing abilities and support the arts on campus and within the community. In short, these community colleges were not just academic settings but also served as cultural hubs within their communities, often engaging in public performances and events.

Music education in online environments. Given the interest in online music education, Klingenstein and Hagen (2013) identified that the first accredited online music course available at the post-secondary level was attributed to Valley City State University's Music Fundamentals course in 2004 (Johnson & Hawley, 2017).

Notably, there have been increased development and learning benefits of online learning technologies from that time forward, which further prompted music educators to rethink the possibilities of learning music online (Crawford, 2017). Johnson and Hawley (2017) found that formal online music learning is increasing at an exponential inclusion rate. Crawford (2017) describes music education as a pivot point for educational change. This change welcomes the 21st-century education technology of online learning, which has become commonplace in music education. Online music learning addressed the challenges of declining post-secondary music student enrollment and provided strategies for future formal art education development. Herbert (2007) recognized a rapid proliferation of online courses among mainstream universities. This proliferation was also valid for community colleges.

Ruthmann and Herbert (2012) posited a rationale for transitioning music education from the face-to-face classroom to the virtual environment. Online music education is far-reaching, with the increasingly widespread understanding that through globalization, all nations have become more intricately connected (Ruthmann & Herbert, 2012). Some researchers agree and sometimes do not agree on whether online instruction is as effective as traditional teaching methods. The challenge is that music education is subject to music history or appreciation, and music business courses are most adaptable to distance learning, while composition and performance are least adaptable.

The initial impact of the pandemic on educational institutions and online learning. According to recent literature, how has the pandemic reality initially impacted educational institutions and online learning? Moreover, how is this now viewed and experienced? The

coronavirus pandemic turned the music world upside down, forcing musicians to re-evaluate their actions. Re-evaluation was especially challenging for large bands, ensembles, and orchestras who struggled to adapt to new social-distancing protocols, other safety measures, and online learning. Hash (2020) argued that teachers moved their instruction from physical classroom space to remote online and offline platforms with little or no preparation. Hence, instrumental ensemble faculty took the same course of action and modified goals and activities to meet the challenges of remote learning while meeting students' needs. Hash (2020) posited that remote learning was "essentially emergency teaching" rather than the implementation of curricula planned, organized, and designed for distanced environments (p. 384). Hash (2020) conducted a study that "examined the practices, experiences, and perspectives of elementary and secondary school band directors concerning remote learning during COVID-19" and the impact it had on music educators (p. 381). The researcher's data showed that COVID-19 created many challenges for directors of bands, especially in schools with higher poverty levels or rural locations. In contrast to the difficulties, however, remote learning "created opportunities for instrumental faculty to incorporate a wider range of technology into curricula, more focus on individual musicianship, lessons in music theory and history" (p. 381). Video conferencing technology, such as Zoom, has become the standard in education.

Best practices for online learning in the arts. The best practices for online learning in the arts emerged during COVID-19 as teaching online presented challenges to educators across the country; they learned to adjust. As instrumental ensemble faculty and students have had to manage more uncertainty than ever, understanding best practices to create communication, a supportive online community, various work experiences, and synchronous and asynchronous activities was critical.

In reviewing the practitioner-oriented literature, the best practice that is most apparent is communication. Communication is imperative, keeping course content short, straightforward, and clear (Boettcher, 2006-2013). Communication would include sharing a set of clear expectations for music students and the music educator regarding the method of communication and how much time students should be working on the course each week. Also, early communication in the term to request informal feedback on "How is the course going?" and "Do you have any suggestions?" was beneficial (Boettcher, 2006-2013, p.1). There was also a need for "experienced teacher behavior toward learners" to provide "an attentive, genuine, understanding and respectful learning relationship reliant on good communication" (de Bruin, 2018, p.6).

de Bruin (2018) studied instrumental music educators in a COVID landscape. The research findings provided a framework for music educators to facilitate communication, "connection, motivation, and student autonomy generating personal commitment to music-making and the learning relationship" (p.1). Communication translated to significant student learning and value in learning music (de Bruin, 2018). The theme "dominance of dialogic communication" emerged in this study, which demonstrated how aspects of mutual support overcome the constraints music faculty experienced in "maintaining connection, engagement, and musical improvement in their students' (p. 2).

Another best practice is creating a supportive online community. The pandemic reshaped various aspects of the music pedagogy landscape (Schiavio et al., 2021), and engaging students in a supportive online community became challenging. McKeithan et al., (2021) described how limited social interactions with others "can become an unfortunate

characteristic of online instruction, and this social isolation can inhibit motivation and student satisfaction" (p. 2). A downfall such as this can be averted through a supportive online community that "can provide an active social presence that can encourage meaningful interactions with the content and peers" (McKeithan et al., 2021, p.2). Active social presence is evidenced by "active discussion, cooperative learning opportunities, group conferences, problem-based learning, and simulations" where students can "apply new learning in real-life settings" (McKeithan et al., 2021, p.2). Boettcher (2006-2013) further encouraged large, small, and individual work experiences used in synchronous and asynchronous activities. Other activities incorporated in prepared discussion posts would invite questions, discussions, reflections, and responses. Lastly, different strategies used in a supportive online community focus on content resources, applications, links to music videos, and other easily accessed examples from the learner's computer or mobile device (Boettcher, 2006-2013). Hence, actively engaging students through engaging activity in a supportive online community creates "effective and meaningful teacher and peer interactions that promote engagement, satisfaction, and establishment of meaningful learning communities for learners" (McKeithan et al., 2021, p.3).

Transition to Remote Learning

Music performance faculty and students faced challenges adapting to online platforms**.** Omelchenko and Ferguson (2022) stated that teaching and delivering a large music ensemble was an enormous challenge during the pandemic from 2020 to 2021. The study of primary symphonic literature was integral to developing a musician's education and training; therefore, the authors quickly modified and adapted their curriculums and delivery formats for the large ensembles they directed. For them, the pandemic brought insights and strategies to address the challenges of remote extensive ensemble rehearsals of 50 to 70 students. One insight was the orchestra during COVID-19 would not look the same as it had in pre-pandemic times, nor was it realistic or feasible to make a genre that was intended to be presented in a live format with large audiences in attendance in a concert hall to fit into a Zoom environment (Omelchenko & Ferguson, 2022). Hence, the challenge was that music performance ensembles are one of the most challenging courses to deliver remotely. The strategies that were employed incorporated the use of Zoom for video and Jamulus for audio. Ensemble rehearsals took place on Zoom for video and visual elements and Jamulus for audio. External mics and ethernet connections were suggested for optimal sound production. To assist the musicians, they were directed to practice outside of Zoom. Videos were created of the music director conducting a piece to enable the musicians to play along with their conducting (Omelchenko & Ferguson, 2022). The utilization of Zoom for the visual elements aided in the opportunity for the musicians to see the conductor conduct, one another, and members of their section on the Zoom screen.

Research Setting and Participant Context

This study will focus on community college instrumental ensemble faculty who are part of the California public community college system. While data analysis and findings are ongoing, the participants were selected from six community colleges out of thirty-five possible Southern California community colleges based on regional proximity and accessibility. The following are the criteria for participants: (a) instrumental ensemble faculty, (b) taught online during the pandemic, and (c) director of bands, conductor of wind ensemble/concert band/jazz band, or music director (orchestra).

Theoretic Framework

The theoretic frameworks that will be used to analyze the data include the Unified Theory of Acceptance and Use of Technology (UTAUT) [Venkatesh et al., 2003] and Kolb's (1984) Experiential Learning Model (ELM) in order to understand how instrumental ensemble faculty overcame their concerns about using the various tools and technology to engage remote learners during the pandemic. These frameworks support the music performance faculty's intention, use of technology, and experiential learning, whereby they learn from experiences. These frameworks help guide the analysis of the perceptions and attitudes of community college instrumental ensemble faculty about the transition to online teaching because of COVID-19. This study interweaves the key UTAUT constructs (Venkatesh et al., 2003) and Kolb's (1984) ELM stages to illustrate the interrelationships between UTAUT and Kolb (1984) to assist in answering the research questions.

Conclusion

While a review of the literature review has helped inform some understanding of the experiences of instrumental faculty transitioning to online delivery, this study will more fully explore how instrumental faculty, music instructors, and directors relied on technology to engage remote ensemble students; what transpired informs both the pitfalls and the best practices for using technology in online settings. While live performances have resumed, concert halls are now filled; the lesson learned from the time of COVID-19 is that it is not realistic to take a genre that was intended to be given in a live format fit into a Zoom screen (Omelchenko & Ferguson, 2022). However, the takeaway is that for both the instrumental faculty and students, learning the necessary technology, whether a learning management system or audio technology, would prepare music students for the future.

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Contact email: fvietti@hawaii.edu

The Effectiveness of Self-Regulated Learning via Infographics on the Topic of the Traditional Chinese Artisan Tools: A Case Study of Sichuan Vocational College of Health and Rehabilitation, Republic of China

Ying Zeng, Rajamangala University of Technology Thanyaburi, Thailand
Metee Pigultong, Rajamangala University of Technology Thanyaburi, Thailand

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Abstract
The objectives of this study were to: 1) compare learning achievement after using infographics of traditional Chinese artisan's tools, 2) study the effectiveness after using infographics of traditional Chinese artisan's tools, and 3) explore student's satisfaction after using infographics of traditional Chinese artisan's tools. The population of this study were 30 students from Sichuan Health Rehabilitation Vocational College in the first semester of 2023. The research instruments included 1) infographics of traditional Chinese artisan's tools and 2) learning achievement papers. The results showed that: 1) the achievement scores after using infographics of traditional Chinese artisan tools were different at a statistical significance level of .05 (t=29.373, p=.000), 2) the effectiveness after using infographics of traditional Chinese artisan's tools could improve the achievement scores in art design which was 0.6253, in other words, students had higher post-test scores of 62.53 percent of cognitive score improvement, and 3) students had the highest satisfaction after using infographics of traditional Chinese artisan's tools (=4.86, SD = 0.34).

Keywords: Infographics, Effectiveness, Self-Regulated, Republic of China

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Introduction

Background of Statement

China's Higher Education SDGs Action Report released the Sustainable Development Goals (SDGS), which are 17 goals unanimously adopted by United Nations member states in 2015, including no poverty, zero hunger, good health and well-being, quality education, etc. It aims to solve the major problems facing the common human society. The China Higher Education SDGs Action Report aims at disseminating the concept of sustainable development to the public, showcases the achievements of China's higher education sustainable development work, focuses on 17 sustainable development goals such as poverty eradication, public health, life and health, digital economy, green development, and climate change, and quantifies data by scientific research output. It reviewed the progress and achievements made by China's higher education in implementing the 2030 Agenda for Sustainable Development from 2016 to 2020, highlighting the achievements of Chinese universities. Among them, SDG4 ensures inclusive and equitable quality education, promotes lifelong learning opportunities for all, and expands higher education and lifelong learning opportunities.

The main reason for the problems with the learning methods and curriculum of art courses is that the traditional education system pays more attention to the instillation of theoretical knowledge in art courses, while neglecting the cultivation of creative thinking and practical experience. This results in students often facing problems such as the disconnect between theory and practice and lack of creative thinking and expression skills in their studies.

The study of art courses needs to focus on practice. Traditional art courses often focus on the teaching of theoretical knowledge and use a large number of explanations and demonstrations in class, leaving little opportunity for students to engage in actual creation and performance. This method can easily cause students to only stay at the theoretical level and find it difficult to deeply understand the essence and essence of art. Therefore, practical courses should be added to the curriculum, focusing on the interaction and practice of students' participation in artistic activities, thereby promoting students' learning methods that combine theory and practice.

Secondly, the study of art courses needs to focus on individualization. Traditional art course arrangements often apply general curriculum plans and lack personalized teaching for different students. In actual teaching, each student has his own characteristics and style. Students' personality and expertise should be fully respected, and they should be encouraged to use their creativity and imagination. Therefore, the curriculum should explore diversified teaching methods, conduct corresponding personalized teaching according to the different situations of students, and help students better explore their potential and advantages.

Purpose

Among art students, some students have low cultural scores，in art course learning, there are problems of low self-efficacy and insufficient learning confidence. In my classroom, there are some problems in art courses, such as lack of individualized teaching, limited creative thinking, and disconnection between theory and practice. The traditional teaching mode often adopts the unified teaching content and evaluation standard, ignoring the individual differences and characteristics of students. Information graphics are very necessary to solve these problems. Informational charts can integrate and present a large amount of student data

and teaching resources to help teachers understand students' needs and learning situations more comprehensively. Informational charts can provide personalized teaching plans and evaluation methods, promote students' development and growth, and make teaching more targeted and effective. In addition, information graphics can also provide a wealth of practical cases and skill teaching, helping students combine theory with practice and cultivate creative thinking and practical operation abilities. Therefore, in the previous research, this paper combined with the main characteristics of vocational school students, using the method of combining theory and practice, to explore the feasibility and effectiveness of infographic in teaching. Based on the United Nations SDG4 on equitable education, this paper takes the students of Sichuan Health Rehabilitation Vocational College as an example, and adopts infographic teaching technology to improve the art design performance of the students with poor performance. The researcher would like to focus on the following research questions:

1) Have infographics be used effectively in art design teaching?
2) How is the differences in scores before and after using the infographic?
3) How about the effectiveness of achievement scores after using infographic?
4) How about the student opinion after using infographic?

Research Objectives

1) To study about the validity of the infographics for using to teaching.
2) To compare learning achievement between pretest and posttest scores.
3) To Comparing the learning achivement of art in this research the course instruction by using infographic.
4) To study about the Student satisfaction.

Conceptual Framework

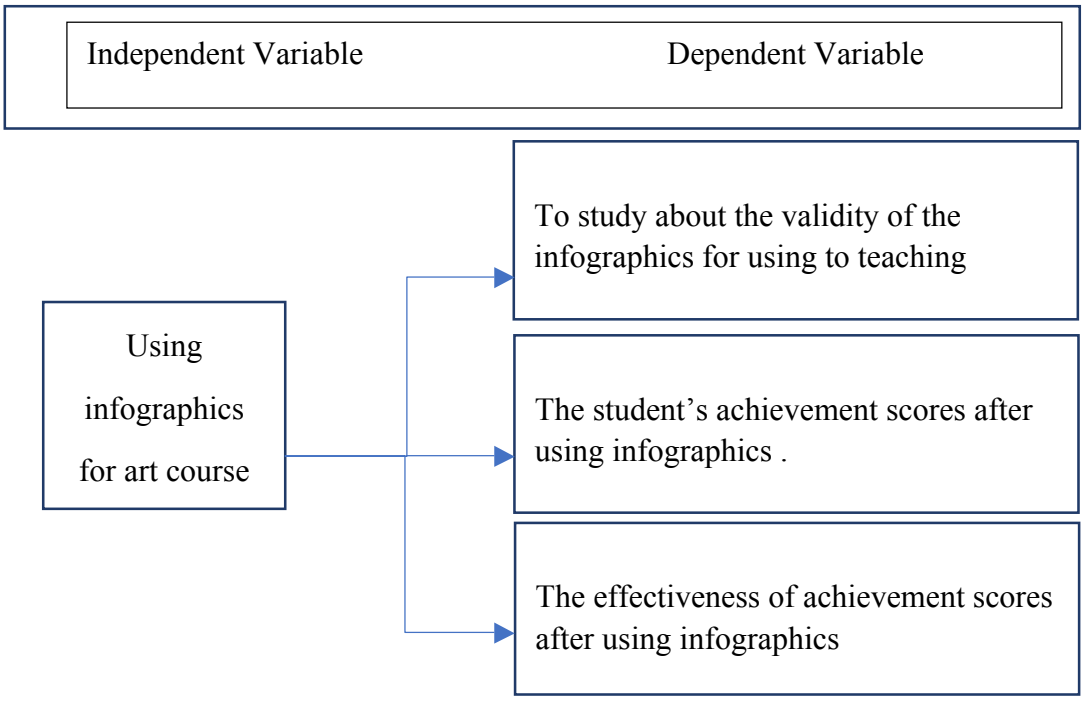

Figure 1: Research framework for the improvement of Achievement scores of students

Definition of Keywords

1. Infographics

Infographics are visual presentations of information and data designed to present complex information easily and quickly. In simple terms, infographics attempt to present a set of data and complex information in a visual way that readers can quickly and easily understand by utilizing visual elements such as images, graphs, maps, and charts. Today's students have been living in an auditory, visual and multimedia dynamic environment since birth, and the use of past methods and teaching models is boring and ineffective for them, unable to produce satisfactory teaching results. Teachers need to be informed about new technologies and media in teaching and learning and have a positive attitude towards them. Research shows that using modern technology in the classroom can lead to better learning experiences and higher classroom satisfaction for students.

2. Effectiveness

Effective learning refers to the learning in line with the principles of education and teaching, its purpose is to spend less time, learn more, more solid, better, with the right way of learning to achieve twice the result with half the effort. Effective learning should be to help students spend less time, gain more knowledge, let students "learn one know ten"; Effective learning should make learning more interesting, it should not make students feel boring, but should be "edutainment".

3. Self-Regulated

Self-Regulated Learning (SRL), proposed by American psychologist Bandura in the 1970s, means that learners actively motivate themselves and actively use appropriate learning methods to learn. It can not only be regarded as a dynamic learning process or learning activity, but also as a relatively stable learning ability. Learners must have four conditions for self-regulated learning. Self-regulated learning is a circular process.

Research Methodology

Research Design

The research design was conducted according to the following structure in the objective of the research; it has been moving with steps as flowing:

The researcher used a quantitative approach in experimental design for conducting this study. The data was collected in a quantitative or numerical form derived from the test, and the experimental data of this study mainly consisted of pre-test experimental data and post-test experimental data.

Group: O1 x O2
O1 = Measurement of the pretest score
X = Infographic teaching to enhance learning achievement
O2 = Measurement of the achievement of the posttest score

The sample for this study was 30 students. They were the worst of the 60 students. The front side of 60 students, after the test to select the underperforming students. With 70 points as the standard, students with more than 70 points pass, and students with less than 70 points do not

pass, and infographic teaching method is adopted for students who do not pass. Through comparison, independent t test was used to explain.

Research Materials

The subjects selected for this experiment are 30 students from my 60 students in Sichuan Health Rehabilitation Vocational College. Our school is a national public vocational school with students from higher vocational colleges. As a teacher in a higher vocational school, I participate in the guidance of classroom teaching and carry out research on the effectiveness of classroom implementation.

The study was divided into two parts: the investigation test stage and the infographic teaching experiment stage, which lasted for 4 weeks, two lessons per week for one month.

The first step of the infographic teaching experiment: two weeks before the experiment, questionnaire survey and prediction of students' design ability were conducted to understand the problems existing in students' learning.

The second step was infographic teaching, which lasted for 4 weeks.

The third step is to test the teaching effect. In the last week of the experiment, students' artistic design ability and satisfaction survey are conducted, and then summarized.

Teaching process:

Step 1: The researcher studied theories of the art creative direction and the design plan to develop the questions in the pretest, posttest.

Step 2: The pretest, posttest was reviewed by the researcher's advisor and other experts in the field.

Step 3: The pretest, posttest was piloted with 30 students.

Step 4: 30 students were selected from the 60 students, in school of Sichuan Health Rehabilitation Vocational College, China, were assigned to complete the pretest. The test time was approximately half an hour.

Step 5: The researcher created the lesson plan using infographic teaching improve the low scores students. This lesson plan was designed for four weeks and approved by the researcher's advisor and experts in the field.

Step 6: The researcher ran the class based on the lesson plan. The students were taught infographic for four weeks. After that, they were assigned to complete both the post-test. The test time was approximately half an hour.

Research Results

1. Three Content Experts Put Forward the Idea of Improving the Learning Outcomes of Art Design for Vocational Students

The 10 items of evaluation consist of the form issued by three contents experts. A 5-point rating scale is utilized in this section to represent the content experts' opinion. Each criterion rating is identified as illustrated in Table below:

Table 1: The 10 items of evaluation

Evaluation Items	$\overline{X}$	S.D.	Result Interpretation
1. Consistency between content and learning objectives.	4.33	0.58	Good
2. The content is interesting.	5.00	0.00	Excellent
3. The content increases students' interest.	4.67	0.58	Good
4. The capacity of each activity is appropriate.	4.33	0.58	Good
5. Content sorting is appropriate.	5.00	0.00	Excellent
6. Content accuracy.	4.00	0.00	Good
7. The content is in line with the situation of Chinese higher vocational students.	5.00	0.00	Excellent
8. Activities are consistent with the content.	5.00	0.00	Excellent
9. Infographics stimulate learners' interest in learning.	5.00	0.00	Excellent
10. The overview of the content is complete.	5.00	0.00	Excellent
Total	**4.73**	**0.17**	**Excellent**

From Table 1, shows the evaluation results of three content experts on the content quality of infographic based teaching to improve art design learning outcomes. The overall quality was excellent ($\bar{X}$=4.73,S.D.=0.17). When considering each project, it was found that the content was interesting, the content was properly organized, the content was in line with the actual situation of Chinese vocational college students, the activities were consistent with the content, the content of micro-lessons stimulated learners' interest, and the content was complete in summary, respectively reaching the excellent level ($\bar{X}$=5.00,S.D. = 0.00).

2. The Efficiency of Using Infographics to Enhance Learning Achievement of Vocational Scores Lowest Students

Table 2: The average score of the pre-test

Average Pretest score	Average Posttest score	Total of pre-test scores	Total of post-test scores	Full scores multiplied by the number of students	Effectiveness Index (E.I.)
63.17	86.20	1895	2586	100 x 30	0.625

From Table 2, the average score of the pre-test is 63.17, and the average score of the post-test is 86.20, indicating that the infographic teaching method has a great improvement in improving the artistic design learning performance of vocational students. The results show that the value of the effective index (E.I.). The result revealed that the value of Effectiveness Index (E.I.). as 0.62 or calculated as 62 percentage. To sum up, this infographic teaching method has improved the learning results of art design for vocational college students.

3. Compare the Learning Achievement of Students Between Pre-test and Post-test Scores Using Infographic

Table 3: The effect of learning based on infographic on improving the artistic design achievements of vocational college students

Items	n	$\bar{X}$	S.D.	df	t-test	Sig.(2-tailed)
Pre-test	30	63.17	1.48	29	29.3	0.000
Post-test	30	86.20	1.91			

**p< .05
The mean difference is significant at the 0.05 level.

The table 3 shows the effect of learning based on infographic on improving the artistic design achievements of vocational college students. The mean pre-test score was 63.17, and the standard deviation (sd) score was 1.48. After the application of infographic-based learning to improve the learning performance of art design in higher vocational students, the students' academic performance was significantly improved, with the post-measured height value of 86.20, standard deviation (sd) of 1.91 and t-test analysis before and after the treatment 29.3 which demonstrated a considerable difference was statistically significant at the .05 level.

Summary of the Results

Results of evaluation efficiency of using infographic to improve the art scores of the low achievement students. The average score of the pre-test was 63.17 points, and the average score of the post-test was 86.20 points, indicating that the infographic teaching mode has a great promotion effect on improving the artistic design learning performance of higher vocational students. The results show that the value of the effective index (E.I.). The result revealed that the value of Effectiveness Index (E.I.). as 0.62 or calculated as 62 percentage.

Based on the concept of infographic teaching, the class has improved the learning performance of secondary vocational students in art design and improved their academic performance.

Three content experts evaluated the evaluation results of micro-classroom content quality based on infographic teaching to improve art design learning outcomes of vocational college students. The overall quality was excellent ($\bar{X}$= 4.73,S.D. = 0.17). The results show that teaching based on infographic can improve students' performance in art design.

When considering each project, it was found that the content was interesting, the content was reasonably organized, the content was in line with the actual situation of Chinese vocational college students, the activities were consistent with the content, the infographic content stimulated the interest of learners, and the content integrity reached the excellent level ($\bar{X}$= 5.00,S.D. = 0.00).

When considering each project, we found that "making it easier for students to understand what they are learning", "making it easier for students to understand what they are learning" and "details are clear and understandable" were respectively excellent levels ($\bar{X}$=5.00,S.D. = 0.00). The order and content of the activities are appropriate, able to present the learning content clearly, these activities are suitable for learners and easy for students to use were scored at high levels ($\bar{X}$=4.33,S.D.= 0.58). The results of this experiment are basically consistent with those of similar studies.

Conclusion

In my study use infographic to improve the art scores of the low achievement students.

Discussion and Recommendation

The classroom application of infographic teaching concept should be carried out step by step according to the best practices in the field, so that researchers can achieve the goal of building a classroom application curriculum based on infographic teaching concept, so as to improve efficiency and achieve greater success.

Infographic-based classroom development allows for more interesting activities to be designed by adding images, sounds and video clips. His plan will help attract students to participate in activities and enjoy more sports.

Art and design have had a profound impact on the surrounding market, and the impact of this course can be further expanded through the use of infographic-based teaching classrooms. At the same time, this research method can also provide reference for other disciplines.

Based on the summary and discussion of this study, the researchers' suggestions for further research are as follows:

New technologies should be introduced into the curriculum to stimulate more interest in learning.

Other arts courses and subjects of interest to students should be developed using infographics.

Future research on the application of infographics to teaching should be combined with other teaching methods such as cognitive skills, systems thinking skills and critical thinking skills.

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Contact emails: zeng_y@mail.rmutt.ac.th
metee_p@rmutt.ac.th

An Investigation on the Similarities and Differences in Conducting Project-Based Learning in Pure Online and Face-to-Face Class Environments at UTAS-Nizwa

Rolando Jr Lontok, University of Technology and Applied Sciences, Oman
Alice Lontok, University of Technology and Applied Sciences, Oman
Suad Abdullah Al-Riyami, University of Technology and Applied Sciences, Oman

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Abstract
Following a prolonged stretch of worldwide online classes due to the COVID-19 pandemic and the subsequent return to a face-to-face setting when everything normalized, the authors had the opportunity to conduct phenomenological observations on a project-based approach to learning. This was done while different cohorts of IT students undergo this approach when classes are done online due to the pandemic, as well as face-to-face when students return to traditional classes after that. This study aims to describe the main observations arrived at by the authors while using the project-based approach, highlighting common similarities and significant differences exhibited by different cohorts of students as they study the course. The authors primarily used the phenomenological approach in conducting the study, observing students' behavior as they go through the project-based learning approach. This methodology is supplemented by quantitative research through a survey distributed to the participating cohorts after conducting the research methodology classes every semester. The research was mainly participated by IT students registered in research methodology course throughout the study. Results showed that although many common similarities exist when the course is conducted in both environments, salient differences also exist that showed surprising student learning behavior. The authors hope to extend this investigation to other course types to develop a more standard framework for conducting the project-based approach in all learning environments.

Keywords: Project-Based Learning, Pure Online vs Face-to-Face, Teaching Modes

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Introduction

In the evolving education landscape, the push towards varied learning modalities has ignited a crucial dialogue on the efficacy of different teaching methods. Project-based learning (PBL) is central to this discourse, a pedagogical strategy that prioritizes student-led exploration through intricate, real-world challenges. This research explores an analytical comparison between applying PBL in entirely online formats and traditional, face-to-face classroom settings. The shift towards online education, hastened by the COVID-19 pandemic, presents an opportunity to investigate the dynamics of these educational environments and their influence on the effectiveness of PBL.

This study is based on the understanding that the widespread, rapid adoption of digital learning platforms introduces hurdles and prospects for PBL's deployment. It scrutinizes the online setting's impact on student collaboration, task completion, and instructor communication, overlaying these with the traditional classroom experience. By adopting a mixed-methods research framework that melds observational studies, comprehensive student feedback, and performance evaluation, the investigation offers a perspective on the relative merits of PBL across varied instructional contexts.

The investigation seeks to develop a roadmap through the complexities of executing PBL in diverse educational landscapes and harness the potential of digital tools in fostering student involvement and knowledge acquisition. It examines the pivotal function of teacher guidance and interactive dialogue in improving the educational journey. Moreover, the paper tackles the adaptation challenges learners and educators encounter in the virtual PBL field, proposing solutions to navigate these issues.

As the educational sector stands at a crossroads in the aftermath of the pandemic, with a foreseeable increase in hybrid and completely online courses, this research adds a vital layer to the discourse on molding future-ready educational models. By delineating the contrasts and convergences in PBL's implementation across online and face-to-face platforms, the study will illuminate pathways toward optimizing teaching strategies for immersive, impactful learning experiences in any setting.

Statement of the Problem

As educational institutions navigate the transition between online and traditional face-to-face teaching modalities, the effectiveness of PBL within these distinct environments remains an area ripe for investigation. The abrupt shift to online learning, driven by the COVID-19 pandemic, has introduced a unique set of challenges and opportunities for PBL—a pedagogical approach renowned for emphasizing student-centered, real-world problem-solving. However, the impact of online versus face-to-face settings on the core components of PBL, including student engagement, interaction, completion of projects, and overall learning outcomes, is not fully understood. This knowledge gap represents a critical barrier to optimizing PBL strategies for diverse learning environments.

Given the observed differences in student behaviors and perceptions between online and traditional classroom settings, such as increased question-asking in online formats versus a noted lack of engagement in face-to-face settings, a pressing need exists to systematically evaluate how these modalities influence the success and effectiveness of PBL. Furthermore, the comparative lack of data on academic performance and student satisfaction in these

settings in the Middle East region underscores the need for a focused investigation at UTAS, Nizwa.

To achieve the aim of this study, the following objectives are set:

1. To identify and compare key behavioral and engagement patterns in PBL among students in online and face-to-face settings;
2. To quantitatively assess the effects of online and face-to-face delivery on PBL learning outcomes; and
3. To bridge the knowledge gap on PBL implementation in diverse educational contexts.

Hypothesis

Null Hypothesis (H0): There is no significant difference in student engagement, academic performance, and perception of the learning experience between Project-Based Learning (PBL) implemented in online classes and PBL implemented in traditional face-to-face classes.

Scope of the Study

This research concentrates on the comparative analysis of PBL within ITIS304: Research Methodology, a course offered at the University of Technology and Applied Sciences, Nizwa. The study is mainly framed around the significant educational transition prompted by the COVID-19 pandemic—from an enforced online teaching model to the traditional face-to-face classroom setting. This pivot provides a rare opportunity to explore PBL's adaptability and efficacy across markedly different learning environments during a critical period. Specifically, the investigation spans three semesters of compulsory online instruction during the height of the pandemic and the initial three semesters after the reinstatement of in-person classes, capturing the immediate responses and adaptations of students and educators to the changing educational modalities.

While centered on a single institution, the geographical scope reflects broader educational dynamics and global challenges during and after the pandemic, offering insights that may resonate beyond the local context. The research contrasts the online and face-to-face delivery modes. Online classes were conducted through the university's e-learning platform, Moodle, complemented by digital communication tools such as email, MS Teams Meetings, and Moodle's messaging features for real-time interactions and feedback. In contrast, the face-to-face classes reverted to traditional in-classroom engagement, relying on direct interactions, though email communication played a significant role in student-instructor exchanges.

An essential aspect of this study is the detailed observation and analysis of student behavior and interaction patterns within these environments. It investigates how students' question-asking tendencies, communication preferences, adherence to project deadlines, and overall engagement with the PBL methodology diverge between online and in-person settings. This investigation is underpinned by a phenomenological approach to capture students' lived experiences and perceptions navigating the PBL framework under both conditions. Such an approach is crucial for understanding the impacts of learning environments on student engagement and educational outcomes.

Complementing the qualitative observations, the study employs a targeted survey to assess various facets of student academic performance and perceptions quantitatively. This includes

their understanding of course requirements, interest in PBL activities, reception of feedback, learning and mastery of course topics, achievement of learning outcomes, and overall satisfaction with the PBL experience. The survey data, collected across multiple semesters, serve as a foundation for a comprehensive analysis, offering statistical insights and a richer understanding of the student experience.

While offering in-depth insights into the PBL implementation during a significant educational disruption, the scope of this research is bounded by its specific institutional context. It delves into the immediate post-pandemic educational landscape, reflecting on the unique challenges and opportunities that emerged from this transition. However, the findings, grounded in the experiences of students and educators navigating this adjustment period, contribute to the discourse on PBL's role in the evolving educational paradigm. While the study's insights are founded in the specific experiences of a single course during a distinctive educational period, they illuminate broader themes and considerations for implementing PBL across varied learning environments, underscoring the adaptability and resilience of pedagogical strategies in the face of unprecedented challenges.

Significance of the Study

This study's significance is multifaceted. It addresses the need to adapt educational practices to the changing landscape of digital and traditional learning environments. By conducting a detailed comparison of PBL in online and face-to-face settings, this research provides insights that are helpful for educators, curriculum designers, and policymakers to enhance education quality and inclusivity.

Central to its contributions is identifying each instructional modality's specific challenges and opportunities. It also offers strategies for leveraging PBL's strengths to foster student engagement, critical thinking, and problem-solving skills. This is especially relevant in a post-pandemic world where the blend of digital and conventional teaching methods has become increasingly common.

Moreover, the study underscores the importance of educational equity, highlighting how diverse learning environments influence student satisfaction and performance. These findings promote creating more adaptable, inclusive educational spaces, acknowledging the significant barriers the digital divide poses. Additionally, the research sets a direction for future inquiries into integrating technology in education, suggesting ways to optimize PBL for enhancing lifelong learning skills.

Literature Review

Project-based Learning (PBL) is an active learning approach where students solve real-life problems, collect and analyze data, and develop skills in socialization, thinking, and self-regulation. It focuses on individual differences in learning and uses evaluation techniques such as performance-based assessment, portfolios, journals, and authentic-based assessment (Yalcin, 2020). PBL is effective in fostering critical thinking, problem-solving, and collaborative skills. It engages students in learning by presenting them with complex, open-ended problems requiring critical thinking and creativity (Taufik & Kwabena, 2023). Students develop critical thinking skills through this process, including analyzing information, evaluating arguments, and making sound judgments (Sartika, Rahman, & Irfan,

2023). Additionally, PBL enhances collaboration and communication abilities, allowing students to work together to find solutions.

PBL actively involves students in real-world complex problems, collaboration, and problem-solving skills. It culminates in a product or presentation, integrating inquiry and real-world issues (Piccolo, Buzzo, Knobel, Gunasekera, & Papathoma, 2023). However, in the PBL implementation, students may face difficulties in collaborative activities, time management, and teamwork due to a lack of self-regulation.

Digital platforms and technologies facilitate PBL by providing various tools and functionalities that enhance the learning experience. These platforms offer a wide range of digital technology and tools, such as learning management systems (LMSs), video conferencing platforms, and collaboration apps, which enable remote learning, online discussion, and collaboration. Web-based platforms specifically designed for project-based learning provide functionalities for creating, managing, and evaluating projects, making it easier for teachers to implement this approach. The emergence of PBL e-learning platforms has also provided solutions to the challenges faced in implementing PBL, offering features and functions that support its learning process and management.

Implementing PBL during the COVID-19 pandemic has been proven effective in developing students' knowledge, professional skills, and learning attitudes. The pandemic highlighted the need for meaningful interaction and engagement in PBL, which can be addressed through teacher strategies that bridge the socio-technical divide. Additionally, the pandemic has accelerated the implementation of alternative learning modalities, providing opportunities for integrating PBL in online and remote learning settings.

Online learning has gained popularity due to its accessibility, affordability, and flexibility. Research findings suggest that online learning can be as effective as traditional methods. In a study comparing traditional campus-based education with online learning, feedback from students who experienced both methods during the COVID-19 pandemic showed a positive perception of online learning. Another study on English language teaching found that online learners performed better than learners in traditional classrooms. (Thakur, 2023) Additionally, a study comparing traditional face-to-face service-learning with e-service-learning found that both methods enhanced student developmental outcomes, with e-service-learning slightly outperforming traditional service-learning.

Student behaviors in online and face-to-face PBL settings differ in several ways. In online PBL, students may experience reduced participation, communication, and group skills. However, one study found that students' ethical behavior in online classes was not always disciplined, engaged, or responsible. On the other hand, face-to-face PBL allows for facilitated problem-solving and strong collaborative skills (Sung, 2023). It was also found that entirely online PBL could improve student learning outcomes and academic staff experience while supporting the development of critical thinking and self-directed research (Apriliaswati & Fitrianingrum, 2022). Another study showed that applying non-face-to-face PBL in online classes could enhance capabilities such as motivation, deep learning, and self-directed learning (Park, 2022). Overall, the mode of instruction, whether online or face-to-face, can affect student behaviors and outcomes in PBL settings.

PBL has been identified as an effective pedagogy for interdisciplinary learning. However, implementing PBL poses challenges in both traditional and online learning environments.

Teachers face difficulties implementing PBL due to lack of experience, time constraints, and language acquisition issues. Students also encounter challenges in PBL, including difficulties in collaborative activities, time management, problem-solving, teamwork, and investigation techniques due to a lack of self-regulation. The emergence of PBL e-learning platforms provides a potential solution to overcome these challenges. However, little is known about their design and how they facilitate the PBL learning process and management. Understanding and addressing these barriers is crucial for successfully implementing PBL in both educational formats.

Educational technology innovations can address instructors' challenges in implementing authentic PBL by providing tools for scoping, sourcing projects, curriculum preparation, assisting teams, and coordinating stakeholders. Implementing innovative technology tools and teaching methods can enhance student engagement in virtual and hybrid environments, especially when addressing students' social-emotional needs and utilizing synchronous and asynchronous educational tools. Integrating technology into the classroom can bridge the gap in traditional teaching methods and contribute to transformative innovations in education, with technology integration measures significantly related to transformative education in terms of performance, reforms, and opportunities.

The studies cited above tackle the intricacies of PBL, underscoring its effectiveness in fostering critical thinking, problem-solving, and student collaboration. PBL's adaptability across different educational settings, notably online and traditional face-to-face environments, emerges as a focal point, especially in the context of the challenges posed by the COVID-19 pandemic. Key findings highlight the transformative potential of digital platforms in facilitating PBL, offering tools for enhanced communication, collaboration, and project management. The literature also identifies student behaviors and engagement patterns within online and face-to-face modalities, suggesting that each setting uniquely influences the PBL experience.

Moreover, the effectiveness of PBL during the pandemic is affirmed, with the shift to online learning presenting challenges and opportunities for meaningful interaction and engagement. Comparative studies further suggest that online learning can match or surpass traditional methods in certain aspects, enhancing student outcomes and perceptions. However, the literature also points to challenges in PBL implementation, including collaboration, time management, and technology integration, underscoring the need for innovative solutions to support effective PBL across educational formats.

Lastly, the literature underscores the critical role of PBL in contemporary education, highlighting its capacity to adapt to and thrive within both online and traditional settings. The findings advocate understanding how digital tools and pedagogical strategies can be optimized to overcome challenges, ultimately enhancing educational outcomes and student experiences in an increasingly digital learning landscape.

Methodology

The methodology for this research is designed to offer a comprehensive analysis of PBL within online and traditional face-to-face educational settings, particularly in the context of the ITIS304: Research Methodology course at the University of Technology and Applied Sciences, Nizwa. This study is anchored in a mixed-methods approach, combining qualitative

and quantitative analyses to explore PBL's implementation and its effect on student behavior, engagement, and learning outcomes.

The study begins with a phenomenological examination of students' experiences during three semesters of online classes necessitated by the COVID-19 pandemic. It continues through the first three semesters after returning to face-to-face instruction. This qualitative approach is pivotal for capturing the essence of students' lived experiences, providing depth to understanding their interactions, engagement patterns, and overall perception of the PBL process in varying educational contexts. Observations focus on key behaviors: question-asking frequency, communication methods (particularly email, Moodle, and MS Teams messaging system), adherence to deadlines, and ease of instructor interaction. These behaviors indicate the students' adaptability to and engagement with the PBL framework in both settings.

To complement the qualitative insights, a structured survey was administered to students to measure their perceptions of the PBL experience across several dimensions. These include their understanding of course requirements, interest in course activities, reception of feedback, learning of course topics, achievement of learning outcomes, and overall satisfaction with the course. The survey comprised ten questions, each rated on a scale to assess the varying aspects of the students' educational experience and perceptions of PBL's effectiveness. Statistical analysis of the survey results, particularly mean score comparison between online and face-to-face modalities, serves as the basis for a quantitative evaluation of PBL's impact on student learning and engagement.

Observational data were systematically collected through the course instructor's notes on student behavior and interaction during online and face-to-face classes. These observations provided a real-time understanding of the classroom dynamics under different instructional modes. The student survey data were analyzed using statistical tools to compare mean scores across different semesters and modalities, offering a numerical representation of the comparative effectiveness of PBL in online versus traditional settings.

This study's mixed-methods approach, combining phenomenological observations with quantitative survey analysis, offers a holistic view of PBL's implementation and effectiveness. This methodology provides depth and breadth to the investigation and ensures that the findings are grounded in both empirical data and the participants' lived experiences. Through this comprehensive methodological framework, the study aims to contribute valuable insights to the ongoing discourse on optimizing PBL in diverse educational settings, particularly in the post-pandemic educational landscape.

Discussion of Results

Data analysis and interpretation for this research delve into the dynamics of PBL within the contrasting fields of online and traditional face-to-face education. Utilizing a mixed-methods approach, the study presents a multifaceted view of student engagement, behavior, and perceptions within the ITIS304: Research Methodology course against the backdrop of the COVID-19 pandemic's impact on educational formats.

For the results in the qualitative data collected, the phenomenological approach yielded rich qualitative data, revealing notable differences in student behavior and interaction patterns across online and face-to-face settings, as described in the following sections:

Online Classes:

- Increased Question Asking: Students were more proactive in seeking guidance, indicating a higher engagement or need for clarification without physical cues.
- Heavy Email Use: Email was the primary mode of communication, suggesting comfort or necessity in written communication over real-time interactions.
- Deadline Adherence: There was an emphasis on meeting deadlines, potentially reflecting the structured nature of online learning platforms like Moodle.
- Ease of Interaction: Students appeared more comfortable interacting through digital platforms (e.g., MS Teams, Moodle forums), possibly due to the anonymity (as this is customary in this region, especially for females) or convenience these platforms offer.

Face-to-Face Classes:

- Relaxed Approach to Deadlines: There has been a noticeable relaxation in deadline adherence; this may reflect the influence of direct, personal reminders and the physical classroom environment.
- Primary Email Communication: Email remained a significant communication tool despite returning to face-to-face learning. This indicates its entrenched role in student-teacher interactions.
- Lower Lecture Engagement: Observations directed to reduced interest in lectures compared to their online counterparts. This is possibly due to differences in content delivery or classroom dynamics.
- Focus during Critical Periods: There was a tendency to concentrate efforts around crucial deadlines, suggesting possible procrastination or strategic allocation of effort.

The statistical analysis of survey responses further illustrates the comparative impact of PBL in online versus face-to-face formats, as shown in the following table:

Question	**Online Classes**			**Mean**	**F2F Classes**			**Mean**
	S1	**S2**	**S3**		**S1**	**S2**	**S3**	
Q1 – Understanding Course Requirements	1.56	1.42	1.50	1.49	1.50	1.20	1.13	1.28
Q2 – Interest in Weekly Activities	1.94	1.53	1.67	1.71	1.70	1.80	1.88	1.79
Q3 – General Feedback from the Teacher	1.50	1.26	1.17	1.31	1.20	1.00	1.38	1.19
Q4 – Learning from Weekly Activities	1.94	1.95	1.67	1.85	2.00	1.80	1.38	1.73
Q5 – Achievement of Learning Outcomes	1.78	1.68	1.67	1.71	1.60	1.60	1.63	1.61
Q6 – Connecting Different Ideas to Knowledge	1.72	1.58	1.33	1.54	2.00	1.40	1.63	1.68
Q7 – Challenged by Weekly Activities	2.06	2.26	2.00	2.11	2.40	1.80	1.88	2.03
Q8 – Doing More Work	1.94	1.74	1.42	1.70	2.30	1.40	1.13	1.57
Q9 – Overall Improvement of Ability	1.78	1.68	1.58	1.68	2.00	1.40	1.00	1.47
Q10 – Overall Learning	1.67	1.53	1.67	1.62	1.80	1.80	1.38	1.66
Mean	1.79	1.66	1.57	**1.67**	1.85	1.52	1.44	**1.60**

Table 1: Statistical Analysis of the Survey Conducted every End of Semester

Following are some of the highlights from Table 1:

Overall Engagement and Understanding: Online students reported marginally better understanding of course requirements and engagement with activities, as indicated by the slightly higher mean scores in questions related to understanding and interest (Q1-Understanding Course Requirements: 1.79 online vs. 1.60 face-to-face; Q2-Interest in Weekly Activities: 1.71 online vs. 1.73 face-to-face).

Feedback and Learning: The feedback reception and learning topics also showed a difference, with online students perceiving feedback as more effective (Q3-General Feedback from the Teacher: 1.31 online vs. 1.19 face-to-face), possibly due to the structured nature of digital platforms facilitating more transparent, documented communications.

Achievement of Learning Outcomes: Both groups reported similar levels of achievement regarding learning outcomes (Q5-Achievement of Learning Outcomes: 1.71 online vs. 1.61 face-to-face), suggesting that while the mode of delivery differs, the effectiveness in achieving educational objectives may be comparable.

Challenges and Improvement: Students in online settings felt slightly more challenged (Q7-Challenged by Weekly Activities: 2.11 online vs. 2.03 face-to-face), which could reflect the adaptability required in navigating digital learning environments. Conversely, the overall ability improvement and contribution to the research project (Q8-Doing More Work due to Weekly Activities: 1.70 online vs. 1.57 face-to-face; Q9-Overall Improvement of Ability: 1.68 online vs. 1.47 face-to-face) highlight the potential for online PBL to foster a sense of autonomy and initiative.

The analysis of the mean scores between Online PBL and Face-to-Face PBL showed that the p-value = 0.0043 and the t statistic is approximately 3.40. This means that the means of the two modes of PBL are widely spread and statistically significantly different.

The findings of the study underscore the complexities of implementing PBL across different educational settings. While online learning environments offer distinct advantages in student engagement and feedback's perceived effectiveness, face-to-face settings provide a different dynamic that may influence deadline adherence and lecture engagement. Notably, the slight differences in quantitative measures of learning outcomes suggest that both modalities can achieve comparable educational goals, even through divergent paths.

This comprehensive analysis enhances students' adaptive strategies in each setting and highlights the critical role of instructional design and educator responsiveness in maximizing PBL's effectiveness. The findings support a blended approach that leverages the strengths of both online and traditional methods to enhance educational outcomes in the post-pandemic era.

Conclusion and Recommendations

This research comprehensively examined PBL within the contrasting realms of online and traditional face-to-face education, using ITIS304: Research Methodology at the University of Technology and Applied Sciences, Nizwa, as the focal point. Combining qualitative observations with quantitative survey analyses, the mixed-methods approach has revealed

insightful differences in student engagement, behaviors, and perceptions across the two settings.

The key findings of the study indicate that:

Students in online settings demonstrated higher levels of question-asking and utilized digital communication tools extensively, highlighting an active pursuit of clarity and guidance in their learning process. The reliance on and the effectiveness of digital platforms for course deliverables and updates were notably higher in the online environment, pointing to the critical role of technology in facilitating PBL. Conversely, students in face-to-face settings exhibited a more relaxed approach to deadlines. They were less engaged in lectures, suggesting differences in motivation and interaction patterns compared to their online counterparts.

Quantitatively, the survey results underscored these observations with significant differences in mean scores relating to students' understanding of course requirements, engagement with activities, and overall perception of learning effectiveness in PBL across the two teaching modes.

Based on the findings of the study, the following recommendations are proposed:

Enhance Digital Communication: Given the active use of digital tools in online settings, educators should integrate these platforms into face-to-face classes to encourage higher engagement and interaction. Tools like Moodle, MS Teams Meetings, and other e-learning platforms can supplement traditional teaching methods, making learning more accessible and engaging.

Incorporate Flexible Deadlines: The online students' adherence to deadlines suggests that clear, structured timelines coupled with flexibility can enhance project completion rates. Implementing staged deadlines with feedback opportunities can motivate students in both settings.

Promote Active Learning: The higher question-asking activity in online classes indicates a proactive engagement that should be encouraged across all formats. Strategies may include incorporating more interactive activities like group discussions and real-time quizzes to foster a more engaging classroom environment.

Tailor Feedback Mechanisms: The importance of feedback was evident across both modalities. Educators should develop efficient, timely feedback mechanisms that leverage digital tools to provide personalized, actionable insights into student work.

Bridge the Engagement Gap: To address the observed differences in lecture engagement; educators should explore blended learning models that combine the best aspects of online and traditional methods. This could involve using online resources to complement face-to-face teaching, enhancing the educational experience.

In conclusion, this study highlights the dynamics of PBL in online versus face-to-face settings. It provides a foundation for enhancing educational practices to better serve contemporary learners' needs. By embracing the recommendations outlined, educators and

institutions can advance toward a more inclusive, engaging, and effective educational paradigm that leverages the strengths of both traditional and digital learning environments.

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Contact email: rolando.lontok@utas.edu.om

Designing an Alternate Reality Educational Game That Integrates Virtual Reality and Storyline to Learn About the History and Culture of a Local Town

Chih-Chung Chien, Graduate Institute of Applied Science and Technology – National Taiwan University of Science and Technology, Taiwan
Pei-Ching Ngu, Graduate Institute of Applied Science and Technology – National Taiwan University of Science and Technology, Taiwan
Chih-Chen Kuo, Graduate Institute of Applied Science and Technology – National Taiwan University of Science and Technology, Taiwan
Hau-An Yu, Graduate Institute of Applied Science and Technology – National Taiwan University of Science and Technology, Taiwan
Huei-Tse Hou, Graduate Institute of Applied Science and Technology – National Taiwan University of Science and Technology, Taiwan

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Abstract
Local cities in Taiwan actively emphasize the preservation of town cultural assets and the creation of distinctive cultural attractions. In this study, we designed an alternate reality educational game, taking the love story of the town of Puzi in Taiwan 70 years ago as the theme, and connecting several representative cultural attractions. The learning objective is for the learner to take an old man who has returned to his hometown from a faraway place to search for the places he remembered in this town 70 years ago and collect clues in each place to complete the old man's mission to find his girlfriend when he was young. The game uses *Google Form* for storytelling and allows learners to control the story by selecting different options. Learners need to actually walk to the places of interest in order to unlock the puzzles presented in the VR (Virtual Reality) surroundings. Players can deepen their understanding of the cultural sites through observation in the actual site, peer discussion, and online research, and final decision-making to solve the puzzles. The preliminary study was conducted with 23 participants from Taiwan, ranging from 12 years old to 50 years old adults. The results of the study showed that the participants' mean scores for flow, anxiety, game elements, and game feedback were all significantly higher than the median of the scale (i.e., 3). The research results preliminarily show that the mechanism designed in this study is easy to operate and will not cause learning anxiety.

Keywords: Alternate Reality Educational Game, Town Cultural Assets, Role-Play Simulation, Multidimensional Scaffolding Mechanism, VR, Location-Based

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Introduction

In an era of economic growth, urbanization and rapid development, towns and cities can be considered modern battlegrounds for the preservation of cultural assets, often faced with choices between conservation and preservation, destruction, and redevelopment (Sadowski, 2017). Therefore, the preservation of cultural assets in towns and cities has become an important policy issue in many countries around the world, especially in historical and cultural urban landscapes (Taylor, 2016). The concept of historic townscape is based on the recognition of the complexity and human history of the town's environment, which is closely related to the value of citizens and tourists (Bonadei et al., 2017). Therefore, citizens' cognitive perception of these historical and cultural locations can contribute to the preservation of cultural assets and the enhancement of the tourism economy (Riganti & Nijkamp, 2004). Moreover, local historical and cultural assets may act as a positive pull factor for the local tourism and creative economy. With the development of technology, VR is increasingly used in educational learning for landscape exploration, which can make environmental teaching easier to understand, interesting and present complex data in a simple way for students to learn (Piovesan et al., 2012). It may also enable learners to interact with objects in the VR environment to find information to discover, explore and build their knowledge (Alfadil, 2020). Piovesan et al. (2012) stated that VR can make learning more fun with the aim of increasing motivation and attention.

At the same time, the combination of storytelling scenarios and simulation games based on situated learning theory (Brown et al., 1989) can promote learners' motivation and enhance the flow (Chien et al., 2022). This study designs an exploratory alternate reality puzzle educational game, based on a love story from 70 years ago, and is guided by modern technology tools VR and connected with the *Google Form* platform for story, and allows participants to experience the urban cultural attractions in depth through walking. The purpose of this study is to enhance the understanding of the cultural assets of the town and the value of creating a distinctive cultural attraction through realistic experiential learning. At the same time, several important psychological factors of learning (flow, activity anxiety, game elements, and game feedback) in this game-based mechanism were initially explored.

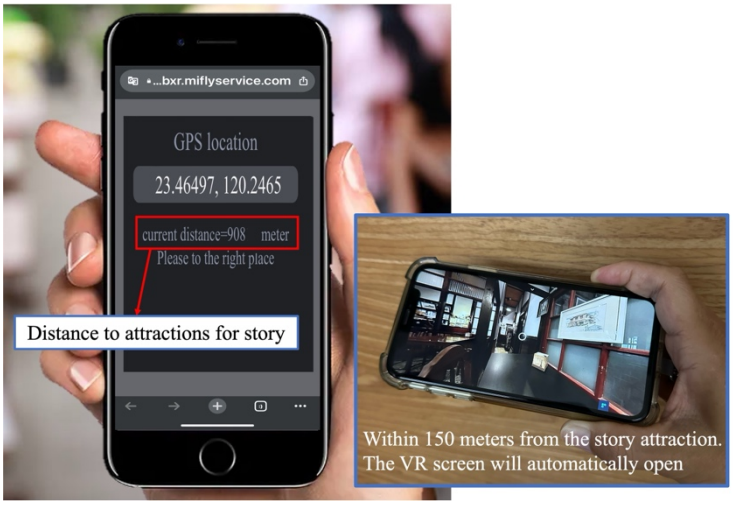
Methods

The mission of this game is to help the old man in the story to find the story of his memory of meeting his girlfriend in several locations in the city 70 years ago. Figure 1 represents the two platforms that learners need to use on their cell phones: 1) VR Surround Video technology to find the clues of story locations, and 2) *Google Form* to choose the direction of the story to achieve the task of the old man looking for his girlfriend. In addition, during the task exploration process, when learners determine the attractions where the next story unfolds based on clues, they can ask residents or use their mobile phones to search *Google Maps* to guide them to the attractions. If the attraction is one of the story attractions, and the GPS location data of the mobile phone is then calculated by the VR platform and is within 150 meters of the story attraction, the VR story attraction clue function screen will appear on the phone (location-based mechanism). As shown in Figure 2. The whole mission goes like this. This is a preliminary study of 23 participants from Taiwan, ranging in age from 12 years old to 50 years old adults, working in groups of three, with at least one cell phone or Tablet PC capable of Internet access and camera scanning in the group. Each session lasted about 80 minutes, including 10 minutes for game explanation and preparation, 20 minutes for filling out questionnaires, and about 50 minutes for walking around the scenic locations. This study

investigated the effects of using an alternate reality puzzle game mechanism on participants' flow, activity anxiety, game elements, and game feedback during a tour of a tourist location. In addition, 3 semi-structured questions were also investigated, focusing on further understanding whether the game mechanism in this study could stimulate participants' interest and emotions in traveling to the tourist attraction.

Fig. 1: *Functional description of the two platforms, VR and Google Form, which are used by the mobile phone in the game task.*

Fig. 2: *VR startup triggering uses Location-based mechanism.*



Results and Discussions

According to the single-sample Wilcoxon Singed-Rank analyses (e.g., Table 1 and Table 2), investigating participants' flow ($M = 4.44$, $SD = 0.46$), game acceptance ($M = 4.5$, $SD = 0.57$), game Usefulness ($M = 4.52$, $SD = 0.65$), game ease of use ($M = 4.46$, $SD = 0.67$), and game elements ($M = 4.53$, $SD = 0.53$), the means were significantly higher than the median of the scales (i.e., 3). It means that the game mechanism is easy to operate and does not cause learning anxiety and enhances the learners' flow. Through the analysis of qualitative opinions, the learners said that the game was interesting, novel, and immersed in the game. From the above analysis, it is inferred that the VR puzzle mechanism can promote the participants'

motivation to learn about the history and culture of the local town, and it has the potential to enhance the tourism interest and emotion of the town's tourist locations.

Table 1. *The mean and standard deviation of learners' flow*

	(*N*=23)			
	M	*SD*	*Z*	*Sig.*
Overall Flow	4.44	0.46	4.20***	0.000
Flow antecedents	4.47	0.51	4.22***	0.000
Challenge-skill balance	4.57	0.53	4.28***	0.000
Goals of an activity	4.54	0.62	4.21***	0.000
Unambiguous Feedback	4.41	0.70	4.12***	0.000
Control	4.48	0.67	4.11***	0.000
Playability	4.35	0.63	4.16***	0.000
Flow experience	4.42	0.50	4.20***	0.000
Concentration	4.54	0.62	4.29***	0.000
Time distortion	4.20	0.72	3.95***	0.000
Autotelic experience	4.62	0.50	4.26***	0.000
Loss of self-consciousness	4.00	1.08	3.23**	0.001

** p <0.01, *** p <0.001

Table 2. *The mean and standard deviation of learners' game anxiety, game feedback, and game elements*

	(N=23)			
	M	*SD*	*Z*	*Sig.*
Game Anxiety	1.96	0.73	-3.88***	0.000
Game Feedback	4.50	0.57	4.15***	0.000
Game Usefulness	4.52	0.65	4.21***	0.000
Game Ease of Use	4.46	0.67	4.21***	0.000
Game elements	4.53	0.53	4.14***	0.000

*** p <0.001

Conclusions and Limitations

In this study, an exploratory alternate reality educational game was designed to enhance the participants' perception of cultural asset preservation and local cultural tourism in towns and cities. In the game, in order to collect the puzzle clues of the narratives in the landscape, participants must plan the city sightseeing routes according to the storyline, Learners can deepen their understanding of the cultural locations through observation, peer discussion, and online research, and then make decisions to solve the puzzles, which can effectively enhance the flow and will not have too much anxiety in the game, so as to deepen the understanding of the cultural scenic spots. In addition, it is inferred that the game mechanism has the potential to promote learners' understanding of the history and culture of local towns and cities. It is suggested that future research can test the cultural landscape of different regions to determine the validity of the inference, and it is also suggested to design experimental and control groups to increase the reliability of the experiment.

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Contact email: hthou@mail.ntust.edu.tw

Best Practices in Promoting Gender Equality in the Philippine Education

Miguelito B. Emfimo, Mindanao State University-Iligan Institute of Technology, Philippines
Faith Stephanny C. Silor, Mindanao State University-Iligan Institute of Technology, Philippines
Adelfa C. Silor, Mindanao State University-Iligan Institute of Technology, Philippines

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Abstract
Integrating gender education into the system is the key to breaking free from biases, closing pay gaps, ending workplace segregation, and empowering women economically. It transforms education into a catalyst for societal equality. The present study delves into an analysis of the best practices of Philippine Education in promoting gender equality. Employing a qualitative design, the research investigates how gender equality is integrated into the educational landscape. Twenty-five teachers participated, and thematic analysis was applied to decipher insights from their experiences. The findings illuminate that the journey towards gender equality in Philippine education commences within the sacred confines of schools, unleashing a transformative ripple effect across society. By instilling the tenets of gender education, deeply ingrained biases are dismantled, forging a path toward a future untainted by gender pay gaps, workplace segregation, and exclusionary practices. Realizing gender equality necessitates the adoption of best practices in schools, including training personnel to combat discrimination, integrating gender, sexuality, and human rights into teacher training and curricula, and commemorating crucial months that emphasize equality. A comprehensive approach involves addressing broader societal issues of social class, culture, ethnicity, age, and sexual orientation within the educational sphere. Providing equal opportunities for all students in school activities, irrespective of gender, reinforces the commitment to inclusivity. Ultimately, the goal is to create a gender-fair learning environment where the rights of everyone are respected, heralding a society where equality is not merely taught but authentically lived.

Keywords: Inclusivity, Segregation, Gender-Fair Learning Environment, Teacher Training

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Introduction

The exploration of "Best Practices in Promoting Gender Equality in Philippine Education" unveils a critical research gap that calls for urgent attention and scholarly exploration. The existing body of knowledge in this domain is marked by notable gaps, underscoring the need for comprehensive research to inform effective policies and practices.

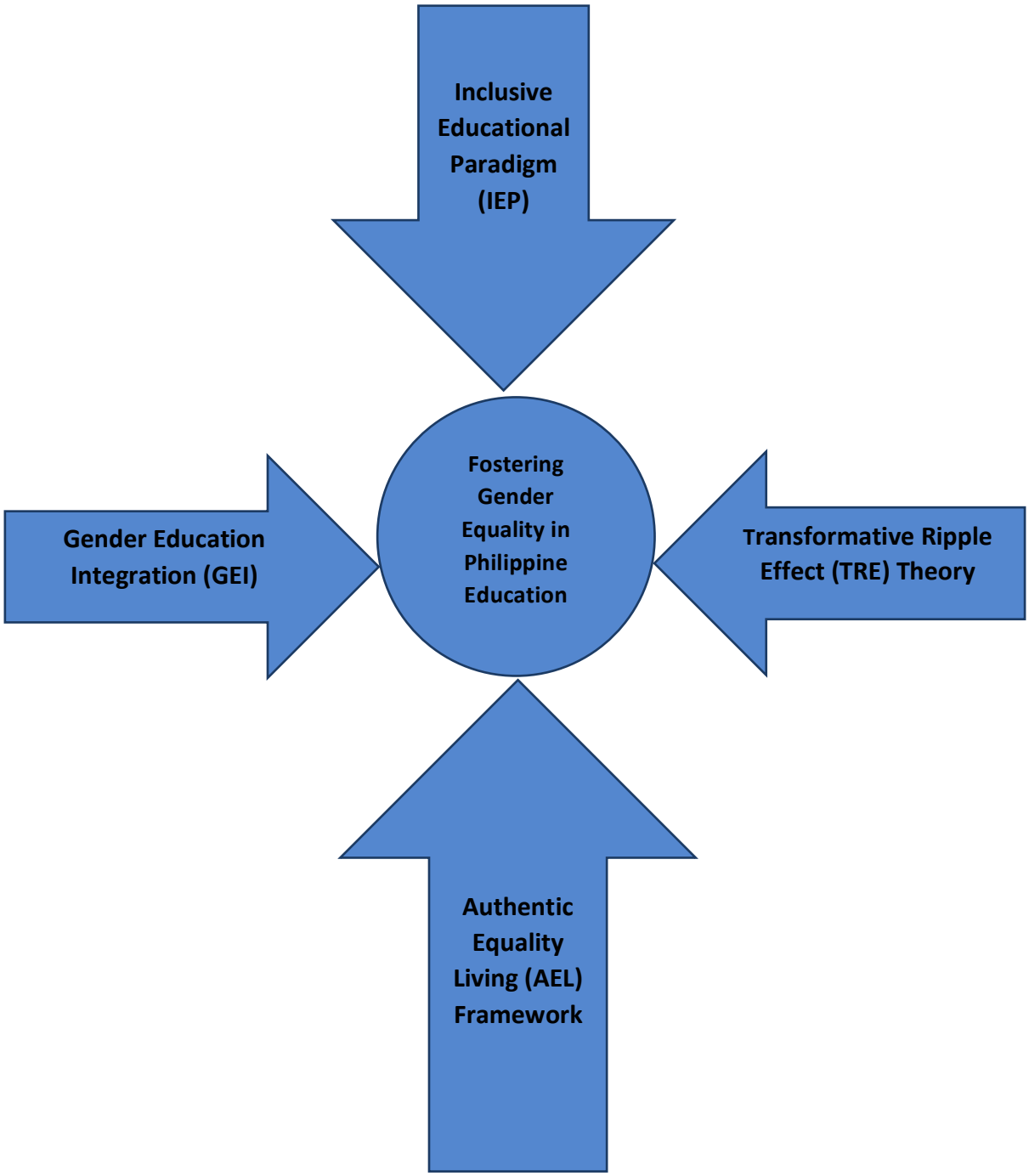
One glaring research gap lies in the specific identification and examination of best practices tailored to the unique socio-cultural context of the Philippine education system. While broader discussions on gender equality prevail, there is a dearth of in-depth analyses that delve into the nuanced strategies and interventions that prove most effective within the Philippine educational landscape. This research gap impedes the development of targeted and contextually relevant initiatives that could significantly propel the nation toward achieving gender equality in education.

Furthermore, there is a notable absence of extensive long-term research that monitors the application and results of gender equality initiatives over time. Understanding the sustained effects of best practices is essential for refining and adapting strategies, ensuring their continued relevance and efficacy. The lack of such longitudinal perspectives hampers the ability to assess the long-term transformative potential of these interventions within the Philippine education system.

Additionally, the research gap extends to the insufficient exploration of intersectionality within the context of gender equality in Philippine education. The interconnected nature of gender with other social factors such as social class, culture, ethnicity, and sexual orientation requires nuanced investigation. Failing to address intersectionality leaves gaps in our understanding of how various identity factors intersect and shape the experiences of individuals within the education system.

In conclusion, addressing the research gap in "Best Practices in Promoting Gender Equality in Philippine Education" is imperative for fostering meaningful progress. A more comprehensive and context-specific understanding of effective strategies, coupled with longitudinal analyses and an exploration of intersectionality, will not only contribute to academic scholarship but also serve as a guiding light for policymakers and educators striving to create an equitable educational environment in the Philippines.

Theoretical Framework Fostering Gender Equality in Philippine Education



Gender Education Integration (GEI)

Definition: The systematic and intentional integration of gender education into the educational system to dismantle biases, eliminate pay gaps, eradicate workplace segregation, and economically empower women.

Key Components: Involves curriculum modifications, personnel training, and the incorporation of gender, sexuality, and human rights into teacher training and educational materials.

Transformative Ripple Effect (TRE) Theory

Definition: The notion that integrating gender education within the educational landscape initiates a transformative ripple effect, fostering societal equality beyond the confines of schools.

Mechanism: By challenging and dismantling deeply ingrained biases within educational institutions, the effects permeate broader societal structures, influencing workplaces, economic practices, and social norms.

Inclusive Educational Paradigm (IEP)

Definition: A comprehensive approach to gender equality in education that addresses not only gender-related issues but also broader societal factors such as social class, culture, ethnicity, age, and sexual orientation.

Implementation: Involves strategies like providing equal opportunities for all students in school activities regardless of gender, fostering inclusivity in educational environments, and acknowledging crucial months that emphasize equality.

Authentic Equality Living (AEL) Framework

Definition: The ultimate goal of gender education, is that equality is not only taught but authentically lived in both educational institutions and broader society.

Components: Requires the adoption of best practices in schools, continuous training of personnel to combat discrimination, and the integration of inclusive values into curricula, fostering an environment where the rights of everyone are respected.

These theoretical concepts collectively form a framework for understanding and implementing gender equality within the educational system, emphasizing the transformative power of education on societal norms and practices.

Related Literature

Gender Disparities in Academic and Research Career Trajectories: Unraveling Vertical and Horizontal Dimensions

One factor influencing the distribution of academic and research career opportunities leads to an underrepresentation of women in higher academic positions. Conversely, women tend to

be overrepresented in the lower ranks of academia (European Commission, 2019). This disparity is particularly pronounced in higher academic ranks, where the majority of European countries have fewer than one female professor for every three professors (European Commission, 2017).

A robust knowledge foundation underscores persistent gender disparities in academic careers, emphasizing the significance of early career years in shaping a successful academic research trajectory. Minor differences during this phase have the potential to escalate into more substantial disparities later on. Our review has identified several research gaps: Current studies predominantly concentrate on the vertical dimension of gender equality, delving into hierarchical imbalances. There is a noticeable scarcity of studies along the horizontal dimension, which entails comparing situations between disciplines or groups of disciplines, despite the desirability of such studies. Furthermore, there is a lack of thorough analyses that examine the variations between women's and men's conditions in academia. Additionally, there is a scarcity of studies measuring the effects of these conditions on publication and career outcomes, employing methodologies such as "differences in differences" (Silander, Haake, Lindberg & Riis, 2022).

Empowering Societal Transformation: Integrating Gender Mainstreaming in Higher Education for Inclusive Policy Changes

Transforming the gender-blind higher education curriculum is a crucial step in successfully integrating gender mainstreaming into diverse policy areas. This initiative unveils the organizational structures and institutional settings that shape the micro-political strategies employed by feminist strategic alliances, resulting in significant policy changes. Additionally, the discussion delves into the possibility of transferring these effective strategies to different contexts (Verge, 2021).

Advanced education and research serve as crucial tools for empowerment and societal transformation. Universities wield significant influence in championing gender equality, diversity, and inclusion, not just within the realm of higher education but also on a broader societal scale (Rosa & Clavero, 2022). The idea that advanced education and research play a vital role in empowerment and societal transformation aligns with best practices in promoting gender equality in higher education. According to Rosa and Clavero (2022), universities have significant influence, not only within the academic sphere but also in society at large. Implementing best practices involves recognizing the transformative power of education and research, and leveraging universities as key players in championing gender equality, diversity, and inclusion. By integrating these principles into higher education institutions, we contribute to a broader societal shift towards greater equity and inclusivity.

Transformations in gender equality within Australian academia mirror broader societal shifts. However, these changes are intricately shaped by various factors such as government legislation, regulatory frameworks, cross-institutional action plans, university strategies, and dedicated individuals. The effects of these influences on gender equality in academia encompass heightened awareness across the sector, the adoption of gender equity strategies at the institutional level, and gradual yet consistent progress (Winchester & Browning, 2015).

Unveiling Complexities: A Capability Approach to Understanding and Addressing Gender Inequalities in Education

Examining gender inequalities in education through the lens of capabilities necessitates careful consideration of the intricate dynamics within the physical, political, and social environment, as well as the allocation of resources. It involves understanding how these complexities, distributions, and conversions contribute to individual freedoms and opportunities in the context of education. Gender influences these dynamics in multiple ways: as an aspect of the social, economic, and political environment; through the processes of resource distribution; in discussions about freedoms and opportunities; and in shaping individual values and interests, influenced by societal factors. Approaching gender inequalities in education through the capability approach involves a focus on freedoms, emphasizing how gender and other inequalities constrain these freedoms, rather than simply viewing gender inequalities as a component of educational outcomes (Unterhalter, Longlands & Vaughan, 2022).

Fostering Gender Equity: Analyzing and Addressing Disparities in Higher Education Participation and Decision-Making in Southeast Asian Contexts

In Asian developing nations, the distribution of males and females in higher education follows similar patterns. Among the nations are the Philippines, Malaysia, and Indonesia experiencing lower levels of male participation in Higher Education Institutions (HEIs) (Saadat, Alam & Rehman, 2022).

The determinants influencing the choice to pursue higher education typically fall into individual, social, financial, and educational categories. It is imperative to undertake research that examines these factors through a gender lens to comprehend the roots of gender disparities within higher education institutions. Equally important is the identification of the most significant factors among these categories that impede male students from pursuing higher education. Existing literature predominantly concentrates on female participants, highlighting the necessity to allocate time and attention to studying these factors specifically for male students (Saadat, Alam & Rehman, 2022).

In Southeast Asia, the decision-making process regarding higher education has historically exhibited gender-based imbalances, with a noticeable inclination toward male participation (Olson-Strom & Rao, 2020). The discussion on gender-based imbalances in the decision-making process for higher education in Southeast Asia, particularly favoring male participation, aligns with the imperative for adopting best practices in promoting gender equality in Philippine education. As indicated by Olson-Strom & Rao (2020), historical disparities in Southeast Asia highlight the need for targeted efforts to address gender-related challenges in education decision-making.

In the context of the Philippines, implementing best practices involves recognizing and rectifying historical imbalances in gender participation in higher education. Strategies may include targeted interventions to encourage and support female enrollment, addressing societal perceptions of gender roles, and promoting inclusivity in educational opportunities.

The discussion underscores the importance of not only acknowledging gender-based imbalances but also actively working towards creating an educational landscape that is equitable and inclusive. By aligning policies and practices with best practices for promoting

gender equality, the Philippine education system might help create a more equitable and balanced representation of both genders in higher education decision-making.

Empowering Education: Transforming Societal Perspectives and Gender Roles for Inclusive Higher Education in the Philippines

Nevertheless, there has been a substantial shift over time, characterized by a noteworthy increase in female enrollment in higher education institutions across Asian countries (Mukerji & Tripathi, 2016). This transformation is ascribed to evolving societal perspectives on gender roles, liberating women from traditional homemaking roles. With the recognition that education can augment their employment opportunities, women are actively responding to the changing societal landscape, thereby diminishing the opportunity cost for their families. The observed shift in Southeast Asia, marked by a notable rise in the number of women enrolling in postsecondary education institutions, resonates with the importance of adopting best practices in promoting gender equality in Philippine education. As highlighted by Mukerji & Tripathi (2016), this transformation is linked to evolving societal perspectives on gender roles, particularly in liberating women from traditional homemaking roles.

In the context of the Philippines, adopting best practices involves fostering an educational environment that actively challenges and overcomes traditional gender norms. Strategies may include implementing awareness campaigns to showcase the value of education for women in enhancing their employment opportunities. Empowering women to pursue higher education not only contributes to their personal growth but also has broader societal implications, as highlighted in the discussion.

By aligning with best practices, the Philippine education system can work towards dismantling stereotypes, providing equal opportunities for all genders, and creating an inclusive space where individuals are free to pursue their educational aspirations without being constrained by traditional gender roles. This not only benefits women but also contributes to the overall development and progress of society.

Decoding Gender Dynamics in Asian Higher Education: Shifting Patterns and Decision-Making

Examining specific instances in Asian countries, Wan (2018) observed a metamorphosis in gender participation in Malaysia, where females have exceeded males in enrollment over the past two decades. Wibrowski et al. (2017) delved into the interplay of decision-making and gender, shedding light on variations in gender preferences for pursuing higher education, leading to a higher proportion of female students in Malaysian Higher Education Institutions (HEIs). Multiple studies, including those by Husain & Sarkar (2011), Jung & Lee (2019), Menon et al. (2017), and Rughoobur-Seetah (2019), consistently highlight a significant correlation between gender roles and the decision to pursue higher education. These findings underscore the pivotal role of gender roles as a determinant in informed decision-making, emphasizing the imperative for further exploration in future studies.

Methodology

In integrating the concept of best practices for promoting gender equality in Philippine Education, the qualitative design, particularly within the phenomenological framework, served as an empowering tool for researchers. This approach facilitated a profound

exploration into the lived experiences of individuals, where the process involved conducting individual interviews with the twenty-five participants, acting as a rich source of personal narratives.

Within the study encompassing twenty-five College of Education teachers at Mindanao State University-Iligan Institute of Technology, the phenomenological approach aimed not only to unveil the essence of their experiences as educators but also to discern the gender dynamics within their professional journeys. The emphasis on individual interviews played a pivotal role, providing each teacher with the platform to articulate their unique perspectives, free from external influences and unveiling gender-related challenges or triumphs.

Thematic analysis, acknowledged as a robust method for discerning patterns within qualitative data, played a crucial role in identifying not only general themes but also specific gender-related nuances within the teachers' narratives. It resembled the discovery of threads intricately weaving their experiences together, shedding light on gender-specific aspects within the educational landscape.

Considering the cultural and regional context of Mindanao, the research inherently anticipated diverse perspectives and unique challenges faced by educators in promoting gender equality. The phenomenological emphasis on individual experiences facilitated the capture not only of general nuances but also specific gender-related variations within their stories.

Exploring themes such as teaching methodologies, challenges encountered from a gender perspective, cultural influences on gender roles, and the impact of experiences on personal and professional growth with a gender lens promised intrigue. Through thematic analysis, the researchers were strategically positioned to organize and interpret these narratives, contributing to a deeper and more nuanced understanding of the intricate landscape of teaching, with a focus on gender equality, in Philippine Education.

Results and Discussions

Theme 1: Transformative Impact of Gender Education in Schools

Recognizing the transformative impact of gender education in schools is instrumental in shaping a more inclusive and enlightened society. Integrating gender education into the curriculum can help students understand and challenge traditional gender norms, fostering a generation that values diversity and equality. By incorporating discussions on gender roles, identity, and stereotypes, schools can contribute to the broader goal of dismantling deeply rooted biases. This proactive approach not only empowers students to question societal norms but also equips them with the tools to advocate for gender equality in their communities.

In tandem with dismantling biases, addressing the gender pay gap within the educational sector takes on added significance. A curriculum that emphasizes the importance of equal compensation for equal work can instill values of fairness and justice. Moreover, educating both educators and students about the consequences of workplace segregation fosters a collective commitment to breaking down these barriers. Through this holistic educational approach, the Philippine education system has the potential to not only eliminate exclusionary practices but also nurture a generation that actively champions gender equality.

In doing so, the nation can forge a path toward a more equitable and empowering future for all.

Theme 2: Best Practices for Gender Equality in Education

Best practices for gender equality in education encompass a multifaceted approach, beginning with the imperative of personnel training to combat discrimination. Teachers are essential in forming the learning environment, and by providing comprehensive training, schools can empower them to recognize and challenge discriminatory practices. This not only includes fostering awareness of unconscious biases but also equipping educators with the skills to create an inclusive and respectful atmosphere within the classroom.

The integration of gender, sexuality, and human rights into teacher training and curricula represents another critical facet. By incorporating these elements, educational institutions can ensure that teachers are well-versed in addressing diverse perspectives and fostering an environment that values all individuals, regardless of gender or sexual orientation. This proactive approach goes beyond mere awareness, fostering a deeper understanding of the nuances surrounding gender equality and human rights.

Commemorating crucial months that emphasize equality further reinforces the commitment to gender equality in education. By dedicating specific periods to highlight and celebrate diversity, schools can create opportunities for meaningful discussions and activities that promote understanding and inclusivity. This not only raises awareness but also encourages a collective effort toward dismantling stereotypes and fostering a culture of equality throughout the academic year.

In essence, these best practices collectively contribute to creating an educational landscape that goes beyond traditional norms and actively works towards a more inclusive and equitable future. Through personnel training, curriculum integration, and commemorations, schools can open the door to a life-changing educational experience that empowers students and educators alike to champion gender equality in all aspects of life.

Theme 3: Comprehensive Approach to Gender Equality

The discussion on best practices in promoting gender equality in Philippine education is inherently linked to the broader concept of a comprehensive approach to gender equality. Recognizing that gender issues are interconnected with various societal factors such as social class, culture, ethnicity, age, and sexual orientation is essential. By acknowledging the intersectionality of identities, educational institutions in the Philippines can gain a deeper awareness of the particular difficulties that each person faces and work towards dismantling barriers that disproportionately affect certain groups.

In the interest of advancing gender parity in Philippine education, a comprehensive approach involves providing equal opportunities for all students in school activities. Extracurricular activities often mirror societal dynamics and may perpetuate inequalities. Ensuring that every student, regardless of gender or background, has equal access and encouragement to participate in a range of activities fosters a sense of belonging and empowerment. This not only enhances students' overall educational experience but also contributes significantly to breaking down traditional gender roles and expectations within the Philippine educational landscape.

Moreover, reinforcing a commitment to inclusivity is the cornerstone of a comprehensive gender equality strategy. This involves creating policies and practices within Philippine educational institutions that actively promote diversity and celebrate differences. Implementing inclusive language, curriculum materials, and support systems that cater to the needs of all students contributes to fostering an environment that values and respects every individual, irrespective of their gender or other identities. In this way, educational institutions in the Philippines become catalysts for societal change, nurturing future generations with a profound awareness of and respect for diversity.

By combining the best practices in promoting gender equality in Philippine education with a comprehensive approach that addresses broader societal factors and embraces inclusivity, the educational landscape can become a transformative force. The Philippines has the opportunity to lead the way in championing holistic efforts toward gender equality, fostering an environment that not only eliminates exclusionary practices but also nurtures a generation actively committed to embracing and celebrating diversity in all its forms.

Theme 4: Creating a Gender-Fair Learning Environment

When considering the promotion of gender equality in the Philippines, the discussion on creating a gender-fair learning environment takes on a profound significance. The Filipino context, like many others, grapples with societal norms and expectations that can perpetuate gender disparities. Implementing best practices in education becomes a crucial step in reshaping mindsets and fostering genuine equality.

Respecting the rights of everyone aligns with the principles enshrined in the Philippine Constitution, which upholds the dignity and equality of all individuals. In the context of education, this involves acknowledging and safeguarding the rights of students, teachers, and staff, irrespective of their gender identity. The Philippines, with its commitment to human rights, can leverage this foundation to create an inclusive educational environment that goes beyond legal frameworks to embrace the lived experiences of diverse individuals.

The broader societal goal of transforming equality from a slogan to a lived reality resonates strongly in a country like the Philippines, where cultural norms can sometimes perpetuate gender stereotypes. Education becomes a key player in challenging these ingrained beliefs and fostering critical thinking. By promoting a culture in educational institutions that celebrates diversity and inclusivity, the Philippines can contribute significantly to shaping a more egalitarian society.

In the Philippine educational context, adapting the curriculum to reflect diverse perspectives is a potent tool for societal change. The rich history and cultural diversity of the Philippines can be incorporated into the curriculum, showcasing positive role models and achievements from different gender backgrounds. This not only breaks down stereotypes but also fosters a sense of pride and identity among students.

Addressing systemic barriers is crucial, especially in a country where gender-based discrimination and harassment persist. Implementing effective reporting mechanisms within educational institutions and creating safe and inclusive spaces are essential steps towards dismantling these barriers. By doing so, the Philippines can pave the way for a more equitable educational landscape that mirrors the values enshrined in its legal and constitutional frameworks.

In essence, the vision of creating a gender-fair learning environment aligns seamlessly with the Philippines' societal aspirations for equality. Education emerges as a catalyst for change, instilling values that transcend traditional gender norms and promoting a culture where everyone can thrive. The Philippines, by embracing and implementing these best practices, has the potential to become a trailblazer in shaping a more gender-fair society.

Conclusion

In conclusion, the multifaceted approach to gender equality in education outlined above holds the key to shaping a more inclusive and enlightened society. From integrating gender education into the curriculum to reducing the gender wage gap and offering opportunities for all in-school activities, these best practices collectively contribute to a transformative educational landscape. By fostering a commitment to inclusivity, embracing diversity, and challenging traditional norms, educational institutions can open the door to a more empowered and equitable future. In the context of the Philippines, these practices take on profound significance, offering a path to reshape societal norms and contribute to the nation’s aspirations for genuine equality. Through proactive measures, the Philippines has the potential to become a trailblazer in championing gender-fair learning environments and fostering a generation that actively advocates for gender equality in all aspects of life.

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Integrating Technology-Supported Multi-representational Scaffolding Into Board Game for Learning Muscular System Physiology

Chia-Hui Huang, Graduate Institute of Applied Science and Technology – National Taiwan University of Science and Technology, Taiwan
Yu-Chi Chen, Graduate Institute of Applied Science and Technology – National Taiwan University of Science and Technology, Taiwan
Huei-Tse Hou, Graduate Institute of Applied Science and Technology – National Taiwan University of Science and Technology, Taiwan

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Abstract
In the teaching of muscular system of physiology, it is difficult for students to memorize a large amount of knowledge such as muscle names and movements generated by muscle contraction from the traditional classroom lecture, which in turn affects the motivation and learning outcome. A board game integrating technology-supported multi-representational scaffolding was designed to promote learning motivation and achievement by the board game mechanism and scanning the game cards to provide muscular 3D animation and videos. Participants were 20 nursing students from northern Taiwan. The study was conducted to investigate the learning achievements and assessment of the game through pre-test and post-test, learning motivation, flow, game acceptance, and scaffolding usefulness questionnaire. The results showed that there was a significant improvement in the academic performance of the learners after the board game learning activity, which means that it helped the learners to construct relevant academic knowledge. In addition, the high motivation, flow and game acceptability ratings indicate helped to enhance the learners' motivation and enjoy the activities of the game. Moreover, the multi-representational scaffolding in the board game is beneficial to learners, understand the abstract concepts of the muscular system better, and reduce the confusion during the game. The data proved that the use of integrated technology-assisted learning and multi-representational scaffolding board games in the curriculum of muscular system of the anatomy and physiology can help learners construct three-dimensional concepts of muscles, understand complex theoretical knowledge, and discuss to solve the problems in the game, which can significantly enhance the learning achievement of the learners.

Keywords: Board Game, Multi-representational Scaffolding, Muscular System Anatomy and Physiology

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Introduction

Anatomy and physiology are essential knowledge for all healthcare students. There is a global trend in teaching identification of specific skeletal muscles within each body region and this is accompanied by teaching actions of said muscles (Reynolds et al., 2022). DeHoff et al. (2011) considered muscle actions to be required learning, in addition to muscle identification and innervation. In the teaching of muscular system of physiology, students need to memorize a large amount of knowledge such as muscle names and movements generated by muscle contraction, and it's difficult to encouraging learning motivation to learn by using the traditional lecture method, thus affecting the effectiveness of learning (McCarroll et al., 2009). Therefore, it is important to enhance the learning outcome of muscular system physiology. In recent years, game-based learning has been increasingly emphasized, and relevant studies have shown that game-based learning can provide learners with an interesting learning environment, which in turn enhances learning motivation and learning effectiveness (McLaren et al., 2017). Studies have found that teaching activities based on board games not only promote interpersonal interaction, but also have a positive effect on learning (Hou & Keng, 2020; Hou et al., 2021; Li et al., 2018). When learners engage in board games, their cognitive comprehension improves (Mostowfi et al., 2016). Medical research has shown that in anatomy and physiology courses, the use of an educational board games in teaching the muscular system is significantly improved learning compared with the use of guided study (Luchi et al., 2019). With the advancement of technology, all kinds of interactive 3C products are everywhere in students' lives. The presentation of multimedia materials that help to understand anatomy and physiology is also advancing, and the visualization in anatomy has turned from the use of images into the use of animations, which allows students to observe anatomical structures in depth from different points of view (Küçük et al., 2016). For students, the combination of digital visualization and video effects will help them to understand the complexity of the 3D structure of the muscles and the movements generated by their contraction. Therefore, this study integrates technology-assisted learning and multi-representational scaffolding into board games to stimulate students' learning motivation through board games and technology-assisted learning. Through the design of multi-representational scaffolding, including text prompts, muscle 3D animation and demonstration video, to help students understand the 3D structure of muscles and their physiological functions, in order to reduce the confusion of students in the process of learning activities, and thus enhance the learning outcome.

Method

The teaching unit of this study was anatomy and physiology of the muscular system, and the participants were 20 nursing students from northern Taiwan. The students were divided into groups of four or five individuals to play the board game in the classroom. There are circles located on anatomical structures, where players are required to place tokens on. The game also consists of two types of cards (anatomical cards and physiology cards for the anatomical structure and physiological functions of 20 muscles) which are used to matching (Figure 1). Learners are required to use multi-representational scaffolding (Table 1) to match anatomical and physiological cards in the game. Then, according to the matching result, place the token in the correct muscle position on the main boards (Figure 2). One-group pre- and post-test research design was used for this study. The pre- and post-test scores in order to evaluate the learning effectiveness after the completion of the game. Based on the game, the questionnaires included flow status, game acceptance, learning motivation, and perceived

usefulness of the scaffold. Quizzes and questionnaires were administered before and after the game activity for 10 minutes.

Table 1. Multi-representational scaffolding

Scaffolding	Description
Text and Image	1. Cards：Text description of old and new knowledge. 2. Anatomical map：Construct knowledge about anatomical locations
3D animation	Showing the anatomy of the beginning and end of the muscle.
video	Demonstrate the movement generated by the contraction and contraction of the muscle.

Figure 1. Learners use Google Forms to complete tasks in the Gather Town conference room.

Figure 2. (A) Students to scan the QR code and to match cards.
(B) Place the token in the correct muscle position.

Results and Discussions

The Wilcoxon Signed-Rank Test was used to analyze the pre- and post-tests scores, which shows that there was a significant difference between the pre- and post-tests ($Z=3.153$, $p=0.002<0.01$). The findings demonstrated a statistically significant increase in the knowledge assessment scores after the game. The data from the flow, game acceptance, learning motivation, and scaffold usefulness questionnaires show that all sub-dimensions of flow are significantly higher than the median of 3, which indicates that students have a certain degree of high flow engagement and immersion under the learning activities of board games. Game acceptance and learning motivation are also significantly higher than the median of 3, which means that learners have high acceptance of board games and can be motivated to learn. Finally, learners were able to visibly perceive the multiple representations of the scaffolding and use the prompt during the process, which means that the design of the scaffolding can reduce students' confusion during board game learning activities and help to enhance the learning effectiveness of anatomical and physiological knowledge of the muscular system.

Conclusions

The results indicating that the learning activity of board games can arouse the interest of learners, promote peer interaction and discussion. In this study, both the results of mind flow, game acceptance and perceived usefulness of the scaffold were above the median score of 3, which means that the learners were able to immerse themselves in the games. They also felt that the board games designed in this study was easy to understand, the rules and mechanisms were well-designed, and the games were entertaining and challenging. Overall, the board games were accepted by the learners and were effective in enhancing learning outcomes. The limitation of this study is the small sample size (n=20), which needs to be further increased in the future, and the results of the experimental group and the control group should be compared. The study only explored learners' learning effectiveness, mental flow, game acceptance, and scaffolding usability, and it is suggested that in the future, learners' learning anxiety and cognitive load could be increased, as these are key aspects that may affect the course of learning activities when students are studying anatomy and physiology.

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Contact emails: D11122311@mail.ntust.edu.tw
hthou@mail.ntust.edu.tw

Design and Evaluation of an Educational Board Game for Learning ESG Sustainability Challenges

Pei-Chun Chung, National Taiwan University of Science and Technology, Taiwan
Chih-Chen Kuo, National Taiwan University of Science and Technology, Taiwan
Hau-An Yu, National Taiwan University of Science and Technology, Taiwan
Hung-Yu Chan, National Taiwan University of Science and Technology, Taiwan
Huei-Tse Hou, National Taiwan University of Science and Technology, Taiwan

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Abstract
Towards the Paris Agreement underlines the need for net-zero carbon emissions by 2050, it has become more and more important for companies to transform and create an Environmental, Social, and Governance (ESG) sustainable development ecosystem. Moreover, there is a growing emphasis on educating and training employees in the concept of ESG. In addition to traditional lectures, game-based learning that encourages discussion and critical thinking is gaining traction. Through industry-academia collaboration with an international technology company in Taiwan, our research team designed an educational board game. The Learning goal is for learners to discuss and propose an action to solve the sustainability challenges for companies. Players can make final decisions through peer discussion which makes deeper understanding of ESG concepts and the ESG meanings of these companies' projects. The preliminary study was conducted with 24 Taiwanese office workers aged 20+ to 50 years old. The results of this study showed that the participants had significant improvement in their understanding of ESG, and the mean scores of flow, game elements, and game feedback were all significantly higher than the median of the scale (i.e., 3), while the learners' activity anxiety was significantly lower than the median, which indicated that the learners had low levels of anxiety about learning. The preliminary findings show that the game mechanism designed in this study is easy to operate and may not make learners feel anxiety and increases the flow of the learners. Through the feedback from open-ended questions in this study, players who experience ESG challenges with different people found it interesting and had a better understanding of the ESG concepts and companies' projects.

Keywords: ESG, ESG Board Game, Educational Board Game

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Introduction

Towards the Paris Agreement (UNFCCC, 2016) underlines the need for net-zero carbon emissions by 2050, it has become more and more important for companies to transform and create an ESG sustainable development ecosystem. High-quality ESG disclosures are essential to reduce the capital cost and risks, also much more important to improve corporate reputation (Wang et al., 2023, Dhaliwal et al., 2011). However, many people only know about CSR and have no idea about ESG. Therefore, the first step is to help employees and others understand what ESG is and what efforts the company can make in the field of ESG. Moreover, there is a growing emphasis on educating and training employees in the concept of ESG. In addition to traditional lectures, game-based learning that encourages discussion and critical thinking is gaining traction.

Through industry-academia collaboration with an international technology company in Taiwan, our research team designed an educational board game. The learning goal is for learners to discuss and propose an action to solve the sustainability challenges for companies. Players can make final decisions through peer discussion which makes deeper understanding of ESG concepts and the ESG meanings of these companies' projects.

The ESG board game consists of three types of cards, including action cards, challenge cards and event cards. Action cards describe the company's projects and their relevance to the field of ESG (Figure 1). Challenge cards describe the sustainability challenges for companies, such as climate change, energy crisis, the Corporate Sustainability Due Diligence Directive (CSDDD), and so on (Figure 2). Event cards describe the sustainability challenges that might happen in the real world, such as wildfires, floods, heavy rains and other disasters around the world, and so on (Figure 3).

There are ten rounds in this game. Each round, players are faced with three challenge cards and need to vote for a consensus action card to address one of the challenges. In odd-numbered rounds (not required in the first round), event cards need to be triggered to generate additional challenges. Just like in the real world, players have to face unexpected challenges.

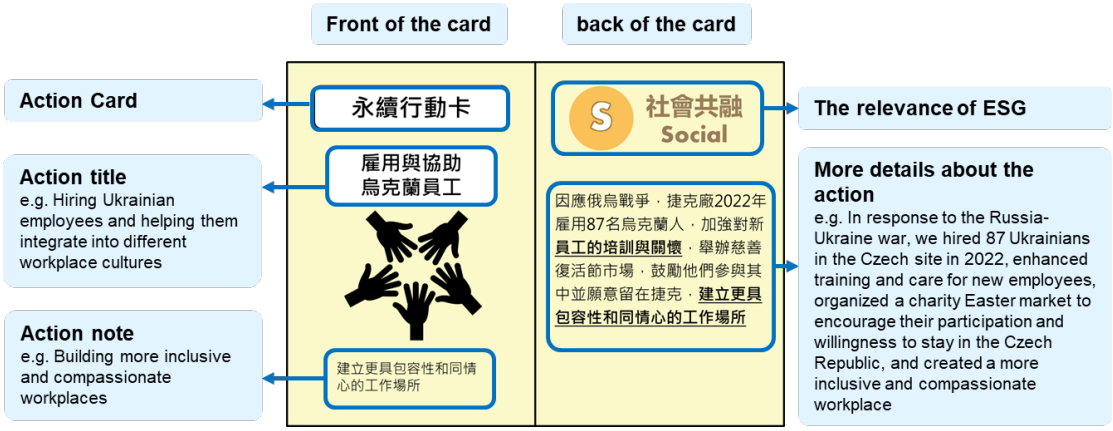

Figure 1: One of the Action cards

Figure 2: One of the Challenge cards

Figure 3: One of the Event cards

Method

This study was a pilot study with 24 Taiwanese office workers aged 20+ to 50 years old.

The office workers were divided into groups of six individuals to play the ESG board game in the same room. The procedure of this study was as follows: introduction of the procedure for 5 minutes, pre-test for 5 minutes, the rules of the game for 10 minutes, the ESG board game activity for 35 minutes, and post-test and questionnaires for 10 minutes. The questionnaires included open feedback at the end, as well as measures for flow status (Kiili, 2006), game acceptance (Davis, 1989), and activity anxiety (Krashen, 1981), all of which were translated and revised by Hou and Li (2014) and scored on a five-point Likert scale. The pre-test and post-test use identical questions arranged in a different order to prevent a memory effect.

Results and Discussions

According to the Wilcoxon signed rank test analyses (Table 1). The results of this study showed that the participants had significant improvement in their understanding of ESG, and the mean scores of flow, game elements, and game feedback were all significantly higher than the median of the scale (i.e., 3), while the learners' activity anxiety was significantly lower than the median, which indicated that the learners had low levels of anxiety about learning.

Table 1: ***Wilcoxon signed rank test analyses***

Dimension	*M*	*SD*	*Z*	*p*
Pre-test	12.46	4.18	-2.44*	.015
Post-test	15.17	2.50		
Usefulness	4.35	0.59	4.24***	.000
Ease of use	3.74	0.76	3.43***	.001
Game elements	3.83	0.68	3.86***	.000
Sense of control	3.75	0.79	3.29**	.001
Uncertainty	3.96	0.75	3.76***	.000
Achievement	3.79	0.72	3.58***	.000
Think the game was fun	3.88	0.85	3.46***	.001
Wish to play again	3.75	0.94	3.07**	.002
Overall Flow	3.87	0.59	4.19***	.000
Flow antecedents	3.89	0.56	4.15***	.000
Flow experience	3.86	0.65	4.02***	.000
Activity Anxiety	2.34	0.59	-3.771***	.000

*p <0.05 , **p <0.01

The preliminary findings show that the game mechanism designed in this study is easy to operate and may not make learners feel anxiety and increases the flow of the learners. Through the feedback from open-ended questions in this study (Table 2), players who experience ESG challenges with different people found it interesting and had a better understanding of the ESG concepts and companies' projects.

Table 2: ***Parts of the open-ended feedback***

Participant No. (#PN.)	*Open-ended feedback*
#P04	Through this board game, I have a better understanding of ESG's concept of sustainable management, and a better understanding of the issues related to the company's projects.
#P06	I feel that this game is well-prepared with thoughtful design, and the atmosphere is also very pleasant. I had the opportunity to get to know colleagues from different departments and gain a better understanding of ESG through this game. I would be interested in participating again if given the chance. Thank you!
#P11	It's interesting to learn more about what ESG is.
#P16	The game is interesting, and it's a fun experience to play it with different people.

Conclusions

This study is designed to develop an ESG board game that is both useful and enjoyable. The results and preliminary findings indicate that learners acquired ESG concepts through this board game. Furthermore, the game helped learners understand that their actions in their daily tasks and work have meaningful impacts on the environment. Future studies will compare the effectiveness of applying technical tools with ESG scenarios to that of this board game.

Acknowledgments

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Contact emails: D11022304@gapps.ntust.edu.tw
hthou@mail.ntust.edu.tw

Effects of SSCS Learning Activities With Bar Model on Mathematical Resilience and Learning Achievement in Fraction Word Problems

Nuttawut Pikunni, Mater Dei School, Thailand
Ratchanikorn Chonchaiya, King Mongkut's University of Technology Thonburi, Thailand

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Abstract
The goals of this this study were to examine two different aspects of learning accomplishment and mathematical resilience in Grade 6 children after they received learning management skills using the SSCS with bar model in fraction word problems. A group of 147 sixth-grade pupils in the first semester of the 2021 school year was the study's target population. Lesson plans utilizing the SSCS with bar model, a questionnaire on mathematical resilience, and a test of students' achievement to apply what they had learned to solve fractional word problems made up the research tools. Relative increase score, mean, standard deviation, percentage, and content analysis were used to examine the data. 1) The target group exhibited stronger mathematical resilience after the intervention, according to this study's findings. 96.60 percent of the target group. After the intervention, no student's math resilience was less strong than it was. 2) Student accomplishment in fraction problems was higher than the required 70%, and 3) 57.82% of the students showed relative gain score improvements in the fraction word problem of more than or equal to 50%.

Keywords: SSCS Learning Activities, Bar Model, Relative Gain Score, Learning Achievement, Mathematical Resilience

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1. Introduction

1.1 Theoretical Background

Mathematics is a highly abstract subject. Many students are not good in mathematics, but some students in this group can succeed and be able to understand the content that they have to learn because they have mathematical resilience. My students have a belief about human development (growth belief) that is related to the ability to learn mathematics. When students encounter difficulty in understanding some mathematical topics, they will still have confidence and be able to learn it successfully. Finally, they will know that there are a lot of resources that can support them in their learning. They will still have a positive attitude towards learning mathematics. Students will be able to overcome obstacles in their mathematical learning. In addition, students can ask for help from other people. Coaching will help promote and support the development of their mathematical skills (Johnston-Wilder, et al. 2013).

The researcher is studying the students who are learning mathematics. It has been found that students do not listen to what the teacher is teaching. They talk and play with their friends. Some students bring other work to do in mathematics class. When they have to do mathematics worksheets, they do not want to do them. They try to avoid it by drawing some pictures. They try not to join in group activities by doing things such as asking permission to go to the restroom. Some students copy their friend's answers so that they can submit that work to their teacher. Moreover, the researcher also has the opportunity to talk with some of the students about their lack of work. A large number of students say that mathematics is a difficult and boring subject, and after studying it they still do not understand. They think that they will not be able to use it in their daily lives. They do not see the relevance in studying to improve their mathematical skills. They also feel anxious and stressed when they have to calculate using mathematics. Students can suffer psychological damage when studying and practicing mathematics, and being pressured and looked down upon by others. These things are an indication that students have a fixed mindset because they believe that their intelligence cannot be changed (Blackwell, et al. 2007). Research by Ricci (2013) found that the number of students who study at higher levels have a more fixed mindset. Mercer (Mercer and Howe, 2012) stated that, "If students still have a fixed mindset they cannot learn or develop their abilities". Even though there are good teaching methods, teachers cannot help students to develop fully, because students will not make effort to study what the teacher has taught.

The results of the National Basic Education Test (O-NET) in mathematics for Grade 6 found that their scores in algebra for the academic years 2018-2020 (Table1) were 52.48 points, 52.94 points, and 59.05 points respectively. Fraction word problems are part of algebra, and it is very important and necessary for further study at a higher level. Moreover, the school of the researcher expects that the average academic achievement of students in algebra will be at least 70 points, so the researcher must develop the mathematical skills of the students to reach that goal.

Table 1: The Average O-NET Score for the Academic Years 2018 – 2020 for Grade 6 Students in Algebra.

Year	2018	2019	2020
The average O-NET score	52.48	52.94	59.05

The researcher found a research paper on learning management using Search, Solve, Create and Share (SSCS), a method first introduced by Pizzini, et al. (1989). SSCS is a teaching model that provides opportunities for students to think, brainstorm, analyze, and gain knowledge in solving problems whilst enhancing their problem-solving skills and self-efficiency. There are four learning stages in the SSCS model, namely searching, solving, creating, and sharing. In the initial phase, students will experience the process of searching for ideas which are involved in the process of collecting materials, then inquiring and formulating ways of solving the problems assigned to them. In the next phase, students are involved in the problem-solving process. Then, they move on to the create phase, where they are involved in finding and summarizing the answers to the problems. The last phase is the share stage at which students are required to present the result of their responses interactively to the other students in their class. Implementing the SSCS teaching model empowers students with a role that encourages them to think critically, creatively, and independently.

In organizing learning activities to develop mathematical resilience, Lee & Johnston-Wilder (2013) mentioned four factors that affect the development of student mathematical resilience in the classroom. The first factor is “Value”, which means that students recognize that mathematics is a valuable and interesting subject to study. Moreover, they see the benefits of applying mathematics to everyday life, including expanding on other matters. The more students think that mathematics is valuable, the more they will be motivated to learn. The second factor is “Struggle”, which means that students accept that effort in learning mathematics is common among those studying mathematics. Even students who have high mathematical resilience must put in effort to learn mathematics too. The third factor is “Growth”, which means that students are ensured that they can develop their mathematical skills. Mathematical ability is not related to the intellectual ability of any student. The fourth factor is “Support”, which means when students encounter negative situations in learning mathematics, the teacher must help and create positive encouragement for students, so that they can get through those situations.

Another process which can be used for solving mathematical problems is the Bar Model, a strategy for solving problems that requires drawing a Bar Model. A Bar Model is drawn in the shape of a block or bar. It is rectangular and is called the Singapore Bar Model, or the Singapore Block Model, or for short, the Bar Model (Yeap Ban Har et al, 2008). Solving problems using the Bar Model process can make students think and analyze the message from the problems, connecting them to student mathematical and analytical thinking. Drawing the results out as a Bar Model helps students understand and create knowledge by themselves, so that they can solve problems correctly.

SSCS Learning Activities with Bar Model will help in developing student mathematical resilience. In the “Search” process, students will see the value of what they are learning and connect it to their daily lives, even transferring this knowledge to other subject areas. Additionally, students must make an effort in choosing how to solve problems and write down their ideas. Even if at first, they do not know about this, they can talk to their friends or ask their teacher for good advice (Solve + Bar Model technique). Students may feel that writing an explanation is very difficult, but because they have friends and teachers who provide good advice and encouragement, they will eventually be able to write a complete a summary, thus developing skills in how the process “Create” works. Finally, students must make an effort to present their ideas on how to solve problems to their friends. In the case of students who volunteer to write the solutions to their problems on the board, even with mistakes, the teacher reinforces and encourages the fact that making mistakes is not a big

problem in learning mathematics. When they make a mistake, they can always correct it. The most important thing that they learn in this "Share" process, is the point that their mistakes are a good lesson for their friends to learn from.

For this reason, the researcher has studied the effects of SSCS learning activities with Bar Model on mathematical resilience and learning achievement in the area of fraction word problems. This is a guideline for improving and developing the teaching of mathematics that focuses on students being more effective, and this process involved a variety of mathematical concepts that can be applied as a guideline for organizing teaching and learning for other teachers in the future.

2. Implementation and Results

The experiment was conducted with a population of 147 sixth-grade students. Lesson plans utilizing the SSCS with Bar Model, a questionnaire on mathematical resilience, and a test of student achievement to apply what they had learned to solve fractional word problems made up using the research tools. The experiment comprised data collection by requesting the cooperation of 147 sixth-grade students, the target group of this research, the classes taught by the researcher. Then, the researcher explained to the students about SSCS Learning Activities with Bar Model in Fraction Word Problems, so that they could manage the activity correctly, by doing the twenty-three questionnaire items on mathematical resilience, and two items testing student achievement. The researcher then recorded the results as a pre-test score. The researcher organized SSCS Learning Activities with Bar Model in Fraction Word Problems by teaching according to the lesson plan, eight periods, each lasting 40 minutes. When they were completing the SSCS Learning Activities with Bar Model, the students did the same questionnaire on mathematical resilience and the test of student achievement. The researcher recorded the results as a post-test score. The researcher brought all data analyzed according to statistical methods, thus checking the hypothesis.

2.1 Results of Analysis of Mathematical Resilience Data

The analysis of data obtained from the questionnaire on mathematical resilience was created to measure attitudes and beliefs about studying mathematics. In this case, the researcher referenced questions from the mathematical resilience scale (MRS), 23 items in the form of a 5-level rating scale: strongly agree (5 points), agree (4 points), not sure (3 points), disagree (2 points) and strongly disagree (1 point). Three issues were studied: Value, 8 items, Struggle, 8 items, and Growth, 7 items. The mathematical resilience scores obtained by the students from this questionnaire can be calculated by adding together the scores for each question. The minimum possible mathematical resilience score for the students is 23, and the maximum possible score is 115.

Table 2: Analysis of pre- and post-scores from the questionnaire on mathematical resilience of the 147 sixth-grade students, with a full score of 115 points.

	Minimum	**Maximum**	**Mean**	**Std. Deviation**
Pre-scores	67	112	92.14	10.13
Post-scores	72	113	97.50	9.70

From the analysis of the pre- and post-scores from the questionnaire on mathematical resilience (Table 2), it was found that the scores obtained from the questionnaire on

mathematical resilience of 147 sixth-grade students after having completed SSCS Learning Activities with Bar Model has a mean of 97.50 points, equivalent to 84.78 percent, standard deviation of 9.70, showing that the students have higher mathematical resilience.

Questionnaire score changes:

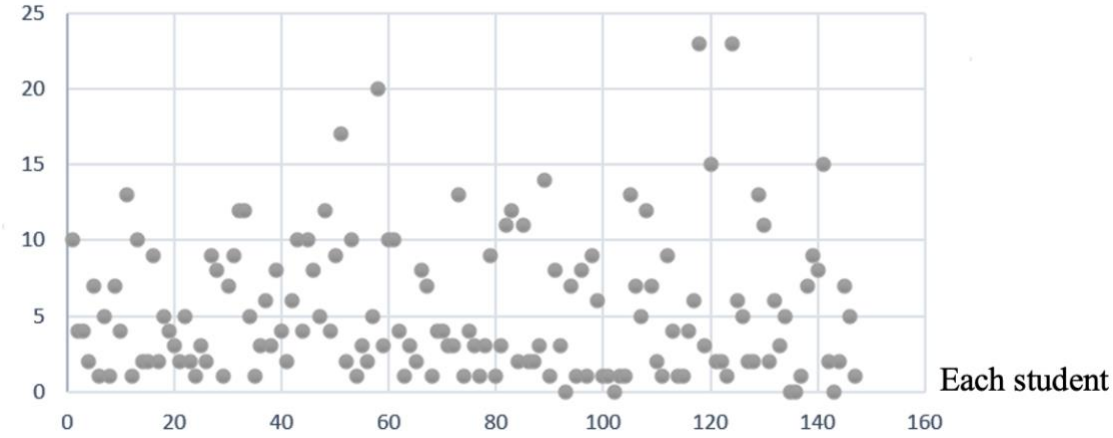

Figure 1: Difference between scores before and after studying and doing a questionnaire on mathematical resilience for each sixth-grade student after receiving learning SSCS Learning Activities with Bar Model.

From Figure 1, it was found that the difference in scores before and after studying and doing the questionnaire on mathematical resilience of sixth-grade students after receiving learning SSCS Learning Activities with Bar Model had a non-negative value, indicating that the scores of 142 students after studying were higher than before studying, accounting for 96.60 percent of all students. No student had a lower mathematical resilience score after studying than before.

Table 3: Comparison table of scores of sixth-grade students who have Mathematical resilience at higher levels before and after receiving SSCS Learning Activities with Bar Model.

Mathematical Resilience level	**Number of students (percentage)**	
	Pre studying	**Post studying**
From the highest level	89.80	95.23

From Table 3, it was found that before studying, 89.80% of students had mathematical resilience at a higher level. However, after receiving SSCS Learning Activities with the Bar Model, there was an increase of 5.43 percent of students who had mathematical resilience at the higher level. which is 95.23 percent. In addition, the researcher interviewed a selection of sixth-grade students. They said that the bar model technique makes it easier and faster for them to find answers to fraction word problems, so they don't have any misunderstandings about whether they have found the correct answer or not. Moreover, they said that they wanted to practice doing fraction word problems by themselves more and more, so that they could check their understanding. They liked the classroom atmosphere which helped promote understanding and learning much better because the teacher taught well and explained logically, so that they could do the fraction word problems.

Table 4: Analysis table of scores obtained from the questionnaire on mathematical resilience. Considering each aspect of the factors of mathematical resilience of sixth-grade students after receiving SSCS Learning Activities with the Bar Model.

	Scores obtained from Questionnaires			Mathematical Resilience
	Value	Struggle	Growth	
Mean	34.22	35.80	27.49	97.50
SD	4.90	3.44	4.99	9.70

From Table 4, it was found that overall, sixth-grade students, after having received SSCS Learning Activities with the Bar Model, have high averages in Value and Struggle. This was determined from scores of 34.22 and 35.80, respectively.

2.2 The Results of the Analysis of Learning Achievement Data on Fraction Word Problems

2.2.1 Learning Achievement Compared to the 70 Percent Criteria

Table 5: Analysis of pre- and post-scores from the test of student achievement on fraction word problems of 147 sixth-grade students, with a full score of 10.

	Minimum	Maximum	Mean	Std. Deviation
Pre studying	0	10	4.56	1.97
Post studying	3	10	7.51	1.85

According to the analysis of pre- and post-study scores from the test of student achievement on fraction word problems (Table 5), it was found that the scores obtained by 147 sixth-grade students after learning was organized using SSCS Learning Activities with Bar Model, the mean was 7.51 points, meaning 75.1 percent. The standard deviation was 1.85. All students had higher learning achievement in fraction word problems.

Test of student achievement score changes:

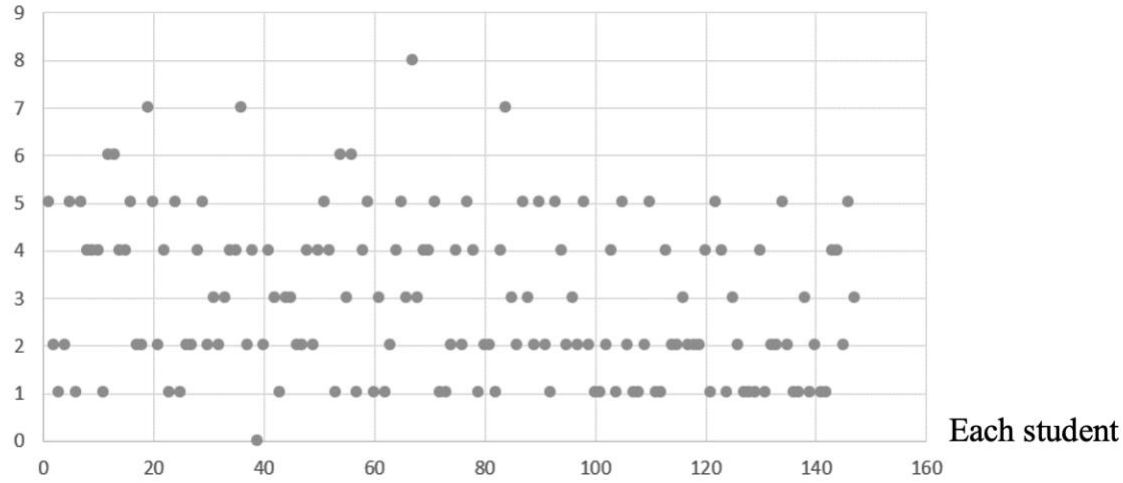

Figure 2: Difference between scores after and before studying from taking the test of student achievement on fraction word problems of each sixth-grade students after receiving learning SSCS Learning Activities with Bar Model.

From Figure 2, it is found that the difference in scores after and before studying from taking the test of student achievement on fraction word problems of 147 sixth-grade students after receiving learning SSCS Learning Activities with Bar Model had a non-negative value, indicating that the scores of 146 students after studying were higher than before studying, accounting for 99.32 percent of all students, which is higher than the 70% threshold. The score of one student remain the same before and after studying. This is because the difference in scores before and after studying is equal to 0, accounting for 0.68 percent of all students.

2.3 Relative Gain Score

The researcher used the test of student achievement to study the relative gain scores of students who received learning SSCS Learning Activities with Bar Model by using pre- and post-scores of students who received learning SSCS Learning Activities with Bar Model on fraction word problems.

Relative gain score:

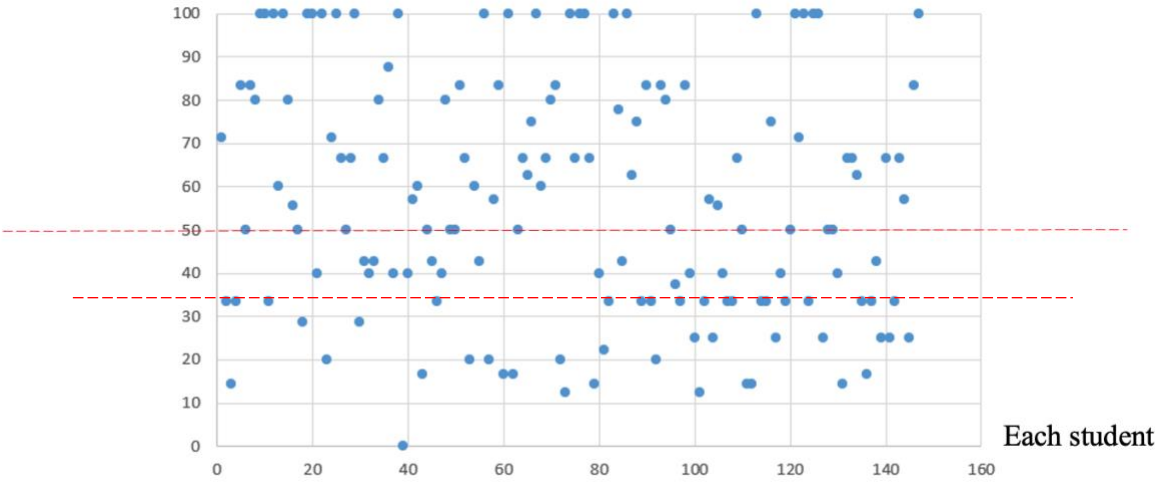

Figure 3: Relative gain score from taking the test of student achievement on fraction word problems of each sixth-grade student after receiving learning SSCS Learning Activities with Bar Model.

From Figure 3, it is found that the relative gain scores from taking the test of student achievement on fraction word problems of sixth-grade students who received SSCS Learning Activities with Bar Model, the relative gain scores equal to or more than 50 percent was a total of 85 students, accounting for 57.82 percent of all students. There were 62 students, accounting for 42.18 percent of all students, with a relative gain scores of less than 50 percent.

3. Conclusions

96.60 percent of the target group. After the intervention, no student's math resilience was less strong than it was. Student accomplishment in fraction problems was higher than the required 70%, and 57.82% of the students showed relative gain score improvements in the fraction word problem of more than or equal to 50%.

Gathering data from a questionnaire on Mathematical resilience that was derived from concepts from Kooken, et al. (2016), it was found that 96.60 percent of the target group after the intervention, no student's mathematical resilience was less strong than it was. This is a result of organizing learning SSCS Learning Activities with Bar Model on Fraction Word problems because in the four steps of SSCS, students developed Mathematical Resilience. In the first step, which is S: Search, students received development in Value because before students can tell about what the problem asks and what the problem specifies in the fraction word problems. Students must be able to answer these questions "Why are fraction word problems interesting? And why do students need to study this?". Students have to give examples that are relatable to their real lives so that they could have a grasp that studying this mathematics topic is valuable and meaningful (Algani, 2019; Pang and Seah, 2021). The second step is S: Solve. Students developed mathematical resilience in Struggle and Growth. Students expressed their ideas by using the Bar Model technique. At first, some of these students don't know on what to write, but they talked and consulted with their friends and asked for a teacher's advice. Based from the interview of some students, the researcher found out that students developed their encouragement within themselves by asking support from people around them (Pieronkiewicz and Szczygiel, 2020; Lee and Simpkins, 2021). The third step, which is C: Create, students developed mathematical resilience in the part of Struggle and Growth because they may find writing difficult but because they have their friends and teachers who provide advice and support until they are able to write a complete demonstration of how to do it (Froiland and Davison, 2016; Middleton et al, 2017; Strati et al, 2017). And the final step is S: Share. Students developed mathematical resilience in Struggle and Growth because students have to put effort into presentations, showing how to do it and find answers from friends and in cases where there are student volunteers who come out and write to show how to solve problems or find incorrect answers on the board, teachers reinforce and encourage that solving problems in the wrong way or getting the wrong answer is not a big problem in learning mathematics. When the students made a mistake, they can always correct it. And most importantly, those mistakes were lessons for others to learn from as well. In addition, when considering the mathematical resilience section after the students received learning activities using SSCS Learning Activities with Bar Model, it was found that the students had the highest level of mathematical resilience, accounting to 95.23 percent, or 140 students, there were 7 students, accounting to 4.77 percent, who had a medium level of mathematical resilience. When the researcher interviewed some students to gain in-depth information, it was found that the anxiety, fear, and insecurity when students had to do difficult fraction word problems disappeared (Zulnaidi et al, 2020) after the students received learning management using SSCS Learning Activities with Bar Model. The students have more confidence, understanding, and learn to have fun solving fraction word problems (Samuel and Warner, 2019). Students can visualize images showing how to find answers to problems easier and faster. Moreover, students are not worried if they do wrong fraction word problems (Dweck, 2000) because the teacher is available to support and explain further. Students are encouraged to take on more difficult fraction word problems. This is from the information obtained from interviews with all students. The researcher further understood that organizing learning using SSCS Learning Activities with Bar Model helped them recognize that mathematics is a valuable subject and see the benefits of applying it to their daily lives, including extending it to other subjects. The more students think mathematics is valuable, the more motivated they will be to learn. This included the fact that students accept that effort in learning mathematics is a common problem for those who are studying mathematics. Even students with strong mathematics skills have to put in the effort to learn mathematics (Johnston-Wilder et al, 2013). Students experience a feeling of hopelessness when solving mathematics problems (OECD, 2013) and students have difficulty

understanding difficult math topics. However, after having been taught using SSCS Learning Activities with Bar Model, the thoughts of the students changed. Students are given confidence that they will develop their mathematical resilience and be successful. Students know that there are resources available to support their learning. They have a positive attitude towards studying mathematics and are able to overcome obstacles in learning mathematics. This includes requesting help from others when necessary.

Learning achievement about fraction word problems for students in Grade 6, after receiving learning management using SSCS Learning Activities with Bar Model, was higher than the criteria of 70 percent. This may be due to learning management using SSCS Learning Activities with Bar Model, allowing students to practice understanding the problem, analyzing what the question asks and what the question specifies. The students are able to plan and carry out problem solving using the Bar Model technique. They are able to bring the results from solving problems to create their own mathematical problems. It is a sequence of steps for communication with others, including practicing presentations and accepting the options of other people. From this research the results of student learning achievement in fraction word problems was shown to be higher than 70 percent. In addition, 57.82 percent of students had a relative gain score in fraction word problems after receiving learning activities using SSCS Learning Activities with Bar Model of more than or equal to 50 percent, and there were 42.18 percent of students, accounting for 62 students with a relative gain score increase of less than 50 percent. When considering the scores on the test of student achievement on fraction word problems before and after class, the group of students who had a relative gain score increase of less than 50 percent, it was found that 61 out of 62 students in this group had an increase in post-study scores. However, this increase was still not double what the students had learned from what they did not know before arranging the SSCS Learning Activities with Bar Model. In fact, the score of one student did not increase, but stayed the same because this student received a full score of 10 points before studying fraction word problems, and after the re-test, her score remained at 10.

Organizing learning activities using SSCS has the advantage that students get practice in understanding problems, analyzing the problem plan and carrying out problem solving using various methods in order to compile the results to solve the problem. It is a sequence of steps for communication with others, including practicing presentations and accepting the opinions of others, all of which leads to develop in student learning.

SSCS learning activities are suitable for all groups of students. From the post-study results we can note whether students are good, average, or weak. During the first period of organizing this set of SSCS learning activities, most students were not familiar with the learning activity format in which they had to carry out each step by themselves. This means that each step in the first period takes a long time to complete. However, when entering the second period, most students began to understand and become familiar with the SSCS format, causing them to spend less time on activities. Students practice regularly, which results in them developing a systematic learning and problem solving process.

The study also suggests that organizing learning activities using SSCS Learning Activities with Bar Model in the first period is quite time consuming, since students are not yet familiar with learning this method. It can cause confusion among students. Teachers need to organize activities for students to gain sufficient teaching experience. It is useful for them to be trained in using the Bar Model technique. Organizing SSCS Learning Activities with Bar Model in step 2 (Solve) and step 3 (Create), the steps for thinking about answers and composing them

in a sequence, teachers should give appropriate time to think and understand problem solving. If there are students who cannot solve the problems, teachers should provide advice and guidance. When organizing SSCS Learning Activities with Bar Model, teachers should make all students participate in learning activities. Teachers must use questions to encourage students to feel involved in learning activities. In step 4 (Share) of the SSCS Learning Activities with Bar Model process, teachers should provide opportunities for students to express their opinions according to their ideas, without being quick to judge their ideas as right or wrong. Instead, teachers should give students the opportunity to discuss methods for problem solving and finding answers.

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Contact email: nutmd2552@gmail.com

Early Diagnosis Prediction From COVID-19 Symptoms Using ANN-Based Machine Learning Method

Charlyn V. Rosales, Bulacan State University, Philippines

The Southeast Asian Conference on Education 2024
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Abstract
Timely diagnosis of COVID-19 is crucial to mitigate the risk of virus transmission. Traditional diagnostic methods, such as medical laboratory and antigen tests, while effective, are not always easily accessible. This study proposes an innovative approach to detect COVID-19 promptly using Artificial Neural Networks (ANN), eliminating the need for laboratory tests. By analyzing an individual's current symptoms, the ANN serves as a powerful tool for early diagnosis. The dataset employed in this research was sourced from Kaggle, specifically the COVID-19 presence and symptoms dataset. To enhance data pre-processing and hyperparameter tuning, GridSearchCV was utilized, incorporating 10-fold cross-validation. The optimal configuration, derived from these procedures, facilitated the construction of an effective prediction model using ANN. The findings reveal that hidden layer sizes of (100,), (50, 100, 50), and (50, 50, 50), coupled with relu and tanh activation functions, adam solver, alpha values of 0.05 and 0.0001, and adaptive or constant learning rates, collectively achieved the highest algorithm performance. Employing this optimal configuration, the ANN-based prediction model demonstrated an impressive 98.84% accuracy, 98.69% specificity, 100% sensitivity, and a 98.84% ROC curve. This developed prediction model holds the potential to revolutionize COVID-19 detection by enabling real-time identification of the disease without the reliance on laboratory tests. Applications utilizing this model could significantly contribute to early intervention and prevention strategies, ultimately reducing the spread of the virus in the community.

Keywords: Algorithms, Artificial Neural Networks, COVID-19, Early Diagnosis, Machine Learning, Hyperparameter Optimization

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Introduction

COVID-19, caused by the SARS-CoV-2 virus, is a highly contagious disease with respiratory symptoms ranging from mild to severe, particularly in individuals with underlying comorbidities (Coronavirus, 2024). The global impact of the disease is evident, with 703,961,073 confirmed cases and 7,004,395 recorded deaths as of March 7, 2024 (Covid Live Update, 2024). Prevention measures recommended by the World Health Organization (WHO) include social isolation, mask-wearing, frequent cleaning, hand hygiene, and vaccination (Coronavirus, 2024).

Early detection is crucial to curbing the spread of COVID-19, as evidenced by the potential for severe symptoms and the risk of outbreaks. Traditional methods, such as COVID-19 RT-PCR testing, though effective, are often expensive and contribute to testing kit shortages and delays (Villavicencio et al., 2021). Addressing this challenge, deep learning models, specifically the Multilayer Perceptron (MLP) artificial neural network, offer promise for early detection applications.

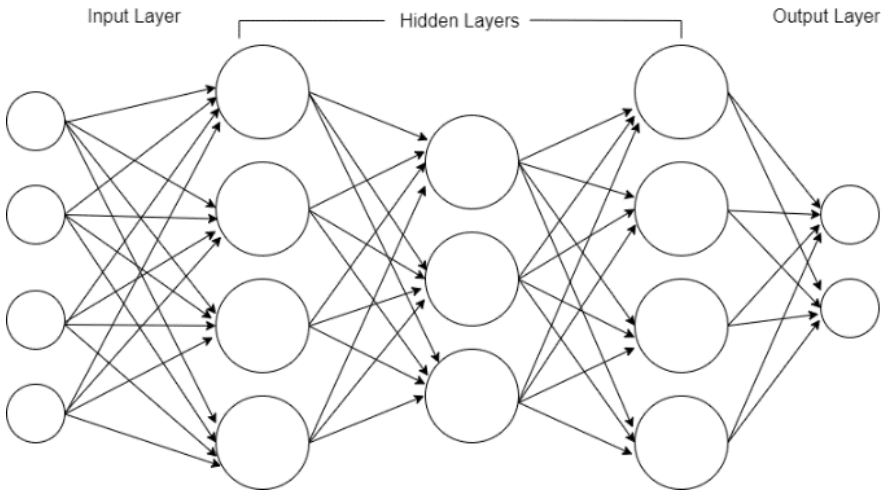

Figure 1: This is an image

In this study, an MLP architecture was employed due to its efficacy in both classification and regression tasks (Itano et al., 2008). Figure 1 illustrates a simplified representation of the MLP structure, featuring input, hidden, and output layers inspired by the human brain's interconnected network.

The depicted ANN structure involves four neurons in the input layer, representing predictors from the symptom dataset. Three hidden layers, with four, three, and four neurons respectively, process and classify the data to determine the potential presence of COVID-19 in an individual. Recognizing the challenges faced by the medical sector during the pandemic, the study aims to develop an ANN-based deep learning prediction model for real-time, early diagnosis of COVID-19. This model seeks to provide a rapid and cost-effective alternative to traditional laboratory tests, aiding in the prompt identification and management of COVID-19 cases.

Materials and Methods

The methodology of this study can be visualized in Figure 2.

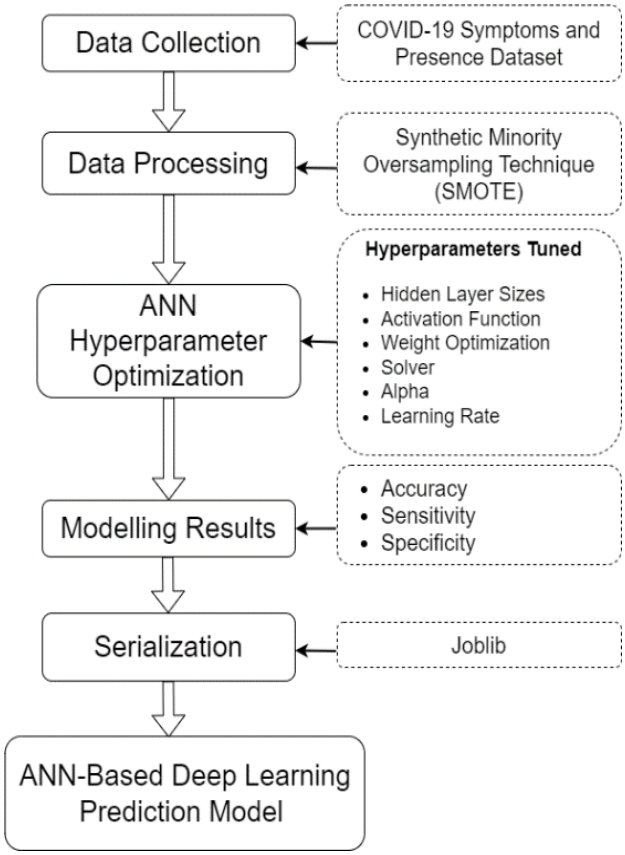

Figure 2: Methodology

Methodology details are illustrated in Figure 2, outlining the process of gathering data from the Kaggle dataset named COVID-19 symptoms and presence dataset. This publicly available dataset comprises 20 variables, with one target variable indicating COVID-19 positivity or negativity.

Acknowledging the 4:1 class imbalance in the dataset (Villavicencio et al., 2021), Synthetic Minority Oversampling Technique (SMOTE) was implemented to address this imbalance. SMOTE mitigates prediction bias by oversampling the minority class through the addition of synthetic samples based on randomly selected neighbors (Chawla et al., 2002). This adjustment ensures a more balanced representation of COVID-19 positive and negative instances, enhancing the classifier's ability to avoid bias in predictions.

Subsequent to data processing, the prepared dataset underwent the training phase of the prediction model. The optimized hyperparameters included hidden layer sizes, alpha, learning rate, activation function, weight optimization, and solver, seeking the optimal performance of the Artificial Neural Network (ANN) algorithm. Following hyperparameter optimization, the modeling process was executed, incorporating three statistical measures and scores to describe the model's performance.

Accuracy, defined as the ratio of correct predictions to the total number of predictions made by the model (Villavicencio et al., 2021), was one of the statistical measures considered. Sensitivity, or the true positive rate (TPR), represented the ratio of correct predictions of true samples over all positive samples in the dataset (Ul Haq et al., 2019). Additionally, specificity, or the true negative rate (TNR), denoted the ratio of correct negative sample predictions to all negative samples in the dataset (Ul Haq et al., 2019). These measures

collectively provided a comprehensive evaluation of the ANN algorithm's predictive performance.

After completing the modeling phase, the model was serialized using the Joblib package. This tool facilitated the compilation of the model into a file object, making it applicable for integration into various machine learning-based applications. Consequently, the ANN-based Deep Learning prediction model has been successfully developed and is now poised for deployment.

Results and Discussion

The dataset initially presented a 4:1 class imbalance, consisting of 4383 positive and 1051 negative samples. Employing the SMOTE dataset balancing method increased the total samples to 8766, ensuring an equal distribution of 4383 instances for both COVID-19 positive and negative classes.

Subsequently, the balanced dataset was divided into training and testing sets using a 7:3 ratio, resulting in 6136 samples for training and 2630 samples for testing. This prepared dataset underwent hyperparameter tuning during the modeling phase to optimize the Artificial Neural Network's (ANN) configuration for maximum accuracy.

Hyperparameter tuning was executed using the GridSearchCV method from the sklearn model selection package, involving the modification of predefined hyperparameter values. The 10-fold cross-validation resampling approach was applied in all experiments. The outcome included the recorded hyperparameter values and the accuracy of the generated classifier, with the best ten results.

Among the various hyperparameter configurations, five setups emerged as top performers, achieving the highest accuracy of 98.84%. The optimal configuration for the ANN algorithm, as determined through hyperparameter tuning, is detailed below: hidden layer sizes of (100,), (50, 100, 50), and (50, 50, 50), relu and tanh activation functions, adam solver, alpha values of 0.05 and 0.0001, and constant and adaptive learning rates.

Following hyperparameter tuning, the prediction model was constructed, with the tuned hyperparameters. This refined model underwent testing on both the training and testing datasets, delivering robust performance with 98.84% accuracy, 100% sensitivity, and 98.79% specificity. These results establish a strong foundation for the development of machine learning-based applications designed to facilitate early COVID-19 diagnosis in individuals.

The results suggest that the ANN MLP is a viable algorithm for constructing a COVID-19 prediction model using symptoms as predictors. Subsequent to model development, the dump() function from the joblib package was employed to serialize the prediction model into a file object, facilitating seamless integration into various machine learning-based applications.

Conclusion

The primary objective of this research is to design an Artificial Neural Network-based Deep Learning Model for Early Diagnosis of COVID-19, utilizing symptoms as predictors and eliminating the need for laboratory tests. Effective hyperparameter tuning, coupled with 10-

fold cross-validation, was employed to identify the optimal configuration for maximizing algorithm performance. Through this process, the most successful classifier configuration featured hidden layer sizes of (100,), (50, 100, 50), and (50, 50, 50), with relu and tanh activation functions, adam solver, alpha values of 0.05 and 0.0001, and adaptive and constant learning rates.

The results showcase the developed prediction model achieving an accuracy rate of 98.84%, perfect sensitivity (100%), and a specificity score of 97.69%, utilizing the most effective configuration of ANN MLP. This study lays the groundwork for machine learning-based applications that serve as health monitoring and management tools, offering real-time insights into the potential presence of COVID-19 in individuals solely based on symptoms. By alleviating the reliance on laboratory tests, this approach reduces both the effort and expenses associated with medical testing, ultimately contributing to the prevention of potential COVID-19 outbreaks.

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The Effects of Fourier Series Game-Based Learning Activities on Industrial Education and Technology Students' Mathematical Self-Efficacy

Ratchanikorn Chonchaiya, King Mongkut's University of Technology Thonburi, Thailand
Roengrit Rattanachawangkun, King Mongkut's University of Technology Thonburi, Thailand
Sutthipong Sindee, King Mongkut's University of Technology Thonburi, Thailand
Atchanaphong Supnoon, King Mongkut's University of Technology Thonburi, Thailand

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Abstract
Self-efficacy is vital for the development of oneself since it is the belief that one could conduct the required actions to achieve the tasks given to them. At a particular University in Bangkok, Thailand, the students from the faculty of industrial education and technology attained the lowest score in almost every learning module among others, especially the module of Fourier Series, due to the lack of mathematical self-efficacy, which is important for the careers that involve scientific and innovative subject. Game-based learning is proven to be an effective pedagogy for improving self-efficacy since it provides the engagement, motivation, competition, and progression needed to foster self-efficacy. This study aims to improve students' mathematical self-efficacy through game-based learning pedagogy. The classes are on-site with online interactive broadcasting where the students could choose to participate in either manner. The participants were 33 out of 115 students who were willing to commit to the study chosen by volunteered sampling from our learning section. The data was collected through the mathematical self-efficacy questionnaire and semi-structured interview and analyzed using the Wilcoxon Signed-Ranked test and content analysis. The results indicated that the students' mathematical self-efficacy was not improved due to students lacking the needed self-discipline toward learning. From the obtained result, we recommend the implementation of well-constructed classes that promote the students' self-discipline for more precise observations of mathematical self-efficacy development.

Keywords: Mathematical Self-Efficacy, Game-Based Learning, Fourier Series, Self-Discipline, Higher Education

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Introduction

1. Theoretical Background

Mathematics is considered to be of great importance, if not the most important, to prepare and enhance one's mind for the enduring process of logical and reasonable thinking. This aspect of thinking is also required in modern education for students need to achieve it to be competent in their career and able to live in society (Thipkhong, 2003). This expectation is also supposed to be met in higher education that is closer to the careers involving scientific and innovative subjects e.g., calculus. The authors had the opportunity to teach and observe MTH 102 (Calculus II) class during the academic year 2020 a university in Bangkok, Thailand. The subject is divided into modules where the students would take an exam at the end of every module (5 week / module), this manner of learning took place just after the outbreak of COVID-19 thus, it is rather new for the students who used to take traditional lessons as midterm phase and final phase. We had found that the students from the faculty of industrial education and technology attained the lowest score in almost every learning module among others, especially in the module of Fourier Series that is considered to be a necessary tool for learning mathematics. Moreover, the data obtained from in-class conversations, observations and interviews indicated worrisome attitudes toward their learning, some of the data is described as follows.

> "I am just too obtuse at mathematics."
>
> "I just study to pass the exam, and I think I am lacking the basics of calculus which I don't really care."
>
> "Online learning and calculus just made me feel unmotivated to learn."

It was shown that students did not believe much in themselves to perform well in class, in fact, they already gave up. These behaviors and expressions were as clear as day during the class, and they spelled the sign of low self-efficacy in mathematics that could stagnate their career in the future.

Self-efficacy is defined as the belief that one could accomplish the task given to them with an effort to overcome some obstacles (Bandura, 1999; Trihatun S. & Jailani Thipanya, 2020; Cheng M., et al., 2015). This is not to be confused with outcome expectancy which focuses on the outcome that is resulted from a certain behavior (Iam-suphasith, 2007) as shown in figure 1.

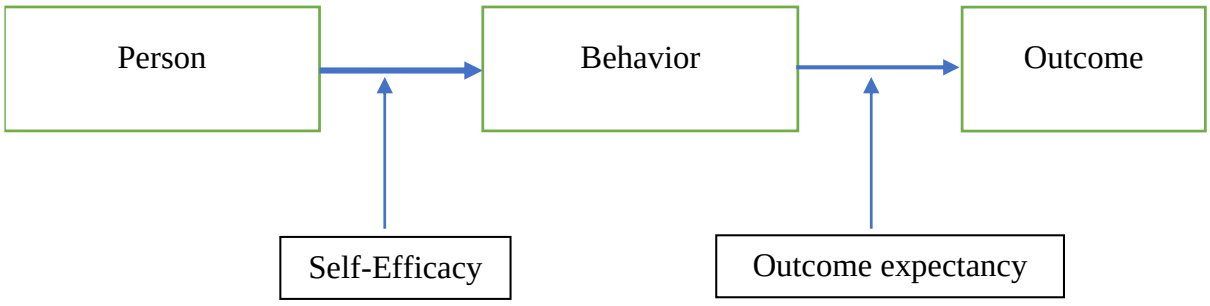

Figure 1: Influence of self-efficacy over behavior

Ayotola & Adedeji (2009) ascertain the positive impact of self-efficacy toward learning mathematics, and that means we could continue to explore self-efficacy in specific context i.e., mathematical self-efficacy which we defined as the belief that one could accomplish the mathematical task given to them with an effort to overcome some obstacles.

Bandura (1986; 1988) stated the importance of self-efficacy, for those who have high self-efficacy believe that they can accomplish their goals whether it results in success or failure, they would not yield and keep improving themselves since they perceive their failure as merely the lack of effort. Thus, it could not be denied that, if their mathematical self-efficacy is left to be deteriorated, it would certainly obstruct their learning process without them realizing it.

To improve self-efficacy, we may increase it corresponding to its sources (Bandura, 1994; Usher & Pajares 2009; Cheng et al., 2015; Haciomeroglu, 2019) as shown below.

1. Mastery experience is the successful experience received after accomplishing the given task that improves their skills and masteries.
2. Vicarious experience is the experience received from observing similar peers accomplishing the same given goals.
3. Social persuasion is the persuasion from the surrounding peers, insisting that they could accomplish the given goals.
4. Emotional and physiological state is the outer influences that affect their mental state which would impact their self -belief in capability.

Game-based learning is defined as the pedagogy that focuses on using game as the medium of formative assessment without further complicating the subject to engage and motivate the students to learn, do and discuss during the class. (Franco-Mariscal, 2014; Khae-Manee, 2000; Moon-Kam, S. & Moon-Kam, 2002). The advantages of game-based learning have shown the positive impacts toward self-efficacy since the students would be looking forward to the classes implemented with games and were tricked to improve themselves as the desire to win stemmed from the feedbacks received, peer observations, social persuasions and competitive environment takes over (Chuayprakong, 2022; Wang & Zheng, 2022). During MTH101 (Calculus I) class in academic year 2021, we had implemented several pedagogies e.g., flipped classroom, self-regulation and game-based learning to engage the students more in learning. The game-based learning was well-received and they tended to be more confident and motivated during the class.

From the aforementioned, this paper aims to improve the industrial education and technology students' mathematical self-efficacy through the use of game-based learning pedagogy.

2. Implementation and Results

The study was conducted at a university in Bangkok, Thailand with 33 out of 1533 industrial education and technology students chosen as the sample using volunteer sampling. As we chose to use game-based learning to improve the students' mathematical self-efficacy, the game that is suitable for educational context in Thailand is Vonder Go. It is the game that could harness the motivation and engagement from students by plunging them through the game progression that requires co-operation, self-improvement and competition. The students must band together to fight waves of enemy using the right answer to each question as their attack. It also provides leaderboard and virtual currency as reward for those who participate in the game. The mentioned elements would prove quite useful for teaching and formative

assessment (Insa-ad, 2022; Kru-Diary, 2021; Leart-thirunsap, 2022). The game interface used in the class is shown in the figure below.

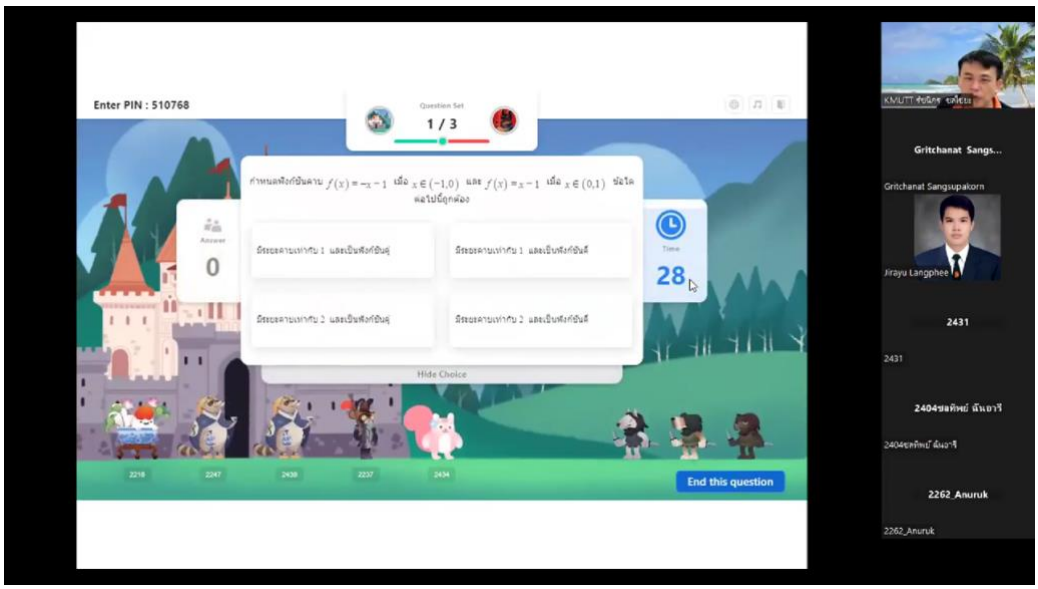

Figure 2: Vonder Go user interface

The game-based learning pedagogy was implemented during MTH102 (Calculus II) class under the topic of Fourier Series for 5 periods in the academic year 2021 where the classes are on-site with online interactive broadcasting and the students were required to attend the classes in either manner they preferred. The teaching process would start with necessary content revision, interactive class teaching followed by formative assessment using Vonder Go. Five students with the most score would be rewarded with virtual ticket that could be used to draw a price from the price pool. The volunteered students must complete mathematical self-efficacy questionnaire that consisted of 24 questions and covers the entire four aspects of the source of self-efficacy (Usher & Pajares, 2009) before and after their participation where the obtained data would be analyzed using dependent t-test with 0.05 significance level. The topics of the module are as follows.

1. Periodic Function
2. Fourier Series, Even Function and Odd Function
3. Fourier Series of Even Function and Odd Function
4. Convergence of Fourier Series
5. Half-Range Extension

After the implementation, only 16 out of 33 students were willing to complete our course. Thus, Wilcoxon Signed-Ranked Test with 0.05 significance level was chosen to analyze the data instead of the dependent t-test. The data analysis result is shown in Table 1 below.

Table 1: The results of statistical test on the students' mathematical self-efficacy

	The difference of pre-test and post-test (general)
Z	-0.817
Sig. (2-tailed)	0.414

As the sig. (2-tailed) is equal to 0.414 > 0.05, we would conclude that the mathematical self-efficacy of the students had not significantly changed in general.

Moreover, the Wilcoxon Signed-Ranked Test results of the students' mathematical self-efficacy according to the sources of self-efficacy are shown in Table 2 below.

Table 2: The results of statistical test on the students' mathematical self-efficacy according to its sources

Source of self-efficacy	Z	Sig. (2-tailed)
Mastery experience	-1.251	0.211
Vicarious experience	-0.410	0.682
Social persuasions	-2.108	0.035
Emotional and physiological state	-0.628	0.530

The results indicated that only the result in the part of social persuasions had improved since its sig. (1-tailed) is 0.0175 < 0.05. The reason might be that the students had the chance to be persuaded by their peers during the classes. These had shown that game-based learning pedagogy did not improve the students' mathematical self-efficacy which is not aligned with Wang & Zheng (2021) and Chuayprakong (2022). This occurrence requires more details for further investigation. Thus, the authors decided to acquire more qualitative data from the students through 7 semi-structured interview questions. Since most of the students chose to learn in online class, and many also decided to quit our course midway, the questions would also involve those aspects. The participants were 5 of the students chosen by convenience sampling; 2 students with higher self-efficacy (H.S.), 1 student with lower self-efficacy (L.S.), 1 student with unchanged self-efficacy (U.S.) and 1 student who chose to leave the course midway (N.P.). The qualitative results and excerpts from the interview are shown below.

Question 1. "How do Vonder Go and the rewarding system promote your learning?" revealed that the students felt more engaged, motivated and interested in our lessons which was resulted from the use of Vonder Go. Though a student (L.S.) had shown the lack of self-efficacy and uncertainty, stating that "Teaching in this way really helped me through the content. It was challenging and motivating, but when I answered the questions wrong, it made me feel a little anxious", we would say that the majority of participants still held positive thought toward our teaching.

Question 2. "Are there any differences between the traditional class and our class? How?" indicated that all the students stated many positive aspects of our lessons i.e., the lessons provided content revision during formative assessment, more engagement and class participation. A student (U.S.) stated that "There were vast differences between your lessons and traditional classes, one of those is it felt more engaging and motivating."

Question 3. "What do you think is the reason that make your classmates choose to learn in online class more than on-site class?" showed that all the students agreed that public transportation, too early class schedule, and lack of self-discipline were the reasons behind why their classmates would only participate in online classes. A student (N.P.) said that "During COVID-9, everything was online so I wouldn't want to change that since it was more convenient." Another student (L.S.) stated that "The classes were too early and hard, I couldn't keep them up with my sleep schedule so not participating might be the right choice."

Lastly, a student (H.S.NO. 2) said that "It was more convenient that way, and no one was going to force you to learn if you would not."

Question 4. "If you have to choose between learning in online class and on-site class, what will you choose?" indicated that the majority of the students would choose to participate in on-site class while only one student would choose to learn in online manner. They indicated that on-site class might provide them with more detailed content and more opportunities to ask questions. A student (N.P.) stated that "Online learning would be better. You could do anything, and no one is going to complain, and since I would rather learn by myself, having classmates during on-site class would only distract me." While most students seemed to choose on-site class, it contradicted with the result in Question 3 and what we encountered during the lessons, as a scarce number of them appeared then.

Question 5. "What are the pros and cons of learning in the manner of module?" revealed that the students reasonably pointed out the pros and cons of module lessons e.g., the content for each exam is reduced, or having to take exam more frequently resulted in them being more stressed. They agreed that it also reduced their motivation to learn since the module learning provides excessive opportunities for them to pass. A student (U.S.) said that "If we failed to pass a module, we would be provided with a chance to retake the exam. This might affect our motivation to learn in the class. And from taking the exam three times per semester, it made me feel more stressed."

Question 6. "Do you think that learning in the manner of module which requires you to take part in the exam more often makes you feel stressed? How?" indicated that most of the students were willing to take part in the module lesson since it reduced the amount of content they needed to review for each exam, making them feel more relieved. A student (U.S.) stated that "Both module and traditional learning produce the same amount of stress for me."

Question 7. "Do you think that online learning affects your stress in your daily life or when you study mathematics? How?" showed that 3 out of 5 students thought that they were more stressed when participating in online learning since there were communication barriers, and sitting in front of the desk all day would negatively affect their health, but 2 out of 5 students disagreed and pointed out that there were no negative impacts from online learning. A student (N.P.) stated that "Online learning does not provide much interaction to develop the relationship between teachers and students. This may hinder the students from asking questions confidently."

The qualitative data indicated game-based learning had positive impact toward the students' mathematical self-efficacy although the quantitative data had provided us with sufficient evidence that there was no improvement in mathematical self-efficacy. The results in both manners might seemed to be contradictory, but in fact they were not. The game-based pedagogy as we mentioned, has positive impact to students' mathematical self-efficacy, but it was not enough to improve it in this case. At first, we thought the cause of this occurrence might be from stress from module lesson and online learning, but from the qualitative data obtained and our observation, we arrived at another conclusion.

The question 3 and question 4 provided us the needed information. Online learning might not be the reason behind their undeveloped self-efficacy, but what come alongside it i.e., self-discipline. This is in line with Gorbunovs et al. (2016) and Hwang et al. (2021) stating that online learning requires a reasonable amount of discipline under social rules. This would

explain why half of the participants leaved our study half -way through. As open-minded as we are, we let them take responsibility in their learning without any negative treatments which most of them choose online learning, and in the end, they chose convenience over discipline in their learning. Most of the students would choose to watch the recorded class video instead of participating in person. There might be the cases that some students would choose on-site class, but in reality, they would not as shown in Figure… This spelled the lack of self-discipline that is an important bridge toward developing mathematical self-efficacy through both online and on-site learning since before they would start believing in their capabilities of doing something, they should be able to do it consistently without excuse first (Jung, 2013; Jung et al., 2017; Wahyuni, 2017; Yang et al., 2019).

Figure 3: On - Site Class Learning

Thus, in this study, game-based learning pedagogy has positive impacts toward students' mathematical self-efficacy, but it is not enough for developing it since the students lack self-discipline that is the key point and first step in higher education which they need to be responsible for their learning. Unless self-discipline is implemented, it may prove difficult to improve their mathematical self-efficacy and other domain-related aspects.

Conclusions

Game-based learning pedagogy has positive impacts toward the students' mathematical self-efficacy, but the quantitative results indicated that we failed to improve it. The qualitative data suggested that the lack of self-discipline that is the main bridge toward self-efficacy might be the possible reason that hindered the development of mathematical self-efficacy since students are required to be responsible for their learning and be consistent in improving themselves before they start believing that they could achieve their goal.

Further research might be augmented with the elements of self-discipline that would be of great help in developing mathematical self-efficacy. Since the classes were online and it had been shown that the students might neglect learning in this manner, and simply watch the recorded class video instead of participating, more engagement and class interaction should be implemented for the entire class.

Further research direction should involve more diverse groups of the students i.e., ethnic, gender, and major. The duration of the implementation could also be lengthened to entire semester since it might help to provide more insight to the development of mathematical self-efficacy.

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Design and Evaluation of a Contextualized Mobile Educational Game for Learning Emergency Medical Care

Pei-Ching Ngu, Graduate Institute of Applied Science and Technology – National Taiwan University of Science and Technology, Taiwan
Chih-Chung Chien, Graduate Institute of Applied Science and Technology – National Taiwan University of Science and Technology, Taiwan
Yen-Ting Ho, Graduate Institute of Applied Science and Technology – National Taiwan University of Science and Technology, Taiwan
Huei-Tse Hou, Graduate Institute of Applied Science and Technology – National Taiwan University of Science and Technology, Taiwan

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Abstract
The emergency medical service is a complex and variable situation and the critical thinking ability of the medical staff is challenged. Compared with traditional education, the contextual simulation of mobile learning can improve the learners' critical thinking ability. This study *《119 Dispatch Center》LINE@* and *Google Form* were combined to design a digital contextual role-playing mobile educational game to develop emergency care skills, with the learning objective of correctly performing the emergency care procedures for patients who have fainted. Learners are required to role-play as Emergency medical staff, performing the correct emergency procedures in complex situations, and calling out for non-player character (NPC) expert advice to assist the learner's decision-making at the right time. Participants were 11 nursing staff from Taiwan. Based on single-sample Wilcoxon Singed-Rank analyses, learners' scores on the flow, usefulness, ease of use, and game elements were significantly higher than the median of the 5-point scale (i.e., 3), and the mean score for activity anxiety was 2.30, which was lower than the median (i.e., 3) of the scale. The results of this study showed that the game design mechanism was easy to operate, which could effectively enhance the learners' flow and engagement, and did not cause too much anxiety about the activity. Through qualitative opinion analysis, learners indicated that the simulation situation was very realistic, just like the usual work experience of caring patients. In addition, the call out has a reminder function, which can help learners to think and make the correct decision in emergency medical care.

Keywords: Critical Thinking, Clinical Reasoning, Scaffolding, Digital Educational Game, Situated Learning

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Introduction

The Emergency Medicine Service System (EMSS) receives a public emergency notification, Emergency medical staff drives ambulances to the scene of the injury or illness to perform a first aid mission, until transit to the hospital, the medical staff will rely on personal experience to provide clinical reasoning and care to the injured patient in order to provide timely, accurate, appropriate and care (Andersson et al, 2022). Lee, D., & Park, J. (2019) stated that critical thinking is the basic foundation of clinical reasoning. Due to the complexity and variability of the patient's situation, the lack of critical thinking among medical staff may affect the patient's life safety and disability, therefore, it is necessary to improve the critical thinking skills of medical staff. Contextual simulation can enhance learners' clinical decision-making, clinical reasoning, and critical thinking skills more than traditional teaching (Macauley et al., 2017), and can promote learner motivation (Chen et al., 2017), further facilitating learning transfer (Catalano, 2015). Game-based learning allows learners to modify their learning strategies through self-directed learning and repetitive practice, develops learners' creativity, problem-solving ability and higher-level thinking (Hsieh et al., 2015), provides clues to problem solving, reduces learning anxiety, and increases engagement to achieve a state of flow (Hou et al., 2022). The study combines the instant messaging software *LINE@* and the *Google Form* digital platform to design 《*119 Dispatch Center*》 (as shown in Figure 1.), a digital contextual role-playing mobile educational game that develops emergency ambulance skills. The learning objective is to use critical thinking to perform proper emergency care procedures for a fainting patient.

Learners are required to play the role of an medical staff, receive a dispatch at *LINE@*, click on the map (red markers), link to the *Google Form* context to perform the proper emergency procedures, use the *LINE@* ambulance radio to call out when the scaffolding needs to be prompted, and request NPC experts consultation when appropriate to guide learners in critical thinking and clinical reasoning.

Figure 1: Combining the instant messaging software *Line@* and *Google form* as a role-playing ambulance paramedic guides critical thinking and clinical reasoning.

Methods

This study was a pilot study with 11 medical staff from Taiwan. Each session consisted of 30 minutes: 10 minutes for the introduction of the story, and rules of the game, 10 minutes for

the game activity, and 10 minutes for the questionnaire. The study investigated the game usefulness and game ease of use of the game mechanism for learning, the game elements that facilitate game motivation, and the learners' anxiety and flow during the learning activities. The other part of the questionnaire consisted of 4 semi-structured questions focusing on whether the game mechanics of this study could enhance learners' understanding of emergency care procedures.

Results and Discussions

According to the single-sample Wilcoxon Singed-Rank analyses (e.g., Table 1), on the game usefulness (M = 3.93, SD = 0.92), game ease of use (M = 4.21, SD = 0.76), game elements (M = 4.4, SD = 0.75), and flow (M = 4.5, SD = 0.52), learners' scores were all significantly higher than the median (i.e., 3) of the scale, and the mean activity anxiety score (M = 2.3, SD = 0.89) was lower than the median (i.e., 3) of the scale. Through qualitative feedback analysis, learners reported that the simulations were very realistic, like the experience of handling a patient at work, and that the call-outs had a reminder function to help learners consider and make the right first aid decisions.

Table1: The Results of single-sample Wilcoxon Singed-Rank analyses

Item	*M*	*SD*	*Z*	*Sig.*
Game usefulness	3.93	0.92	2.75**	0.006
Game ease of use	4.21	0.76	2.72**	0.007
Game elements	4.40	0.75	2.69**	0.007
Sense of control	4.27	0.79	2.74**	0.006
Uncertainty	4.36	0.81	2.76**	0.006
Achievement	4.18	0.87	2.60**	0.009
Think the game was fun	4.55	0.82	2.89**	0.004
Wish to play again	4.64	0.81	3.00**	0.003
Overall flow	4.50	0.52	2.937**	0.003
Flow antecedents	4.40	0.53	2.937**	0.003
Flow experience	4.58	0.55	2.941**	0.003
learning anxiety	2.30	0.89	-2.08*	0.038

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

Conclusions and Limitations

In this study, we developed《*119 Dispatch Center*》, a digital contextual role-playing mobile educational game that aims to develop emergency care skills. Through the process of individual play, the game can effectively enhance the learner's flow and engagement without high anxiety about the activity. The simulation context of the game and the call out scaffolding reminders can guide the learners to critical thinking and clinical reasoning. It is suggested that future research can design experimental and control groups, and increase the number of experimental participants to improve the reliability and validity, as well as to explore the learning effectiveness.

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Contact email: hthou@mail.ntust.edu.tw

Design of Complex Problem-Solving Ability Training Games That Combine Simulation Spaces and Plots

Chih-Chung Chien, Graduate Institute of Applied Science and Technology – National Taiwan University of Science and Technology, Taiwan
Pei-Ching Ngu, Graduate Institute of Applied Science and Technology – National Taiwan University of Science and Technology, Taiwan
Yen-Ting Ho, Graduate Institute of Applied Science and Technology – National Taiwan University of Science and Technology, Taiwan
Huei-Tse Hou, Graduate Institute of Applied Science and Technology – National Taiwan University of Science and Technology, Taiwan

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Abstract
The most important thing in complex problem-solving is to recognize the characteristics of the crux of the problem, which is a very important "ability" in the workplace, and the need to understand the problem comprehensively before analyzing it is an important step in making decisions on how to deal with the problem. This study uses *Gather Town* to design a simulation company environment. The first learning objective of this game is that suddenly an important client is coming to visit, and in the absence of a redundant meeting room, the general manager assigns the "The Super Secretary" to coordinate with several key figures (NPCs, Non-Player Character) and propose the best solution to solve this complex problem. Good communication skills are our second learning objective. This game uses *Google Forms* to provide players with dialogues and interactions with key figures NPCs in the *Gather Town* simulation space, and different communication discourse content choices will generate different information and plot development. The participants of this preliminary study were 12 adults over 20 years of age in Taiwan. The results of the study showed that the participants' mean scores for flow, game elements, and game feedback were significantly higher than the median of the scale (i.e., 3), and their activity anxiety scores were lower than 3. In addition, the qualitative opinion feedback collected also showed that the learners also reported that the game was "very realistic, as if we were really discussing and negotiating with them". Therefore, the results of this study suggest that the digital situation simulation mechanism designed in this study has the potential to develop decision-making thinking and communication skills for complex problem-solving.

Keywords: Educational Game, Situated Learning, Scaffolding, Communication Skill, Complex Problem-Solving, Contextual, Online Distance Learning

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Introduction

In the workplace, it is not uncommon to find oneself confronted with perplexing decision-making problems that are inherently complex, not because they are difficult to solve, but because they are subject to conflicting variables that complicate and entangle the problem (Dutta, 2018). The intrinsic impact of complex problems on strategy management is serious, confronting management with profound paradoxes (McMillan & Overall, 2016). These problems require consideration of holistic solution strategies because issues and problems are inherently interrelated and dynamically changing (Waddock et al., 2015) and require the active engagement of multiple stakeholders with potentially conflicting perspectives and goals (Edmondson, 2016). Therefore, the ability to solve complex problems in the workplace is one of the important training competencies in the workplace. Kornelakis & Petrakaki (2020) studied that the ability to solve complex problems is a cognitive process of strategic thinking. In addition, Buchanan (1992) suggested that complex problems without explicit conditions and constraints need to be handled in a non-linear way, which requires the coordinator to have a holistic view of the problem situation and to formulate testable hypotheses about possible solutions. Since the problem situation will not reach the coordinator under predefined conditions, defining the problem and finding a solution are equally important (Dutta, 2018). This is related to the inductive reasoning process, in which acceptable solutions are then coordinated through the formation of exploratory hypotheses, so that in the complex problem-solving coordination process, the problem definition and the proposal of a solution are determined simultaneously (Liedtka, 2006).

This study proposes a new online digital game "The Super Secretary" for workplace complex problem-solving skills training. The game is designed on the *Gather Town* platform, with a simulation space and company context, and *Google Form* as the interactive mechanism for NPC dialogues. The contextualized learning game in a simulation space can promote immersion and reflection for learners (Hou, 2015). The game goal of this study is to allow learners to propose the best solution to complex problems through consultation with key colleagues (NPCs) in the game. The game allows learners to make different choices in the dialogues with NPCs to produce different information outcomes and plot developments, and to experience communication skills in dialogues with different characters. At the same time, the game guides learners to construct comprehensive generalization and reasoning, develop complex problem-solving skills, and achieve more organized decision-making.

Methods

This study was conducted with 12 adults over 20 years of age in Taiwan, who participated in the preliminary case study. Before taking the test, none of the participants had taken any relevant courses using the scripted interactive mechanism learning method designed by *Google Form*. The operation of the activity was based on the *Gather Town* game platform, where participants interacted with NPCs in a free-exploration mode, as shown in Figure 1. The hidden cognitive scaffolding is designed in the dialogues, so that each page of the dialogues contains the judgmental thinking of communication skills. When the learner selects a good communication path, the learner will get a good message back, which can increase the strategic thinking of complex problem solving. The cognitive scaffolding tips for communication and complex problem-solving can also be explored during the game. At the end of the task, learner will have completed the learning of communication and complex problem-solving skills.

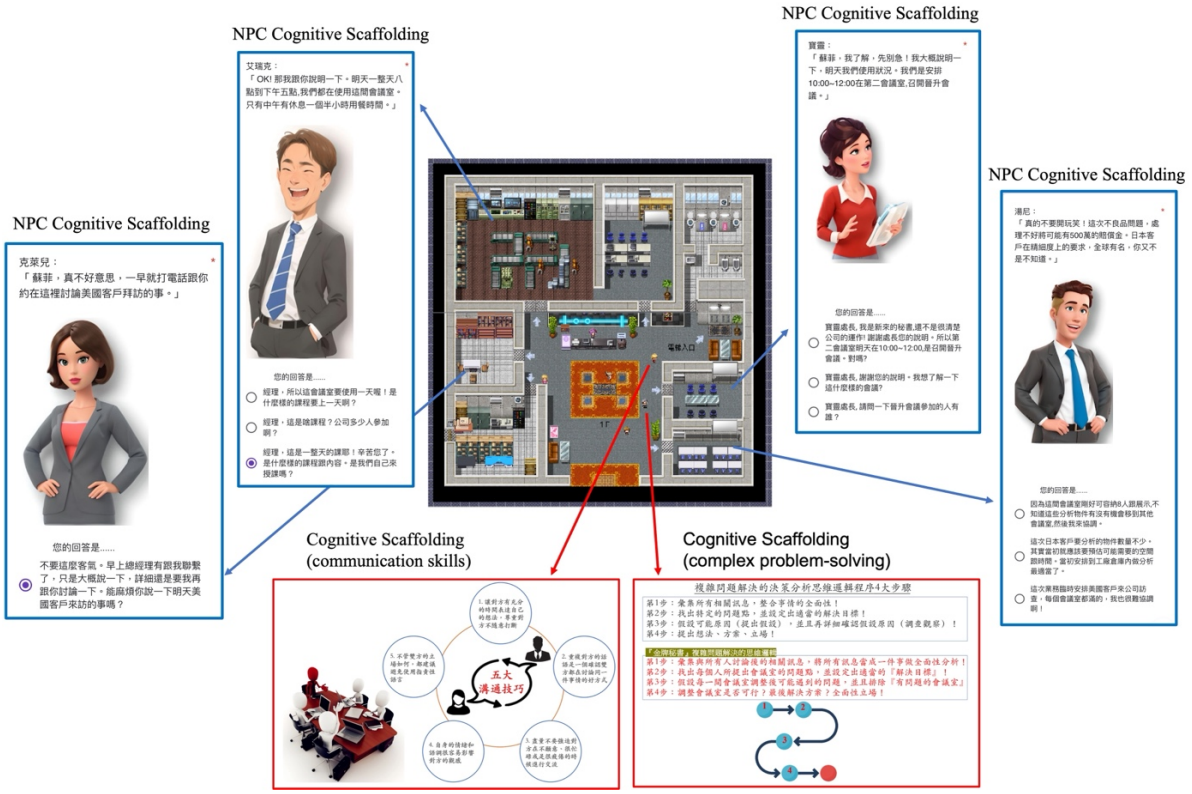

Fig. 1. *Gather Town* simulation platform and scripted interactive mechanism by *Google Form*

Results and Discussions

"The Super Secretary" is based on the learner's free exploration and interactive dialogue with NPCs in the situation simulation space, and finally summarizes the reasoning process, forms an exploratory hypothesis, and then coordinates an acceptable solution to the task as a learning goal. Table 1 shows the descriptive statistical analysis of learners' flow state after completing the task. The overall flow (M=4.19, SD=0.66) is significantly higher than the median of the scale (i.e., 3). Flow antecedents (M=4.23, SD=0.67), flow experience (M=4.17, SD=0.69), and other flow average dimensions are all high at a median of the scale (i.e., 3). Among them, the average concentration ratio of sub-dimensions is as high as 4.42. It is inferred that the overall game design of the scaffolding-oriented NPC plot dialogue interaction mechanism can make learners more immersed in the game. Ou et al. (2021) mentioned that when learners are immersed in a realistic learning environment, their cognitive speed is accelerated, their attention is enhanced, and their critical thinking is improved.

Table 1. *The mean and standard deviation of learners' flow*

	(*N*=12)			
	M	*SD*	*Z*	*Sig.*
Overall Flow	4.19	0.66	2.949**	0.003
Flow antecedents	4.23	0.67	2.809**	0.005
Challenge-skill balance	4.33	0.83	2.881**	0.004
Goals of an activity	4.33	0.72	2.842**	0.004
Unambiguous Feedback	4.08	0.73	2.821**	0.005
Control	4.25	0.87	2.833**	0.005
Playability	4.13	0.64	2.971**	0.003
Flow experience	4.17	0.69	2.944**	0.003
Concentration	4.42	0.76	2.985**	0.003
Time distortion	3.75	0.84	2.413*	0.016
Autotelic experience	4.35	0.87	2.902**	0.004
Loss of self-consciousness	3.71	1.03	2.074*	0.038

*p <0.05, **p <0.01

Table 2 shows the descriptive statistical analysis of learners' game anxiety, game feedback, and game elements. Overall anxiety (*M*=1.84, *SD*=0.52), lower than the median of the scale (i.e., 3) and reaching significance. Moderately low anxiety is an important indicator of sustained flow during gaming activities (Hou, 2015). In addition, overall game feedback (*M*=4.42, *SD*=0.56), game usefulness (*M*=4.40, *SD*=0.64), game ease of use (*M*=4.44, *SD*=0.61), and game elements (*M*=4.38, *SD* =0.74) is also significantly higher than the median of the scale (i.e., 3). Hassan et al., (2021) pointed out that good game elements will cause learners' sense of achievement, participation and improved motivation.

Table 2. *The mean and standard deviation of learners' game anxiety, game feedback, and game elements*

	(N=12)			
	M	*SD*	*Z*	*Sig.*
Game Anxiety	1.84	0.52	-3.061**	0.002
Game Feedback	4.42	0.56	3.066**	0.002
Game Usefulness	4.40	0.64	2.956**	0.003
Game Ease of Use	4.44	0.61	3.089**	0.002
Game elements	4.38	0.74	3.007**	0.003

**p <0.01

Conclusions and Limitations

"The Super Secretary" is a situation simulation online game developed by this research based on the theme of "Coordination tasks for conference room scheduling" in a company, which focuses on the training of complex problem-solving skills. It also allows learners to experience the importance of complex problem solving and inductive reasoning process (Khisty, 2000). In summary, there were significant differences in flow performance, learning anxiety, game experience, and game elements. The preliminary results of this study show that the simulated experiential learning with the company context and colleague interactions, and the introduction of the scaffolding-oriented NPC dialogues, can maintain a high level of flow and reduce learning anxiety during the learning process. The preliminary results of this study show that the digital situation simulation mechanism designed in this study has the potential

to cultivate decision-making and communication skills for complex problem solving. For future research, we can increase the sample size and explore the differences between the scaffolding-oriented NPC plot dialogue interaction mechanism and the general scaffolding mechanism in terms of online learning scaffolding effectiveness, realistic feelings and critical thinking, and do more research. In-depth comprehensive comparative analysis.

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Contact email: hthou@mail.ntust.edu.tw

Digital Strategies in Education Across Nordic Countries

Marie Bajnarová, Palacký University Olomouc, Czech Republic

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Abstract
Digitalization has already played an important role in education when COVID-19 forced the closing of school buildings and the digitalization of education to varying degrees around the world. COVID-19 started an unprecedented experiment in school systems and the ongoing digital transformation was suddenly accelerated. This situation initiated the creation of new challenges and opportunities for users such as teachers, pupils, administrators, but also creators of national strategies and action plans in education. The paper is specifically focused on the comparison of current government strategic documents dealing with the National Strategies for School System Digitalization within selected Member States of the European Union (EU). This study discusses and analyses two interrelated issues: first, the current trends in the development of digitalization across the Nordic EU countries regarding the development of digital transformation, and second, related initiatives described in selected National Strategies for Digitalization in Education. The research objectives are specified in the summarizing chapter, based on which the methodology for comparing the documents is described. The main objective of the study is to analyse the Swedish National Digitalization Strategy for the School System, the Danish National Strategy for Digitalization and the Finnish Artificial Intelligence Programme. A sub-objective is to identify the interests of these Nordic countries in digital innovation in education. The results of the study show that the digital strategy in education across the Nordic EU countries is strongly linked to the 21st century education, thus contributing to various debates on technologies, development of digital literacy and progress in education.

Keywords: Digitalization, Digital Transformation, Strategic Documents

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Introduction

Digitalization has already played an important role in education when COVID-19 forced the closing of school buildings and the digitalization of education to varying degrees around the world. COVID-19 started an unprecedented experiment in school systems and the ongoing digital transformation was suddenly accelerated. This situation initiated the creation of new challenges and opportunities for users such as teachers, pupils, administrators, but also creators of national strategies and action plans in education. The paper is specifically focused on the comparison of current government strategic documents dealing with the National Strategies for School System Digitalization within selected Member States of the European Union (EU).

Subsequently, we present important terms that are related to the issue being addressed:

1. The Digital Education Action Plan

The Digital Education Action Plan (2021-2027) is a renewed European Union (EU) policy initiative that sets out a common vision of high-quality, inclusive, and accessible digital education in Europe, and aims to support the adaptation of the education and training systems of Member States to the digital age. The Action Plan, adopted on 30 September 2020, is a call for greater cooperation at European level on digital education to address the challenges and opportunities of the COVID-19 pandemic, and to present opportunities for the education and training community (teachers, students), policy makers, academia, and researchers on national, EU and international level (European Education Area: Digital Education Action Plan, 2022).

2. The Recovery and Resilience Facility

Member States use the funds provided by the Recovery and Resilience Facility to implement ambitious reforms and investment to make their economies and societies more sustainable, resilient and prepared for the digital transitions (The Recovery and Resilience Facility, 2022). In this section, we are interested in the following two areas, i.e.:

- Digital transformation
  Here are the areas of focus for development: Promoting the roll-out of very high-capacity networks, the digitalisation of public services, government processes, and businesses, in particular SMEs; developing basic and advanced digital skills; supporting digital-related R&D and the deployment of advanced technologies.
- Policies for the next generation
  Here are the areas of focus for development: Improving access to and the quality of general, vocational, and higher education; focusing on digital education, early childhood education and care; supporting youth employment.
- The issue of digital education within the framework of Europe's digital future
  To shape Europe’s digital future, the European Commission is determined to tackle the digital skills gap and promote projects and strategies to improve the level of digital skills in Europe. All Europeans need digital skills to study, work, communicate, access online public services and find trustworthy information. Digital skills are a crucial driver of the EU’s competitiveness and innovation capacity. They are also a key determinant of social cohesion and personal well-being. Ongoing digital and green transformations bring fast economic restructuring, which requires people to engage in lifelong learning. Moreover, these transitions require Member

States to unlock their full skills and innovation potential. This includes reforms to improve the quality of education and training systems. The European Commission supports EU Member States by providing expertise and exchange of good practices in the field of skills, education, and training. Examples of support (Reform Support: Digital transition, 2022):

- Improving the upskilling and reskilling systems in adult education.
- Fostering digital education and skills.
- Improving higher education, research, and innovation.
- Improving vocational education and training.

Methodology and Research Goals

This study discusses and analyses two interrelated issues:

- first, the current trends in the development of digitalization across the Nordic EU countries regarding the development of digital transformation,
- and second, related initiatives described in selected National Strategies for Digitalization in Education.

The research objectives are specified in the summarizing chapter, based on which the methodology for comparing the documents is described.

The main objective of the study is to analyse the Swedish National Digitalization Strategy for the School System, the Danish National Strategy for Digitalization, and the Finnish Artificial Intelligence Programme. A sub-objective is to identify the interests of these Nordic countries in digital innovation in education.

Sweden: Digital Transformation and Strategies for Digitalization in Education

Digital challenges for Sweden focus on the need to realise the transformative potential of digitalisation, including broadband network roll-out and increased numbers of study places in higher vocational education to address the current scarcity of experts in the information and communication technology sector. In addition, the Swedish plan contains investments to scale-up the education at universities and other higher education institutions (Sweden's Recovery and Resilience Plan, 2023).

The Swedish National Digitalization Strategy for the School System: The main objective of the Swedish strategy is to create further opportunities for digitalisation, to achieve a high level of digital skills (especially for children, students, and young people) and to promote the development of knowledge, equal opportunities, and access to technology. The national digitalisation strategy for the school system in Sweden is based on 3 focus areas each accompanied by a set of milestones (National Strategies: Sweden National Digitalization Strategy School System, 2023).

1. *Digital literacy for everyone: All children and students need to develop appropriate digital skills:*
    - Children and pupils in primary and secondary education should be given the necessary conditions to develop digital skills.
    - Pre-school leaders, head teachers and school leaders must have the ability to strategically lead digital development in their organisations.
    - Staff working with children and students must be competent to identify, select and use digital tools in education.

2. *Equal access and use: Children, students and staff must have good and equal access to digital tools and resources to improve educational activities:*
    - Children, students, and staff must have access to relevant digital tools based on their needs and adapted to their conditions.
    - Appropriate infrastructure and technical and pedagogical support must be in place.
    - The digital learning resources used in teaching must be appropriate and technology opportunities should be used efficiently.
    - Staff training and administrative work should be available in digital format to contribute to policy analysis and implementation.
3. *Research and Follow-up on the Opportunities of Digitalisation:*
    - Research into the impact of digitalisation on teaching and learning should be strengthened and supported.
    - The follow-up of digitalisation in the school system will be implemented and support the development of future activities and initiatives.

Denmark: Digital Transformation and Strategies for Digitalization in Education

The Danish government established an expert group called "digitalisation partnership", consisting of the main stakeholders of the industry (including business representatives and experts). Based on recommendations and following political negotiations, the government presented the new Digital Strategy in 2022. The aim of the measure was to set up a new digital strategy consisting of five sub-reforms with the following objectives (Digitaliseringspartnerskab offentliggør anbefalinger for Danmarks digitale fremtid, 2021):

- Sub-reform 1: Strategy for the digital public sector and services of the future.
- Sub-reform 2: Strategy for the digital professions and jobs of the future.
- Sub-reform 3: Framework for innovation, public-private partnerships, and use of new technology.
- Sub-reform 4: Framework for a data-driven society.
- Sub-reform 5: Framework for Denmark fit for a digital future.

The Danish National Strategy for Digitalization focuses on the following points (National Strategies: Denmark National Strategy Digitalization 2022-2026, 2023):

- Children and young people should be better equipped for the digital society of the future. That is why technology must be integrated in primary school education. This can be done by introducing more practical elements into primary education. At the same time, technology as a proficiency must be strengthened among teachers at higher education and future primary school teachers.
- The digital skills and understanding of graduates and the workforce must be boosted by strengthening higher education (both regular programmes and supplementary and continuing programmes).

The lack of specialised IT skills risks inhibiting Danish growth, innovation, and export opportunities. That is why more people need training in IT, technology, data, and coding. The government wants the Danes to acquire more digital skills by 2030 so that they become equipped to seize the opportunities offered by the digital development.

Finland: Digital Transformation and Strategies for Digitalization in Education

Promoting the digital transformation is a cross-cutting theme across the Finnish plan. Digital challenges for Finland focus on the need to realise the transformative potential of digitalisation. This includes upgrading rail traffic management system, extending the coverage of broadband connections, digitalising healthcare, and employment services, increasing the level of digitalisation and automation in business, and raising the level of investment in research, development, and Innovation (Finland's Recovery and Resilience Plan, 2023). The country, therefore, provides a unique opportunity for understanding the narratives, policy interventions, which shape perceptions the future of work and education in Europe. Finland has more recently introduced three major strategic initiatives:

- The AI strategy: Finland's Age of Artificial Intelligence.
- The Future of work 2030.
- The reform of continuous learning.

In this respect, the government's approach to the implementation of the continuous learning reform with the establishment of the National Service Centre for Continuous Learning to stimulate further supply of short skills-based courses, and the strategy and vision proposed by the innovation fund SITRA through a model of localised ecosystems of skills formation and based on systematic experimentation present two distinct scenarios for realisation of Finland as a learning intensive society. The latter model could situate Finland as a globally leading country showing new avenues to a digitally inclusive society and a future of work underpinned by a sense of personal agency, competence, and personal meaning (Finland: AI, policy innovation and the future of work and learning, 2023).

The Finnish Artificial Intelligence Programme, launched in May 2017, prioritises actions aimed at enhancing Finland's position in the global of Artificial Intelligence (AI) and build partnerships with national, European, and international stakeholders. According to the AI Programme, developed and coordinated by the Finnish Ministry of Economic Affairs and Employment, labour markets and citizens should prepare for the disruptive effect that AI poses in education. To address this challenge, the Programme aims to strengthen the role of lifelong learning and adapt education and vocation education and training (VET) systems so that they can respond to increased demand for skilled and highly educated workforce. Within this context, Finland's Artificial Intelligence Programme prioritises actions and initiatives on innovative approaches in AI and machine learning and continuously upgrades and improves technical infrastructure and the deployment of 5G technology. Through this approach, the Programme aims to optimise education and modernise it to achieve better results. Within the framework of the Programme, a variety of additional training activities and opportunities for citizens, labour force, education professionals and students, and digital experts (National Strategies: Finland artificial intelligence programme, 2021).

Discourse

Digitalization plays a key role in the Nordic countries, and Scandinavia is often seen as a leading player in digital innovation. Countries such as Sweden, Denmark, Norway, and Finland are known for their rapid adoption of new technologies and the efficient use of digital services in both the public and private sectors. The high level of digital literacy of the population, together with progressive government policies, support the development of both the digital innovation and education. The approach to digital transformation in Scandinavia is systematic and comprehensive. In the field of education, Scandinavia brings digital

innovations to the classroom, develops online and distance learning methods, and provides teachers and students with modern teaching tools. Finland, for example, is known for its innovative approach to education, which includes integrating technology into the curriculum and providing students with tablets and computers. In the education sector, Sweden is implementing digitalization strategies that aim not only to modernize teaching methods, but also to ensure that digital competences are an integral part of lifelong learning. The government invests in research and development of educational technologies and supports projects aimed at increasing the digital skills of teachers and students. One of the key elements of Sweden's strategy for digitalization in education is to provide equal access to quality digital educational resources for all students, regardless of their socio-economic status. This is important to maintain the principle of equal opportunities, which is highly valued in the Nordic countries. In Denmark, the strategy for digitalization in education focuses on similar goals. The Danish government supports innovation in education through various initiatives, such as national projects for digital education, which include the development of digital curricula and the creation of online learning platforms. Danish schools are equipped with the latest technology and infrastructure, allowing for the effective integration of digital tools into the classroom. Finland, as another Nordic country, approaches digitization in education with a similar commitment to innovation and equality. Finland's education system has long been considered one of the best in the world, and digitization has played a significant role in its success. The Finnish government promotes digital education through various programs and initiatives that aim to promote technological literacy and critical thinking.

Conclusion

The National Recovery Plan is a key element for the restart of EU Member States after the COVID-19 pandemic. This strategic document, which each country must submit to the European Commission, maps out the paths to sustainable and inclusive growth. The Digital Education Action Plan is an essential component and aims to transform Member States' education systems to meet the new challenges of the digital era and prepare pupils and students for the future labour market. For these reasons, we have focused on Scandinavian countries such as Sweden, Denmark, and Finland, which are members of the European Union and emphasize digital education as part of their national recovery plans. These countries have a long tradition of innovation in education, and their approaches are often seen as role models. All three countries – Denmark, Sweden, and Finland – show that digital strategy in Europe is not just about technology, but about a holistic approach that encompasses both education and social equality. This model offers inspiration for other European countries that are trying to digitize education and their society. The interpretation of the documents shows that the digital strategy in education across the Nordic EU countries is strongly linked to the 21st century education, thus contributing to various debates on technologies, development of digital literacy and progress in education.

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Contact email: marie.bajnarova@gmail.com

Mental Health Services & Education Policy for Generation Z After the COVID-19 Pandemic in Yogyakarta City

Amanda Elista, Universitas Gadjah Mada, Indonesia
Khusnul Prasetyo, Universitas Gadjah Mada, Indonesia
Iklima Ritmiani, Universitas Gadjah Mada, Indonesia
Citra Sekarjati, Universitas Gadjah Mada, Indonesia
Ratminto, Universitas Gadjah Mada, Indonesia
Rahmat Hidayat, Universitas Gadjah Mada, Indonesia

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Abstract
Mental health is a serious issue during and after the pandemic. Young people, including Gen Z, are the most vulnerable group to experience mental health. Yogyakarta is the locus of research where this city has a high life expectancy of 75.04 years, but unfortunately the prevalence rate of mental disorders is the second highest in Indonesia. This research aims to determine and analyze the implementation of mental health education policies. This research uses qualitative research methods with purposive sampling techniques, through 1) in-depth interviews 2) surveys 3) FGD 4) Literature and Documentation Studies. The results of the research show that 1) the implementation of mental health education policies in Yogyakarta City has not been running optimally 2) the factors causing this include 1) economic uncertainty 2) social media 3) toxic relationships 4) mental health services at PUSKESMAS have not been optimal 5) health budget mentally. Conclusion: mental health is a problem that will have a broad impact on human development, therefore a serious commitment from the government is needed in handling this case. Recommendations: 1) the government needs to make improvements to mental health services at PUSKESMAS 2) provide a budget allocation for mental health and 3) encourage the mental health movement in the city of Yogyakarta.

Keywords: Mental Health, Education Policy, Generation Z

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Introduction

Mental health issues have become a serious problem in many countries, and Indonesia is no exception. The COVID-19 pandemic has been the main trigger for a wide variety of mental illnesses that have mushroomed especially among youth due to the duration of quarantine, fear of infection, limited social interaction, and more. Our youth have been mentally and emotionally burdened by the stress of the COVID-19 pandemic (Alsadek et al., 2021). According to the United Nations (UN), youth are defined as people between the ages of 15 to 24. However, the operational definition and nuances of the term 'youth' vary from country to country, depending on relative sociocultural, institutional, economic and political factors (UN, 2024). In Indonesia, Law No. 40/2009 on Youth gives the age range of youth from 16 to 30 years old. According to the results of the National Socio-Economic Survey (Susenas) in 2023, the estimated percentage of youth is 23.18 percent or almost a quarter of the Indonesian population. The average age that is the standard for regulation in Indonesia is the millennial (Y) and Z generations. It is estimated that by 2024, the Z generation population will dominate the Indonesian population, reaching 56 percent (BPS, 2023).

This research will focus on generation Z because of its unique characteristics, has extensive creativity and high intensity of technology use, especially social media which is one of the causes of mental health issues, such as depression, to suicidal ideation (Prasetyo et al., 2021; Yahaya et al., 2023). Not only social media, there are actually many reasons why generation Z is prone to mental health issues, some of the other things are environmental factors such as material poverty, poor living conditions, and social stressors such as violence and victimization (Curtis et al., 2013). Mental illness and poverty tend to be traveling companions. Worry and uncertainty can worsen mental health (Ridley et al., 2020). Violence including war and conflict, child abuse, harsh parenting (Lindert & Bilsen, 2020), then bullying, social isolation, academic pressure, and high societal expectations can also be triggers for mental illness (Cooper & Hornby, 2018).

The complexity of mental health issues is unfortunately not accompanied by quality policy responses. Policies issued by the government during the COVID-19 pandemic such as staying at home, social restrictions, and lockdown measures are not well mitigated for their impact on mental health. There is very little literature that shows the efforts of countries in the world to mitigate these impacts. Most countries only focus on solving health and economic problems. Even after the pandemic, there is little concern from the government. So far, mental health issues are still considered trivial and underestimated (Villarreal-Zegarra et al., 2022). If in the substantive aspect, mental health policy is still not a priority, while in the technical aspect it is still faced with a lack of resources, coverage and access to services and a large treatment gap (Ayuningtyas et al., 2018; Behanova et al., 2013).

As a result of the government's lack of responsiveness, in Indonesia itself, people entrust their mental health consultations to non-government institutions, namely the private sector such as psychology services in private hospitals to the Halodoc, Riliv and similar platforms. According to Handayani et al (2020), people with high mental health literacy tend to utilize mental health services well compared to people with low mental literacy. It can be interpreted that the utilization of mental health services also depends on the behavior of the community.

In this research, Yogyakarta was chosen as the research location because it is the main reference for young Indonesians to study and get an education. It is no wonder that this city is nicknamed the city of students. The number of campuses in Yogyakarta has led to high

mobility of young people, especially Gen Z from various cities in Indonesia. The high quantity of young people is certainly accompanied by new problems that arise, one of which is mental health. Based on Basic Health Research (Riskesdas) from the Ministry of Health, the prevalence of severe mental disorders in Yogyakarta is the second highest in Indonesia (Kemenkes, 2018). Based on this background, the researcher wants to examine how mental health services and education policies in Yogyakarta City and what factors cause mental health problems in Yogyakarta City.

Literature Review

According to WHO, mental health is an integral part of health and well-being, as reflected in the definition of health in the WHO Constitution: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 2013). Mental health is an integral component of health and well-being that underlies our individual and collective ability to make decisions, build relationships, and shape the world in which we live. Mental health is a fundamental human right. And it is important for personal, community and socio-economic development (WHO, 2022). Determinants of health and mental disorders encompass individual attributes as well as social, cultural, economic, and environmental factors, while exposure to adversity, particularly in vulnerable groups such as those living in poverty, individuals with chronic health conditions, and marginalized communities, significantly heightens the risk of mental health problems (WHO, 2013).

Mental disorders, encompassing impairments in cognition, emotional regulation, or behavior, are clinically significant conditions associated with distress or impaired functioning, including anxiety disorders, mood disorders, externalizing disorders, and substance abuse disorders, influenced by both internal factors like personality and external factors such as social circumstances (Darajat, 1982). WHO's research highlights the significant global increase in mental health issues due to the COVID-19 pandemic, including heightened depression and anxiety rates, a higher risk of severe illness and death for those with mental disorders, particularly among younger generations, alongside widened disparities in access to mental health treatment, emphasizing the importance of maintaining mental health services and psychosocial support throughout the pandemic (WHO, 2022).

In Indonesia, the availability of journals addressing mental health policy post-pandemic is scarce, despite extensive research in psychology focusing on individual mental health; however, Kartika's (2020) study on stress symptoms in students during COVID-19, caused by various factors including distance learning challenges, provides insight akin to the mental health concerns of Gen Z. However, during the COVID-19 pandemic, universities shifted to distance learning, fostering increased student learning independence as they manage study time, assignments, and learning resources autonomously. This shift, prompted by the need to prevent the spread of the virus, has compelled both lecturers and students to leverage modern technology for online learning, as conveyed by Firman (2020) on the positive impact of COVID-19 on higher education.

Methodology

This research uses qualitative methods as the main research method because this research aims to map in depth the policies and services related to mental health from the side of the service provider, in this case the Yogyakarta city government and also service users, namely generation Z in the city of Yogyakarta. In parallel, quantitative methods are also used to see

in general what factors cause generation Z to experience mental health problems in the context of the post-COVID-19 pandemic.

Qualitative research was conducted with data collection techniques in the form of interviews. Interviews were conducted with the Yogyakarta city government, doctors in community health center, and students aged 18-26 years. Meanwhile, quantitative research was conducted using survey techniques. The survey was conducted on 51 respondents who are students aged 18-26 years old at Gadjah Mada University. Secondary data was also used in this study, including regulations on Gen Z mental health and the results of previous studies that discuss Gen Z mental health in Indonesia. The sampling method used in this study is a non-probability sampling method, namely purposing sampling, namely by purposive sampling where the author sets the sample of choice according to what the author needs and wants. Data analysis conducted for quantitative data was descriptive statistics. Quantitative data was triangulated with qualitative data and secondary data.

Table 1. Research Informants and Respondents

No.	Informants	Total
1	Government of Yogyakarta City (Dinas Kesehatan Kota Yogyakarta)	2
2	Community Health Center	1
3	Undergraduate Students (19-22)	24 students
4	Post Graduate Students (23-26)	27 students

Findings and Result

1. Factors Affecting Mental Health in Yogyakarta City

Based on the survey results in 2023-2024, the factors that affect mental health are as follows:

a. Uncertainty of the future
The survey results show that as many as 32.7% of respondents said the factor that affects mental health is the uncertainty of the future, such as the economy, work, education and others. A person experiences anxiety and even depression when thinking about when thinking about future uncertainty. Future anxiety is worry, fear, or uncertainty associated with the future and the possibility of undesirable outcomes. This can include concerns about future career, education, relationships, health, and finances (Wilinaza et al., 2023). It is also something that can affect a person's mental health.

b. Friendship and romance (Toxic Relationship)
Furthermore, the second highest percentage in factors affecting mental health is toxic relationships such as friendships and romance at 19.2%. Toxic friendships and romantic relationships can cause internal conflict within oneself. This internal conflict will cause anger, depression and anxiety. Toxic relationship itself is a relationship that makes one party feel negative actions, feel unsupported, demeaned, attacked. These negative forms can affect a person's mental health in physical, psychological and emotional forms (Keny et.al, 2023).

c. Trauma to a certain thing
The survey percentage was 17.3% that the factor that affects mental health is trauma. Psychological trauma refers to stressors that arise either directly or indirectly, causing significant and serious subjective distress. Mental health trauma is ubiquitous and generally experienced throughout life. Often, the sequelae of traumatic experiences involve functional impairment, which can lead to decreased quality of life, morbidity, and poorer health outcomes (Feriante & Sharma, 2023).

d. Academic pressure (coursework load)
The survey results showed that 11.5% of respondents identified academic pressure such as coursework as a factor affecting mental health. Academic pressure is a potential contributor to adolescent mental health problems, one of the common sources of stress experienced by adolescents is academic pressure (Steare et.al, 2023).

e. Digital technology and mass media
Based on survey results digital technology and mass media are also factors that affect a person's mental health. Increased rates of depression, anxiety, and suicide, especially among women (Mojtabai et al, 2016) who are the heaviest users of new media, have led some to claim that smartphones and social media drive increased suicidal behavior, depression and loneliness (Odgers & Jensen, 2020). Thus the use of digital technologies has led to an increase in adolescent depression and related mental health problems (Daly, 2018; Livingstone, 2018), and digital technologies contribute greatly to the worsening of mental health symptoms and well-being.

f. Genetics/Family History
According to survey results, genetics and family history have also been shown to be factors that influence an individual's mental health. Gershon & Alliey-Rodriguez (2013) explains that the chance of indirect inheritance of mental disorders in the second generation can genetically occur in inheritance from direct descendants or first offspring.

g. Stigma from society
Stigma from society is also confirmed to play a role as a factor affecting a person's mental health. Lack of knowledge about mental health disorders is one component of the stigma construct itself, for example in Thornicroft's concept of stigma as a construct consisting of knowledge (ignorance), attitude (prejudice), and behavior (discrimination) issues (Thornicroft & Kassam, 2008).

2. Mental Health Services, Education Policy in Yogyakarta City and Their Challenge

Yogyakarta City is located in the Special Region of Yogyakarta (DIY) Province, this city has 455,535 inhabitants (BPS D.I. Yogyakarta, 2023). The population in the city of Yogyakarta is mostly dominated by Generation Z. This is because the city of Yogyakarta is a city that is widely known in Indonesia as the "City of Students". The number of students who come from various cities in Indonesia makes Yogyakarta a very complex city. Various problems, especially related to mental health, are important issues that should be the main concern of the government. Based on data from a survey conducted by the author in the period of December 2023 to 52 students in Yogyakarta City. The author found that of the 52 student respondents studied, only 48.1% of students stated that they had received mental health

education while 38.5% and 11.5% said rarely & sometimes, the rest said they had never received mental health education in the city of Yogyakarta.

When accumulated, there are 50% and 1.9% (never) of students who rarely or never get mental health education in Yogyakarta City. Most respondents answered that they obtained more information about mental health education through social media (online) than through offline methods. A total of 84.3% of respondents answered that they mostly obtained information about mental health education through the Instagram platform, 29.4% from Youtube and 23.5% from the X application. Meanwhile, respondents who chose offline answered that most obtained mental health education from socialization and discussions in the campus environment (72.4%) and the rest obtained the most information about mental health education through seminars and discussions by Non Governmental Organizations (NGOs).

Another finding in this survey is that 78.4% of respondents stated that they obtained most of their information on mental health issues from non-government stakeholders. Meanwhile, 13.7% came from the campus and only 7.9% came from government stakeholders. This is of course very concerning considering that the role of the government is considered very lacking in the implementation of mental health services and education policies in Yogyakarta City. The uneven distribution of mental health education throughout the city of Yogyakarta is a homework that must be resolved immediately by the Yogyakarta City Government today. In fact, 50% of respondents answered that they would use online platforms such as Halodoc, Alodokter and Good Doctor to access mental health services rather than offline platforms such as Puskesmas, Hospitals and Psychologist Clinics provided by the Yogyakarta City Government. Generation Z in Yogyakarta City prefers online platforms to access mental health services rather than offline platforms such as hospitals and community health centers.

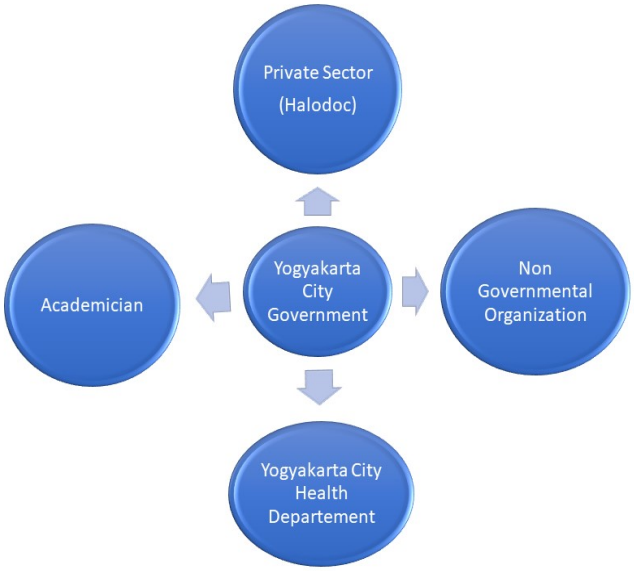

Figure 1. Stakeholders Relation on Mental Health Policy in Yogyakarta City

The Yogyakarta City Government's broad policy granting equal access to mental health services positively impacts accessibility, yet Colombia's centralized mental health policies face criticism for neglecting collaboration, leading to exclusion, especially among young people, exacerbating intergenerational impacts due to uneven service distribution (Fenton et al., 2024). Based on experiences from Latin American countries, after the COVID-19

pandemic, there are several activities ranging from promotive, preventive, rehabilitative, and curative efforts pursued by the Yogyakarta City Health Office together with friends in health facilities in realizing a general mental health policy.

Promotive and preventive efforts through mental health promotion partner with cross-sectors in Yogyakarta. From the promotive side, the Yogyakarta City Health Office in collaboration with the health promotion section always intensifies promotive efforts through Instagram media, websites, infographics that can be shared in groups that can be each WA status. Before the pandemic, the Yogyakarta City Health Office had initiated socialization and advocacy for the development of mentally healthy schools. The target is teenagers. We coordinate with the Education Office and friends from health facilities. In 2023 we have a pilot project for mentally healthy schools in 4 junior high schools (SMPN 3, SMPN 7, SMP Taman Dewasa Jetis, SMP Bopkri 3).

In the city of Yogyakarta from 2018-2022, the Yogyakarta City Health Office has a Regional Action Plan for Mental Health and Drugs. But during the pandemic, its implementation was slightly constrained. Starting in 2022, the Yogyakarta City Health Office has advocated to the governance department to include the indicators of the Community Mental Health Implementation Team (TPKJM) and the Mental Health Alert Village in the performance indicators of Kemantren. Every year it will be evaluated whether the TPKJM already exists and whether it is running well.

TPKJM and Kelurahan Siaga Sehat Jiwa are a forum for the community to carry out activities in mental health prevention and control efforts in the community. One example is in the Gondomanan area, the community, especially teenagers, can already be engaged, they call themselves Kareja (Kader Remaja Kesehatan Jiwa). So they are socialized and trained as peer counselors and become mental health assistants, in addition to eliminating the associated stigma itself. At the community level, they can also provide assistance to the community around them. This has also been developed in several other areas, such as Kemantren (sub-district) in Kraton, the Community Health Center has partnered with the Kemantren (sub-district) itself. So there are promotive and preventive activities also in collaboration with private universities in Jogja, UNISA, UGM. They conduct promotive, preventive, rehabilitative activities (providing training to people with mental illness problems). The curative efforts are carried out through health facilities at each of the PUSKESMAS and Hospitals in Yogyakarta City.

The Yogyakarta City Health Office, in collaboration with universities and educational authorities, actively engages Gen Z students through discussions, podcasts, and initiatives like Mental Health Schools and Healthy Mental Campus, recognizing and nurturing their high curiosity and literacy about mental health. The Yogyakarta City Health Office conducts advocacy and socialization with several universities in Yogyakarta City as shown in Figure 2.

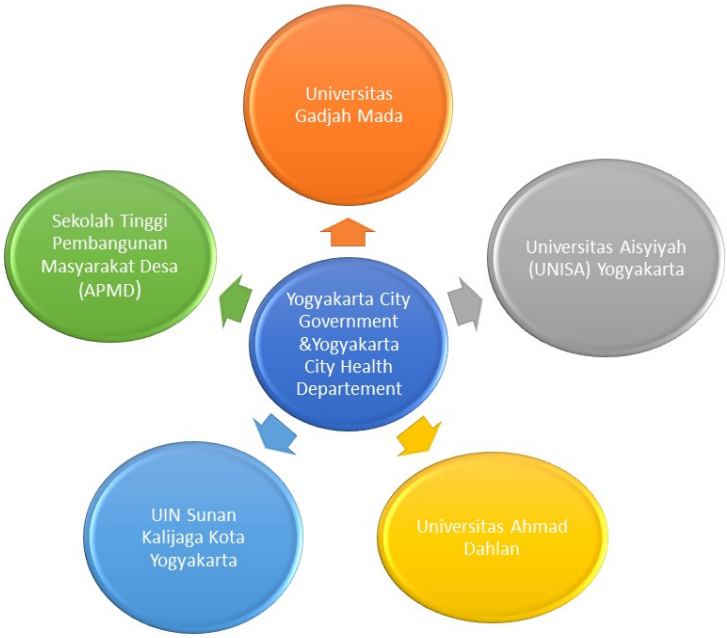

Figure 2. The Mentally Healthy Campus Program in Yogyakarta City

The form of cooperation carried out by the Yogyakarta City Government with several universities can be seen in Figure 2, where the university does not directly cooperate with the Yogyakarta City Health Office, but under the coordination of the Yogyakarta City Government. Figure 2 shows that the main stakeholder leading the way on mental health issues is the Yogyakarta City Government. Meanwhile, the Yogyakarta City Health Office as an extension of the Yogyakarta City Government is authorized to address mental health issues. The Yogyakarta City Government with an open cooperation system provides maximum opportunities for all universities in Yogyakarta City to collaborate in overcoming mental health issues. Some universities that have joined the "Healthy Mental Campus" program include 1) Gadjah Mada University 2) Aisyiyah University (UNISA) Yogyakarta 3) Ahmad Dahlan University 4) UIN Sunan Kalijaga Yogyakarta 5) College of Village Community Development (APMD).

The Mentally Healthy Campus Program has made several efforts to address mental health issues including 1) preventive efforts through early detection services and socialization in the form of podcasts, social media and various other media platforms 2) rehabilitative efforts are carried out in the form of empowering students with the Community Health Center in Yogyakarta City 3) holding cross-sectoral meetings by inviting various universities that are members of the mentally healthy campus program. The Yogyakarta City Government encourages various universities to optimize the resources they have. For example, by developing the resources they have in the faculty of psychology, when universities open services for their students it will encourage students to do counseling. Students who come from various cities in Indonesia make counselors (those who provide counseling) feel difficult in dealing with various problems experienced by students with diverse backgrounds.

Some of the challenges faced by the Yogyakarta City Government include:

1. The existence of informal behavior, actions from the community in the form of reluctance to use counseling facilities provided by the Yogyakarta City government

is a challenge faced by the Yogyakarta City government. Young people (Generation Z) are reluctant to seek help for mental health problems due to various factors such as stigma from society (Fronteira et al., 2024).

2. Stigma from the community, the negative view from the community about people accessing mental health services is a major challenge faced by the Yogyakarta City Government. Changing people's views to always monitor their mental health with counseling is a major task for the government. Currently, the government can do socialization and education to the entire community to change their stigmatized view that mental health is needed. The existence of stigma that hinders mental health education policies is not only experienced by Indonesia (Yogyakarta City Government), it is also experienced by the United States Government, Latinos face various cultural & structural barriers in accessing & utilizing mental health services. The stigma in Latin society is that men are masculine (strong) and at high risk of receiving inadequate mental health care. Masculinity influences barriers & facilitators of depression care among Latino men at the stages of self-recognition, help-seeking, and diagnosis and treatment of depression (Swetlitz et al., 2024).

3. Mental health services that have not been optimally accessed by the community are a challenge for the Yogyakarta City Government. Promotion and education to various lines of society continues to be carried out in order to create optimal health services.

Conclusion and Recommendations for Mental Health Education Policy in Yogyakarta City

The City of Yogyakarta implements mental health policies and services across promotive, preventive, and rehabilitative scopes through collaborations with NGOs, campuses, and schools, employing methods such as infographics and youth cadres. While psychologists are accessible in health centers, challenges like budget constraints and human resources hinder the city's efforts to provide optimal mental health services. Generation Z in Yogyakarta primarily obtains mental health education and information from online sources and non-government entities, highlighting a gap in government outreach efforts. Furthermore, as they prefer online mental health services over offline options, adapting communication strategies and service delivery to cater to the preferences of Generation Z is essential for the Yogyakarta city government.

To effectively engage Generation Z in Yogyakarta with mental health education, the city government should expand its online presence and utilize platforms like Instagram, Tiktok, and for reach out many people. Collaborating with popular social media influencers could also help increase awareness and understanding of mental health among Generation Z by providing relatable role models and accessible information. The Yogyakarta City government should collaborate with NGOs and community organizations involved in mental health education to enhance outreach efforts to Generation Z. By pooling resources and expertise, both government and non-government entities can effectively engage Generation Z and provide essential mental health information and support. Additionally, allocating resources to improve the quality and accessibility of mental health services, including training more psychologists at community health centers, is essential for addressing mental health needs comprehensively in Yogyakarta.

The Yogyakarta City government should tackle budget and human resource limitations by considering innovative solutions like telehealth services, which would enable Generation Z to access mental health support online, offering convenience and comfort while increasing accessibility to services. The Yogyakarta City government should prioritize mental health education for Generation Z by organizing seminars and workshops in schools and community spaces, focusing on stress management, self-care, and resilience. Collaboration with educational institutions and NGOs to integrate mental health education into the school curriculum will ensure comprehensive and structured learning, catering to Generation Z's preference for interactive and practical learning methods.

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Contact email: ratminto@ugm.ac.id

A Multi-dimension Correlational Study Between Self-Directed Learning and Team Effectiveness in Project-Based Learning

Low Bee Lee, School of Chemical and Life Sciences – Singapore Polytechnic, Singapore
Desmond Ng, School of Chemical and Life Sciences – Singapore Polytechnic, Singapore
Heng Jun Jie, School of Chemical and Life Sciences – Singapore Polytechnic, Singapore
Low Kang Min, School of Chemical and Life Sciences – Singapore Polytechnic, Singapore

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Abstract
At Singapore Polytechnic (SP), the Diploma in Perfumery and Cosmetic (DPCS) embraces an innovative Industry Now Curriculum (INC) pathway. With this framework, students engage in industry projects to equip themselves with valuable knowledge and skills crucial to the profession. This project-based learning (PBL) approach not only imparts practical expertise but also fosters autonomous learning through collaborative team-based activities. Students are empowered to solve complex real-world problems by capitalising on concerted team efforts and self-directed learning skillsets inculcated in the learning process. This study was designed to investigate the plausible effect of team effectiveness (TE) on students' self-directed learning readiness (SDLR). The results, based on Friedman test with a significance level of $p < 0.001$, revealed a notable increase in SDLR as project teams deepened their engagement in PBL over time. Deeper insights into the relationships between TE and SDLR were corroborated by strong Spearman correlations ($\rho > 0.8$) and qualitative teamwork evaluations. The findings concluded that specific team factors of Team Motivation, Team Structure, Team Dynamics, and Team Excellence exhibited positive and consistent associations with enhanced SDLR. Harnessing this synergy derived from TE in the cocreation of a collaborative, inclusive, and supportive learning environment, in conjunction with students' sustained interest in independent problem solving and skill development through PBL, would redefine the way we perceive self-directed learning. The ability to take ownership of learning under team influence would transform the concept of an individual playing the central role in the agency of learning to stimulate personal growth.

Keywords: Industry Now Curriculum, Design-Thinking, Project-Based Learning, Team Effectiveness, Self-Directed Learning Readiness

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Introduction

The mission of Singapore Polytechnic is to provide a holistic education for the development of six graduate attributes, including (i) Competency & Versatility; (ii) Communication & Collaboration; (iii) Creativity, Innovation & Enterprise; (iv) Ethics & Responsible Citizenry; (v) Self-Directed & Personal Effectiveness and (vi) Global Mindset. Self-Directed Learning (SDL), in particular, is crucial for lifelong learning in the dynamic education and VUCA industry landscape.

By referencing to Malcom Knowles's (1975) definition of self-directed learning as follows:

> *In its broadest meaning, SDL describes a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes.*

This initiative aims to cultivate SDL based on team influences.

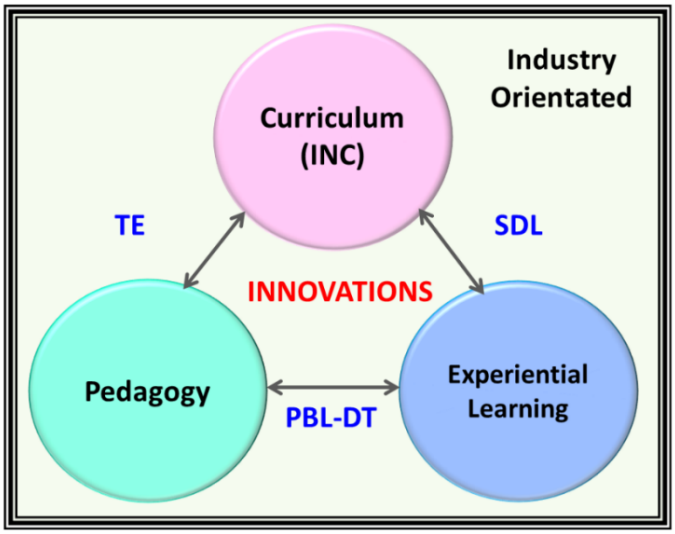


Figure 1: Macro-representation of the pivotal roles of INC, PBL-DT and Team-SDLR approach in driving innovations under industry settings.

Figure 1 illustrates macro-representation of the pivotal roles of INC, PBL-DT and Team-SDLR approach in driving innovations under industry settings. Together with the integration of theoretical and practical learning experiences, specific learning outcomes in response to future skills demands have been achieved in INC. The learning contents and assessments are designed with inputs from industry experts in order to align with the current trends, technologies, needs, standards and practices of the industry. The INC provides a structured way to incorporate experiential learning activities into industry-sponsored projects, internship and mentorship programs. In this way, students are presented with learning and networking opportunities to acquire relevant technical knowledge and skills as well as develop professional portfolios for enhanced employability. The experiential learning is facilitated through PBL-Design Thinking (DT) pedagogy as students work collaboratively on industry-sponsored projects that mirror industry scenario. In order to create tangible innovations for the industry collaborators, each project team are required to take ownership in active upskilling, continual experimentation and critical reflection in search of the feasible solutions to the project challenges.

Research Questions

It is of great interest to address the following research questions:

1. What are the team factors that would influence self-directedness/autonomy?
2. How does the INC instructional design develop TE through project-based learning?
3. What co-relationships exist between SDL behaviours and TE?

The conceptual framework is further elaborated in Figure 2. INC provides the platform to empower students in planning and executing the learning outcomes while integrates the application of PBL-DT pedagogy to co-create innovations for solving authentic and complex real-world issues. The implementation of the detailed instructional design in TE development would address Research Question 2. On the other hand, Research Question 1 would be addressed by the pillars of team effectiveness in terms of motivation, structure, dynamics and excellence. The plausible effect of these team factors on SDLR are further investigated to address Research Question 3.

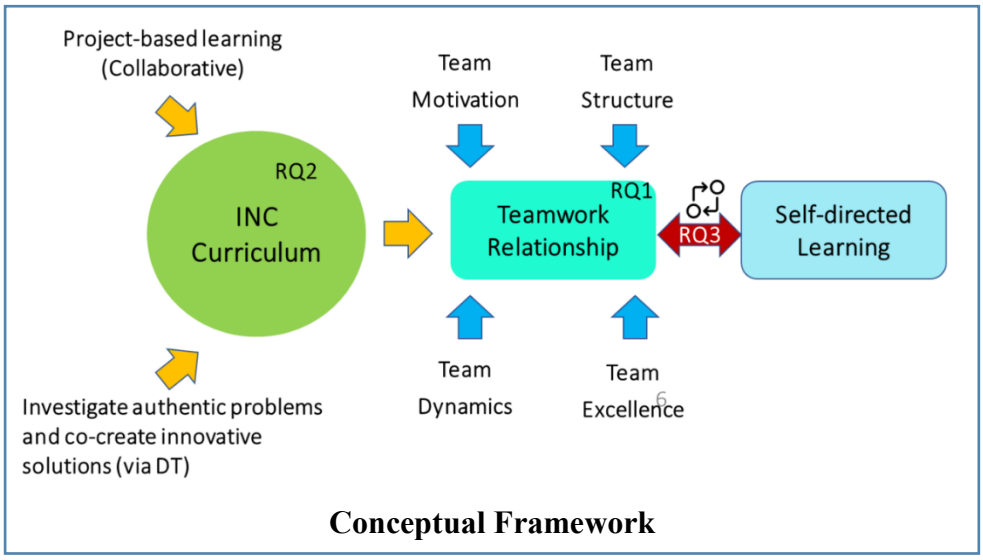


Figure 2: Conceptual framework for study of SDL, TE and its team factors to facilitate PBL-DT in INC.

Literature Review

SDL, a critical skill of 21st century, has undergone transformative evolution over time. This is marked by shifts in educational philosophies, advancements in science and technology, and changing perspectives on the role of learners in shaping their own educational experiences. The SDL evolution has since been influenced by many theorists, psychologists, and educators. The SDL concept first gained significant traction in the mid-20th century when Malcolm Knowles (1968) coined the term 'andragogy' of adult learning. While not exclusively focused on SDL, Carl Rogers (1969) emphasized the importance of a supportive and non-judgmental learning environment that fosters self-directed exploration and intrinsic motivation in learner-centred education. Paulo Freire (1968) also posited that dialogue, critical consciousness and transformative learning in critical pedagogy have influenced SDL discussions to extend beyond individual development to include social and emancipatory dimensions. Albert Bandura (1977) and Lev Vygotsky (1978) posited the importance of social learning theory and social-cultural theory on SDL. The late 20th century witnessed the emergence of Katherine Wiley (1983), David Boud (1985), Stephen Brookfield (1985), Jack Mezirow (1985), Huey B. Long (1989), Philip Candy (1991), Jean Lave and Etienne

Wenger (1991), and Randy Garrison (1997). At its core, Wiley (1983) stressed the importance of self-regulation and autonomy in learner's ability to set goals, identify resources, and monitor progress independently while Boud et al. (1985), Brookefield (1985) and Mezirow (1985) explored reflective practices in fostering autonomy in educational settings. While Long (1989) studied the roles of intrinsic motivation and self-efficacy in SDL, Candy (1991) delved into the cognitive and affective aspects of independent learning. Lave and Wenger (1991) continued the work on Communities of Practice. Garrison (1997) integrated contextual control, cognitive responsibility and motivational dimensions in SDL. As the 21st century witnessed the rise of internet, online courses and educational platforms, the unprecedented access to information, resources, and collaborative tools led to the introduction of connectivism concept by George Siemens (2004) and personalized learning by Kurt VanLehn, (2011) in fostering SDL. However, the dynamic landscape of education also led to in a plethora of theories about SDL manifestations in diverse contexts (Sharan Merriam, 2001; Michael Gibbons, 2002; Barry Vann, 2006). Ronald Hiemstra and Ralph Brockett (2012) reframed SDL into three aspects of personal responsibility, encouraging positive learning behaviours, and cultivating supportive learning environments. Stefanie Boyer et al. (2014) also studied the positive influence of internal locus of control, motivation, performance, self-efficacy, and support in SDL. Apart from internal factors, external factors play an equally important role in shaping SDL experiences. Betty Breed (2016) investigated the positive influence of effective cooperative learning, including learning positive interdependence, individual accountability, promotive face-to-face interactions, appropriate social skills and group processing on students' SDL. In more recent studies, Morris (2019) discusses the societal and individual factors on SDL promotion. Wong (2020) provides insights into how the interactivity within the small-group work can effectively motivate students to commit in developing cognitive skills for lifelong learning. Oyelere at al. (2021) further afformed the positive impact of self-regulated learning and teamwork experiences in academic performance. Subsequently, Tamara et al. (2021) and Kemp et al. (2022) also explored the contribution of collaborative efforts towards SDL.

Methodology

Thirty-nine year two DPCS cohort (n= 39) participated in this study who are distributed into nine groups of four and one group of three (n^{group} =10). Three sets of questionnaires were prepared. The first questionnaire was adopted from the well-validated Fisher's SDLR Scale (Fisher et al., 2001; Torabi et al., 2013; Kumar et al., 2021; Laine et al., 2021) which comprises of 40 items that are subdivided into the three domains: Self-Management, SM (13 items), Desire to Learn, DL (12 items) and Self-Control, SC (15 items). Questionnaire items were set up in Microsoft Forms. The survey comprises of scoring statements using a five-point Likert scale (1-Strongly Disagree; 2-Disagree; 3-Neutral; 4-Agree; 5-Strongly Agree). Monitoring of the SDLR development in students took place at three checkpoints with repeated measures at the beginning (baseline), middle and end of the semester. The second questionnaire, comprises of 25 selected questions, was adapted from the Team Effectiveness Diagnostic, developed by London Leadership Academy, National Health Service. This aspect of the study is to solicit information to address Research Question no. 1, which evolves around four TE variables of interest, namely Team Motivation, Team Structure, Team Dynamics and Team Excellence with the objective to assess the effectiveness of the team's attributes and behaviours after going through the intervention process. Questionnaire items include scoring statements using the five-point Likert scale as before. The survey data was collected only after extensive team interactions had resulted (i.e., at the end of the semester) to give a more realistic assessment. Finally, the third instrument with nine items, also known

as Self & Peer Assessment (SPA), is customized with a five-point Likert scale. This monitoring tool not only serves as a feedback mechanism to help students improve on their teamwork performance but also aids in validating the consistency of TE outcomes. It was administrated on the Learning Activity Management System (LAMS) during the middle and end of semester. The profiling of teamwork performance is important so that the respective project supervisors can provide timely interventions and support individual's development within the team.

PBL-DT Pedagogical Approach

The integration of PBL-DT pedagogical approach (Maknuunah et al., 2021) creates valuable synergy to inspire product innovations. Figure 3 illustrates the schematic diagram of the PBL-DT implementation in a team setting. To address Research Question 2, specifically designed team activities and monitoring mechanisms are infused to support TE facilitation towards project completion.

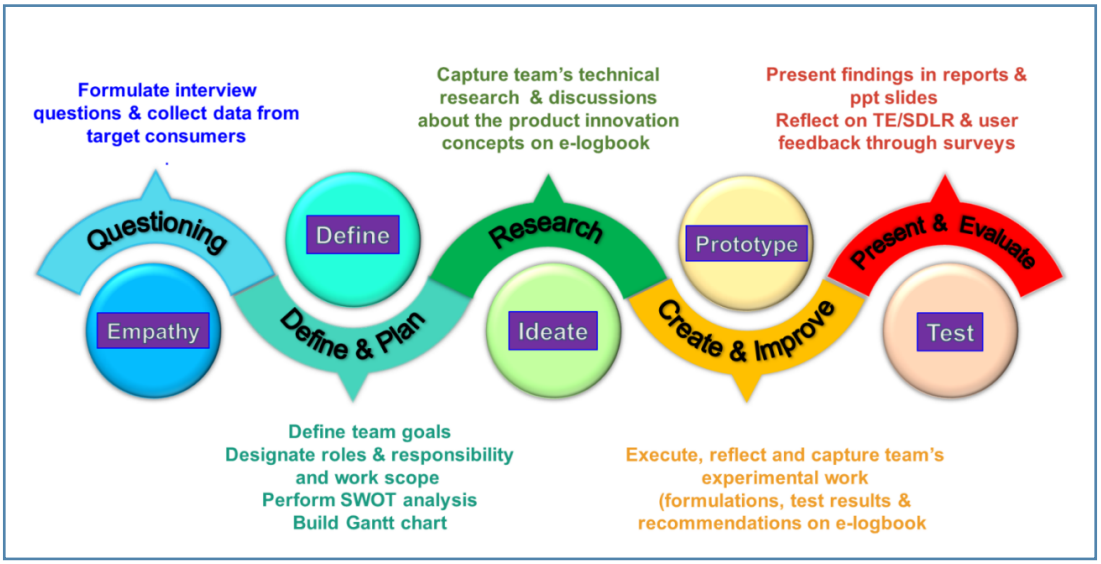


Figure 3: Schematic diagram of the PBL-DT implementation in a team setting.

The user-centric DT framework constitutes five phases to reframe and tackle wicked problems in a non-linear and iterative manner. The first stage of 'Empathy' provides students with an empathetic understanding of the behaviour and needs of users. The second stage of 'Define', helps students reframe the problem statements and personas after gathering sufficient consumer insights. The third stage of 'Ideate' ignites students' creativity to think out of the box and generate all possibilities and opportunities for the innovations. The fourth stage of 'Prototype' involves translating the most feasible and creative solution into a physical product so that evaluation of the product attributes can take place to cater to user needs in the final stage of 'Test'. The process may be iterative until product refinements are able to meet the project success criteria. Having said that, PBL instructional approach engages students to develop transferable skills of problem-solving, decision making and investigative abilities in addition to acquisition of relevant technical knowledge and skills. Furthermore, it encourages collaboration and cultivates students' sense of ownership. PBL synergizes the five DT stages, starting with the deployment of inquiry-based technique to stimulate intrinsic curiosity and solve problem statements. Team members would brainstorm and formulate interview questions to solicit consumer insights. These information helps teams to strategically define project scopes, milestones and plans. Project planning would

involve designation of roles and responsibilities, setting SMART (i.e., Specific, Measurable, Achievable, Relevant and Time-Bound) team goals, scheduling milestones, analysing SWOT to capitalise on its strengths and opportunities while preventing its weaknesses and threats from hindering project progress. Teams would then facilitate ideation of all possible innovative concepts and research for relevant technical information and resources from books, journals, lecture notes, articles, online materials etc.. The subsequent stage of create and improve is for prototyping the most feasible product concept which involves hands-on team activities such as experimenting on formulations, testing, data collection and other related laboratory work. Collaboration and communication skills are often emphasized since teams are given the flexibility to optimise its resource utilisation and make necessary recommendations for improving product formulations in an efficient and effective manner. At this stage, it is essential to monitor the project progress closely by tracking the tasks executed by every member, ensuring availability of materials and resources, evaluating findings as well as facilitating team priority and shared decision-making in a systematic manner. Details of the planning, monitoring and reviewing stages, including ongoing project direction, timelines, experimental formulations, results and recommendations, can be updated in e-logbook accordingly. The final stage of present and evaluate the outcomes would also involve collaborative efforts when facilitating insightful reflections and knowledge sharing. Teams would crystallize research findings and recommendations in the form of group reports and presentations to an audience comprising lecturers, industry partners and professionals in the field. Teams would also reflect on diagnostic feedback or self-assessments on teamwork performance and SDLR in their learning journey.

Results and Discussions

This study creates a meaningful purpose of harnessing the value of TE for reinforcing SDL due to limited correlation studies in a PBL environment. Firstly, the two principal latent (unobservable) factors of this hypothesis are verified using factor analysis of Minitab statistical software. As seen in Table 1, the high positive factor loadings (with acceptable criteria > 0.6) indicates a strong influence of the variables on each latent factor: TE (Team Motivation, Team Structure, Team Dynamics and Team Excellence) and SDLR (SM, DL and SC) respectively. The loading plot in Figure 4 illustrates the clustering of variables with respect to each latent factor. As a whole, TE and SDLR account for 95.1% (i.e., 0.951) of the variation in the data.

Variable	TE	SDLR	Communality
Team Excellence	**0.845**	0.497	0.961
Team Motivation	**0.838**	0.498	0.950
Team Structure	**0.884**	0.392	0.935
Team Dynamics	**0.914**	0.407	1.000
SM	0.563	**0.777**	0.920
DL	0.381	**0.899**	0.953
SC	0.429	**0.870**	0.942
Variance	3.6781	2.9824	6.6605
Var	0.525	0.426	**0.951**

Table 1: Rotated factor loadings and communalities data in factor analysis (n group =10).

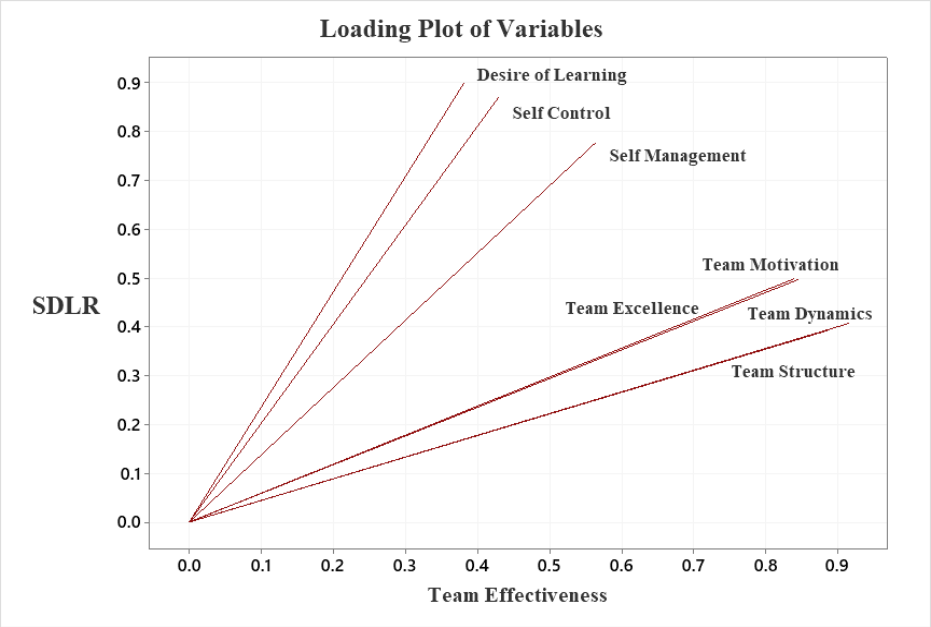


Figure 4: Loading plot of variables (n^{group} =10) for the principal latent factors, TE and SDLR.

The measurement constructs are further analysed using Cronbach's alpha (α). Good internal consistency is observed from Table 2. The reliability is considerably high since all α coefficients scores above 0.9 (with acceptable criterion of 0.7).

Cronbach's alpha, α	**(*n*=39)**
SDLR Construct	0.9360
TE Construct	0.9755
SPA Construct	0.9872

Table 2: Cronbach's alpha results for the three measurements of constructs (n = 39).

The SDLR construct is first discussed. As the validated SDLR Scale measures the extent an individual is willing to take up the responsibility for one's learning, it describes the degree at which the individual possesses the attitudes, abilities and personality characteristics necessary for SDL. It would imply the learners have the autonomy to plan, manage and control of their learning trajectories within the polytechnic. As such, SM subscale on managing the learning environment (e.g., time and resources); DL subscale on learner's motivation and attitudes toward learning and SC subscale on goal setting and self-monitoring/evaluation shall form the basis of the SDLR Scale (ranging from 40 to 200). If the total score exceeds 150, a high degree of SDLR is exhibited. Figure 5 captures a progressive SDLR enhancement in students across three checkpoints (i.e., from beginning, middle to end of semester) transiting from a lower baseline score (<150) to upgraded scores (> 150). Statistical differences in the median scores of SDLR subscales was determined with Friedman test at $p < 0.001$. The increment in SM and DL subscales is more noticeable initially while that of SC subscale occurs towards the end of the learning experience. A possible explanation could be students tend to focus more on planning and consolidating prior knowledge needed for fulfilment of project directives at the beginning. They become in a better position to control their learning needs and accomplish assigned tasks after gaining adequate confidence and competency over time.

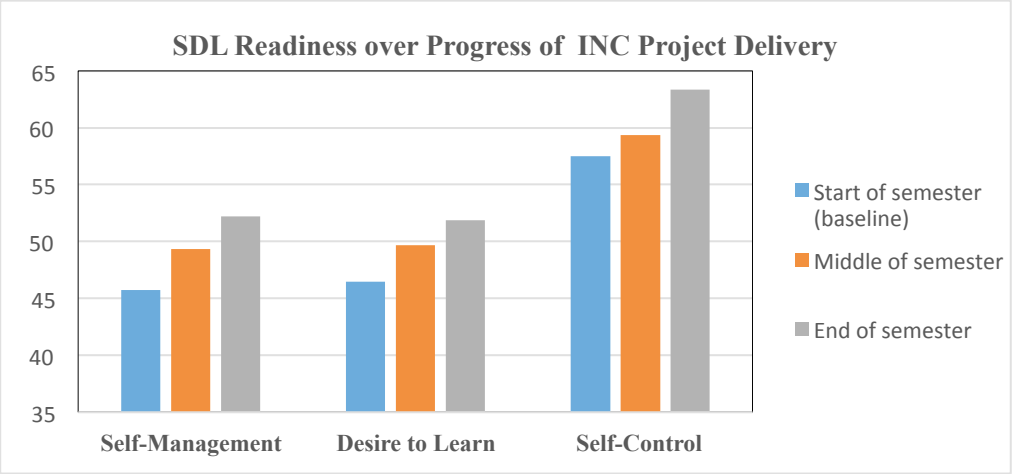


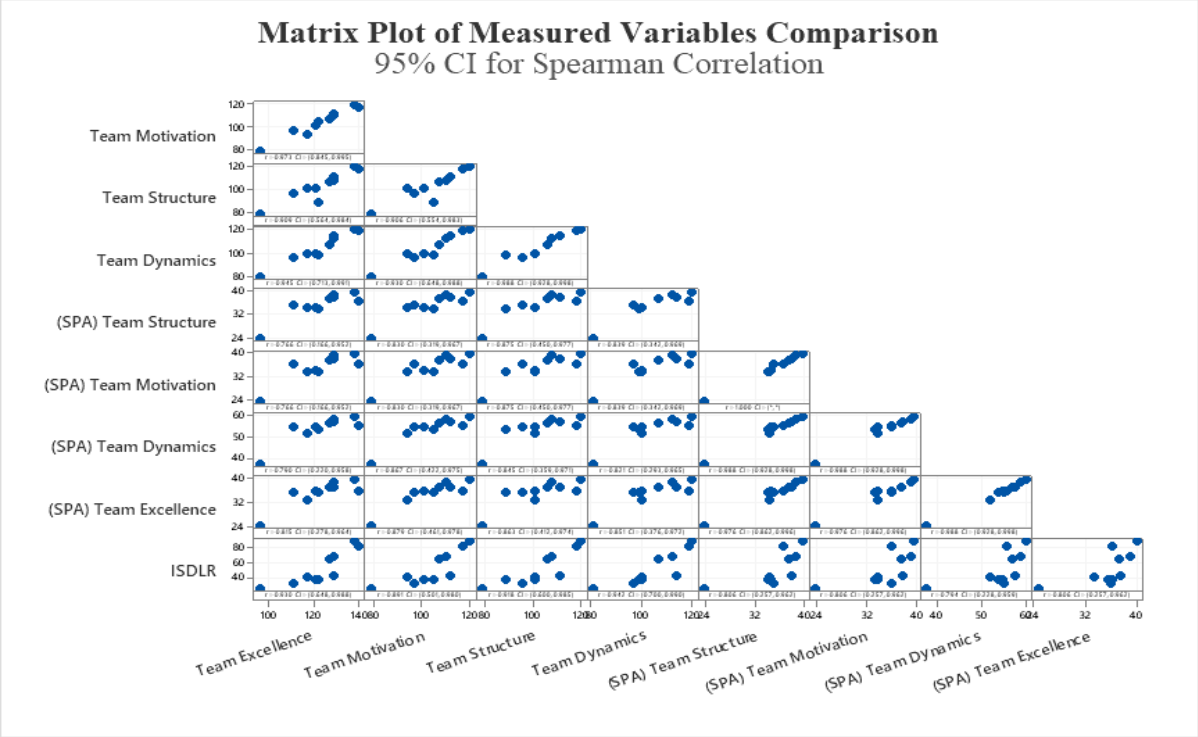
Figure 5: Progressive enhancement of SDLR measures (n = 39).

One the other hand, the core TE elements are morphed from GRPI model. This is one of the oldest and fundamental frameworks (Rubin et. al, 1978; Jaiswal et. al, 2021; Thabo et. al, 2021), comprising of four key elements: Goals, Roles, Processes, and Interpersonal Relationships, starting with team goal to augment a shared purpose, followed by the delegation of clear roles and responsibilities of team members to enable efficient work processes, including workflow, procedures, decision-making and conflict resolution. The readjustment of roles may be required for a more effective facilitation wherever possible. In this study, Team Motivation is chosen to incorporate purpose and team goals, Team Structure integrates the roles and processes while Team Dynamics encompasses effective team interactions. As individuals work together collaboratively, the team build trust and emotional security through strengthening of team's interpersonal relationships. Finally, Team Excellence encapsulates the mind-set on team–enabling growth orientation. A series of Spearman correlation coefficients (ρ) are compiled in Table 3 for the purpose of addressing Research Question 3.

Pairwise Spearman Correlations, *p*		**By groups (n^{group} = 10)**	**By cohort (*n* = 39)**
Team Structure	Team Motivation	0.906	0.893
Team Structure	Team Excellence	0.909	0.885
Team Motivation	Team Excellence	0.973	0.846
Team Dynamics	Team Motivation	0.930	0.848
Team Dynamics	Team Structure	0.988	0.914
Team Dynamics	Team Excellence	0.945	0.849
(SPA) Team Structure	Team Structure	0.875	
(SPA) Team Excellence	Team Excellence	0.815	
(SPA) Team Motivation	Team Motivation	0.830	
(SPA) Team Dynamics	Team Dynamics	0.821	
ISDLR	Team Excellence	0.930	
ISDLR	Team Motivation	0.891	
ISDLR	Team Structure	0.918	
ISDLR	Team Dynamics	0.942	

Table 3: The pairwise Spearman correlation of measured variables (n^{group} =10 and n = 39).

Apart from having both sets of ρ coefficients (either by group or by cohort) above 0.8, Figure 6 (a) illustrates a general upward trend in the corresponding matrix plots. Positive monotonic relationships among the measured variables: Team Motivation, Team Structure, Team Dynamics, Team Excellence and increased value of SDLR (ISDLR) are therefore inferred. Based on the acceptable ρ values for TE and SPA measures, SPA can serve as an independent instrument to countercheck the consistency of teamwork data. This concise version offers ease of periodic data collections so that timely interventions can be delivered. Similar trend on ISDLR vs TE (by group) is observed in Figure 6 (b).



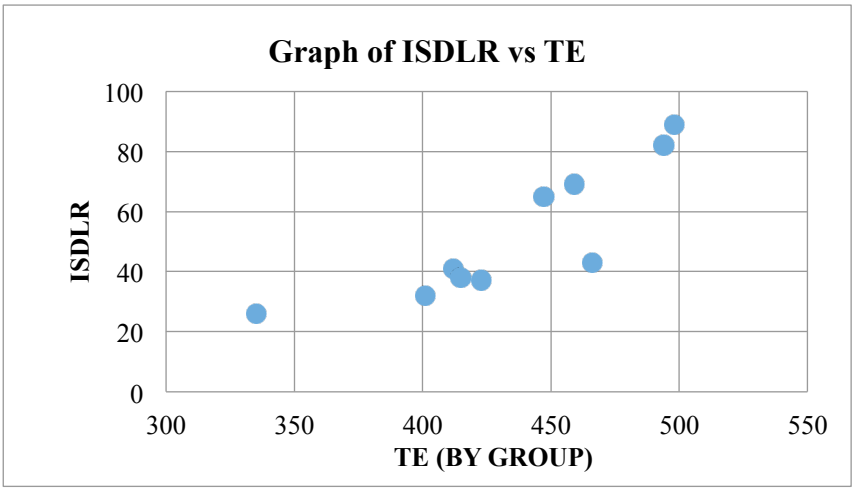


Figure 6: (a) Matrix plot comparison of the measured variables and (b) Graph of ISDLR vs TE on per group basis (n^{group} =10).

Qualitative SPA data in response to the open-ended questions on Team Strengths and Areas for Improvement within the team, are simultaneously collected. With reference to the summary in Table 4, the spectrum of team strengths seems to outweigh the areas for improvements, signifying the effectiveness of the INC instructional program to a certain

extent. The qualitative indicators on per group basis are translated into numerical values for better comparison against the ISDLR and TE trends.

Team Strengths	**Areas for improvements**
Take initiative to update progress in a timely manner	Organisation
Take initiative to clarify matters	Prioritisation of getting things done earlier/meet deadline
Take responsibility to meet deadlines	Punctuality
Listen actively and be open to options	Responsiveness
Provide constructive feedback/ideas	Distraction
Being inquisitive	Confidence to speak up
Exhibit diligence and perseverance to produce quality work	Exploring out of comfort zone
Being cooperative	Conflict management skills
Boost team morale	Optimism
Set team goals	Effective communication
Exercise critical thinking	
Ensure fair in work delegation	
Being organised	
Being creative and meticulous for best quality work	
Establish good team relationships for effective communication	
Being punctual	

Table 4: Reflections of team strengths and areas for improvement within the team.

Reflections	
Student A	"By asking for help, we take ownership of our own learning process, demonstrating the initiative to identify and rectify areas where we might need additional external support or guidance. It required me to be committed and responsible in working together with my team mates on this project by planning ahead of one's schedule and taking up more tasks."
Student B	"I decided to step out of my comfort zone and take up the leadership role to provide team direction."
Student C	"I feel relieved that I have realised this problem of mine (for being too dependent on my team members) sooner. This learning matters as it provided me with impactful insights to how I can understand needs of my group mates and better support them. I would be more proactive and take the initiative for my own learning. "
Student D	"I believe autonomous learning does not only concern oneself, but also influences the progress and learning of those around them, particularly in a group project setting."
Student E	"I learnt that we should be in charge of our own learning and know how to plan our time well for our group mates and for project deadlines. I can use my love for reading to acquire knowledge and share them to my peers when they did not appear to know about the subject matter. During those times, I felt incredibly happy as I was able to help move the project forward."

Table 5: Qualitative evidence of TE-driven SDL.

Additional qualitative evidence from students' reflections (see Table 5) are solicited to augment the TE-driven SDL construct, thereby affirming that the students have demonstrated the ability to take ownership of their learning under positive team influence.

Conclusion

The empirical evidence of this study concurs with the notion of SDLR development through deliberate experiential practices of PBL-DT pedagogical approach. The INC provides a good platform to develop self-directed teams through open-ended industry project challenges. By empowering DPCS students to solve increasingly complex and higher order real-life applications of industry values, a multitude of autonomous learning opportunities are presented in the search and design of feasible solutions. The reinforcement of SDL behaviours in students by capitalising on team influence is a prospective strategy. The development of a collaborative, inclusive and supportive learning environment is posited to encourage sustained interest of students' learning independence. Friedman test at $p < 0.001$ indicates statistically significant outcome in the progressive SDLR increment as students deepened their PBL engagement over time. The relatively high Spearman correlations ($\rho > 0.8$) among the TE and SDLR measures provide additional insights into their positive monotonic relationships. In other words, TE comprising elements of Team Motivation, Team Structure, Team Dynamics and Team Excellence, acts as an enabler to stimulate continual growth in students' SDLR. From a broader perspective, this study targets to fulfil the institutional mission on inculcating SDL skillsets in students, thereby improving their capacity to engage in lifelong learning for their professional advancement.

Acknowledgement

We would like to express our gratitude to Singapore Polytechnic for the steadfast support and provision of essential resources, which have been instrumental in the fruition of this research.

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Contact email: LOW_Bee_Lee@sp.edu.sg

Examining the New Course of Study of Japan

Minako Inoue, Health Science University, Japan

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Abstract
The Course of Study, set by The Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan, describes overall framework in education system, from elementary school to high school education. It provides goals, contents, and guidelines for instructions for all subject areas and has been revised every ten years. The newest Course of Study was revised in 2017 and have been implemented during the past four years. In terms of English education, responding to the rapid growth of globalization, emphasize is given to the ability to effectively communicate in various situations. Increased number of vocabularies required are observed, which seems having an intention to raise the overall level of students' language proficiency. The study compares two groups of college students, one had no experience of such increase and the other group had one year (high school senior period) experience. The study measures their placement test scores, vocabulary sizes, and their attitudes toward English language learning. The IBM SPSS Statistics is used for numerical presentation, distributions, frequency, and correlation analysis. The study found significant differences in the above-mentioned variables. It also found correlations between their vocabulary size and attitudes toward English learning. More students who learn English under the new Course of Study is expected to increase. The continuation of examining students learning as well as their attitudes toward English learning would play important role to examine and evaluate the current Course of Study. The accumulation of such data can be beneficial for improvement or modification on the next revision.

Keywords: Placement Test, Academic Proficiency, GPA, Freshman Seminar

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Introduction

The Ministry of Education, Culture, Sports, Science and Technology (MEXT) in Japan is responsible for overseeing and implementing policies related to education, culture, sports, science and technology. Its primary mission is to provide quality education to all Japanese students, from early childhood through tertiary education.

The MEXT provides the Course of Study and curriculum guidelines as broad standards for all schools, from kindergarten through upper secondary schools, to design their programs in order to ensure a consistent standard of education across the country. The Course of Study has been revised every 10 years to reflect the current societal needs and developments. In 2017, the 7th revised Course of Study was announced and gradually implemented. The revised upper secondary school curriculum was implemented in 2022.

Problem Statement

In terms of English Education, the MEXT has emphasized the need to improve English language education in response to globalization. The new Course of Study focuses on students' "productive abilities" and "practical abilities" while also attempting to improve students' attitudes and encourage them to actively engage in learning. It has placed particular emphasis on laying a foundation for effective communication with others, stressing interactive language activities in which students communicate their thoughts and feelings to each other in various situations. At the same time, it should be noted that the new Course of Study has increased the amount of vocabulary required. In elementary school, 600 to 700 words are required. The required vocabulary in junior high school was increased from 1600 to 1800 words, and in high school, from 1800 to 2500 words. This increase appears to be intended to raise the overall level of language proficiency among students. However, concerns have been voiced that emphasizing increased communication activity leaves little time for students to develop fundamental grammatical knowledge and skills, as well as the vocabulary required for building a foundation.

Significance of the Study

To examine the effect of such revision, the current study aims to compare two groups of college students, one with no experience with the new Course of Study and the other with one year (high school senior period) experience. Since the implementation of the revision for high school started in 2022, few studies have been conducted in this regard. It should be mentioned that this study will function as a pilot study for data collection. The information on the 24th and 25th cohorts, who would be better exposed to the new Course of Study, would aid in obtaining more valid data for examining the effectiveness of the revision of the new Course of Study.

Purpose of the Study

To examine the effectiveness of the revision, a comparison of the two groups was performed in terms of the following points.

Study Methods and Analysis

The study measures the students' placement test scores, vocabulary sizes, grade point average (GPA) scores, and attitudes toward English language learning. IBM SPSS and Microsoft Excel are used for numerical presentation, distributions, frequency, and correlation analysis.

Studied University

The target university is a small private 4-year university with approximately 1200 students. It comprises two departments; one is the Health Science Department, which consists of the Rehabilitation major (Physical therapy・Occupational therapy) and Human Communication major. Another one is the Nursing Department with a Nursing major.

The subjects of this study came from Heath Science University. The participants include 83 first-year students (the 23 cohort) and 97 second-year college students (the 22 cohort).

Background Information

Placement Test Scores

At the start of each school year, the university conducts placement tests for English, mathematics, and Japanese for first-year students. These placement tests are developed, implemented, and evaluated by the faculty members responsible for each subject. For English, all new students take the English placement test. Students are assigned to groups based on their test scores for the mandatory English I class. A placement test for mathematics is required only for PT and OT students. Students with low scores are recommended but not required to take a basic mathematics class. For Japanese, a placement test is administered to all students. The information on students' scores is used for the freshman seminar, and students with lower scores are recommended to take non-credit Japanese courses.

GPA and the GPA System Used at the University

In response to globalization, Japan has adopted the GPA system that is used internationally. According to JUDGIT's study, 92.2% of Japanese universities employ the GPA system as of 2018. Regarding the GPA system, the university calculates each student's individual semester scores and uses them to decide whether to move them up a grade level or for graduation criteria.

Vocabulary Size

The Vocabulary Size Test (VST) assesses the students' vocabulary size. Hamada et al. (2021) developed a VST for Japanese learners of English as a foreign language based on the New JACET List of 8,000 Basic Words (VST-NJ8). The current study level ranges from 1 to 5, concluding with 100 words. It was administrated at the beginning of the school year. In daily conversation, a vocabulary size of 2000 to 3000 is considered a requirement, whereas 5000 is needed for reading authentic text. However, the VST results show that the 23 cohort has a much lower average than such scores, indicating insufficient vocabulary size.

Attitudes and Perceptions Toward English Learning

The online survey was conducted using Microsoft TEAMS. The participants include 83 first-year students and 97 second-year college students. There are 20 questions related to intrinsic/extrinsic motivation as well as negative and positive attitudes toward English learning. Agawa's study (2011) on motivation factors is used as a reference for questionnaire

development. The questionnaire used a 5-point Likert scale, and Excel was used for analysis, which provided descriptive analyses.

Conclusions

The Results of the Study

Findings of the current study will be presented as the following manner.

Placement Scores

Figure 1 shows the average of the placement tests over 17 years.

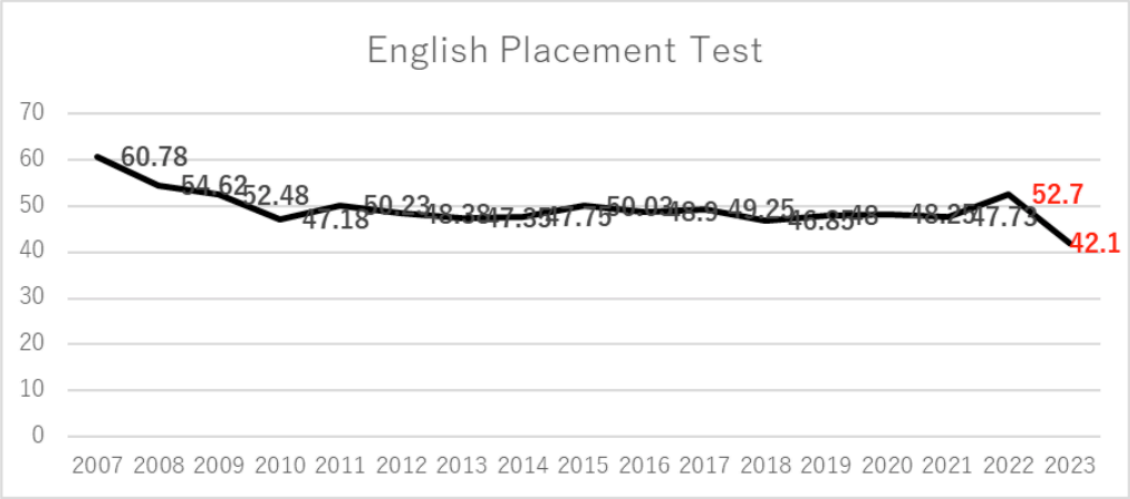

Figure 1: Placement Test Scores

As shown, when the data was collected for the first time, the average was 60.78, but it has since been lowered to the lowest average of 42.1 in 2023, which is the 23 cohort, whereas the average of the 22 cohort was 52.7.

In the following graph (Figure 2), a dotted line represents the percentage of students whose scores were less than one-third of the total score, and a line represents the percentage of students who had less than half the total score. As indicated, the percentage of students with lower scores has dramatically increased in 2023. In 2007, just 15.74% of students did not get half of the score on the test; however, in 2023, 60.7%, or more than half of the students, could not get half the score and 36.1% could not even get one-third of the score. In contrast, for the 22 cohort, over half of the students could not get half of the score, and 16.5% could not get even one-third of the score.

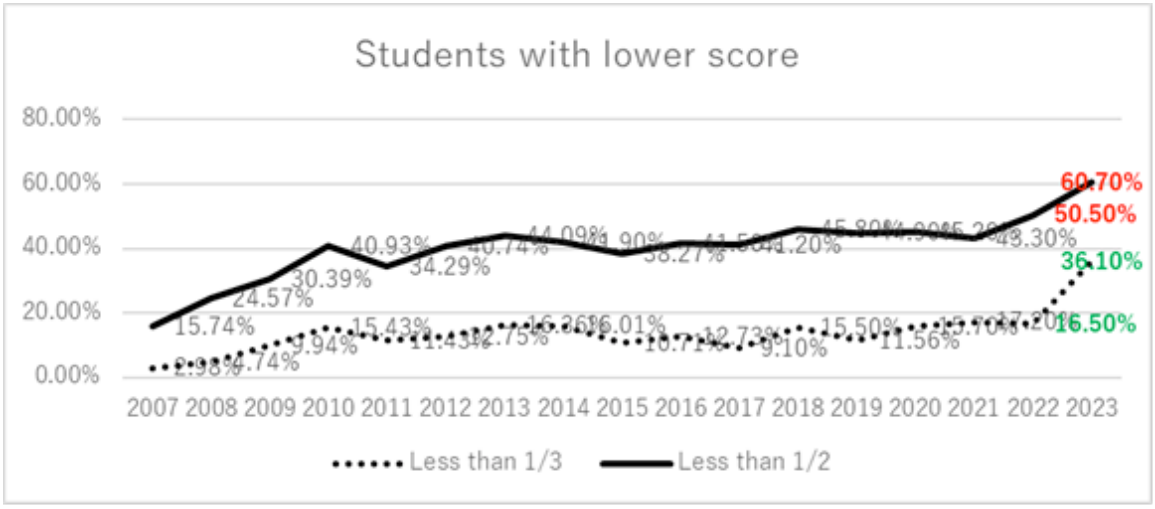

Figure 2: Students With Lower Scores

Vocabulary Size

Figure 3 shows a comparison of the vocabulary sizes of the two groups. The left indicates the vocabulary size for the 23 cohort, whereas the right shows that of the 22 cohort. The average of the 2023 cohort was 1639, whereas the 2022 cohort had an average of 2436.

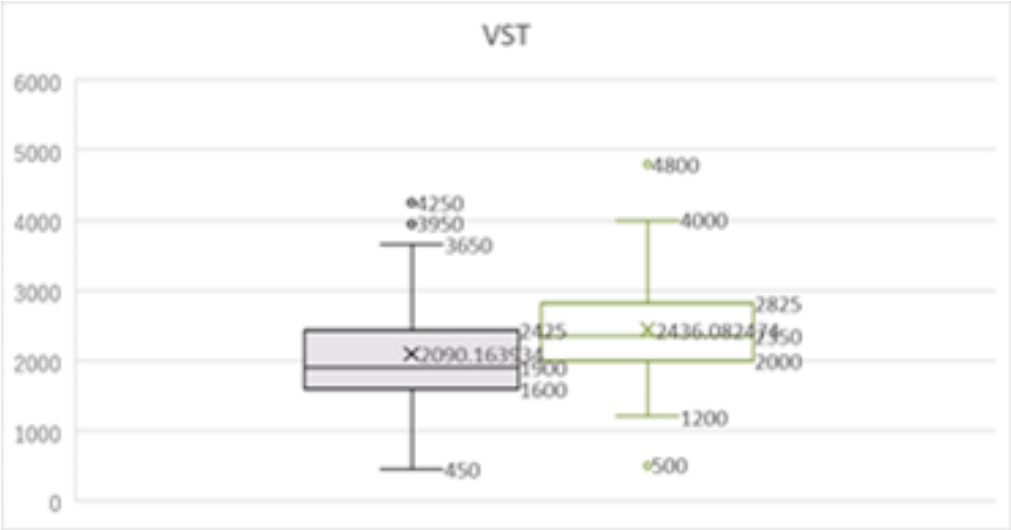

Figure 3: Vocabulary Size Test

GPA

Figure 4 compares the GPA scores. Although the average scores of both groups are similar, the 23 cohort has a longer interquartile range and a longer lower whisker with a negative skewed distribution.

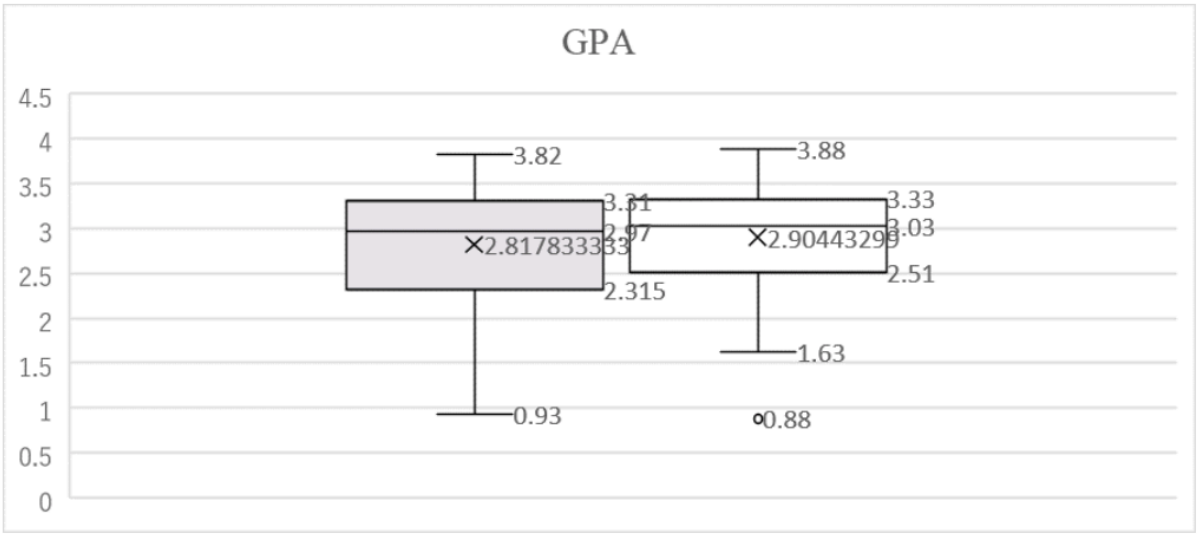

Figure 4: GPA

Correlational Analysis of the Placement Test Scores, Vocabulary Size, and GPA

Figure 5 focuses on the 23 cohort. As is shown, there is a high correlation (**p.> 0.01 .701) between placement test score and vocabulary size and a weak correlation (**p.> 0.01 .464) between the placement test score and GPA as well as GPA and vocabulary (**p.> 0.01 .284).

Correlation Analysis for the 1st year students

		Placement	VST	GPA
Placement	Pearson's correlation	1	.701**	.464**
	Sig. (2 tails)		.000	.000
	N	61	61	60
VST	Pearson's correlation	.701**	1	.284*
	Sig. (2 tails)	.000		.028
	N	61	61	60
GPA	Pearson's correlation	.464**	.284*	1
	Sig. (2 tails)	.000	.028	
	N	60	60	60

**. P<0.01

*. P<0.05

Figure 5: Correlational Analysis (22 cohort)

For the 22 cohort, there is a moderate correlation (**p.> 0.01 .639) between the placement test score and the vocabulary size. In contrast, a weak correlation was found (**p.> 0.01 .376) between the placement test score and GPA as well as between GPA and vocabulary size (**p.> 0.01 .451) (Figure 6).

		Placement	VST	GPA
Placement	Pearson's correlation	1	.639**	.376**
	Sig. (2 tails)		.000	.000
	N	97	97	97
VST	Pearson's correlation	.639**	1	.451**
	Sig. (2 tails)	.000		.000
	N	97	97	97
GPA	Pearson's correlation	.376**	.451**	1
	Sig. (2 tails)	.000	.000	
	N	97	97	97

**. P<0.01

Figure 6: Correlational Analysis (23 cohort)

Students' Attitudes and Perception Toward English Learning

Although there are 20 questions on the survey, some of the results show similar tendencies for both groups. Therefore, major differences between the two groups will be presented in this section.

Figure 7 shows the students' responses to the statement, "I like English because I like to be exposed to English itself." This statement reflects the intrinsic motivation of the students. The pie graph on the left presents the 23 cohort, whereas the right indicates the 22 cohort. Notably, approximately 13% of the 23 cohort and 28% of the 22 cohort responded positively.

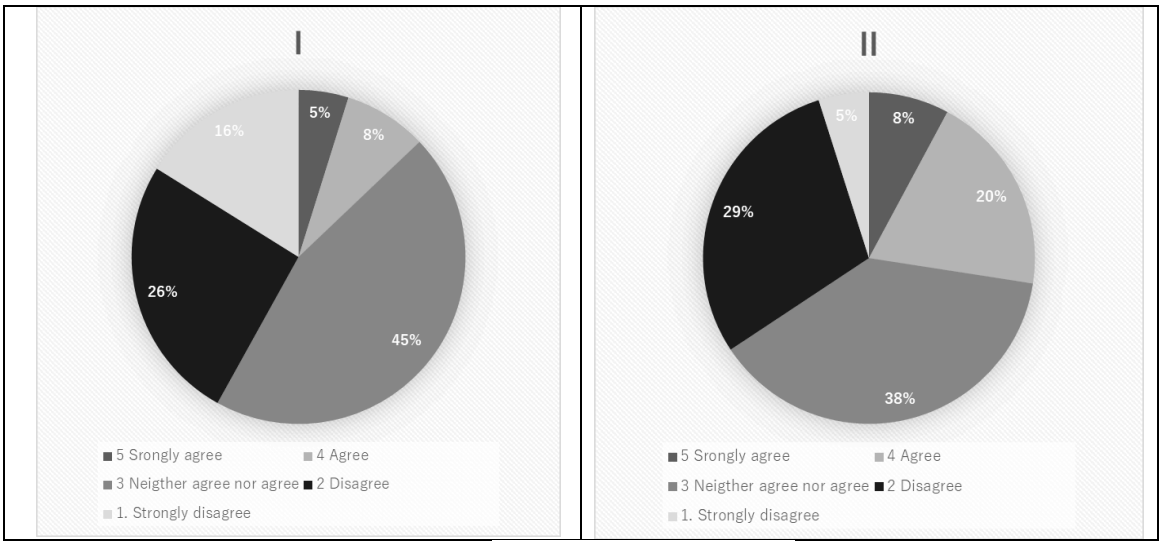

Figure 7: Intrinsic Motivation (1)

Figure 8 depicts the students' responses to the statement, "I study English because I feel happy when I understand something I did not know before." The statement also shows intrinsic motivation. More than half (52%) of the 22 cohort gave positive answers, as well as 41% of the 2023 cohort. Again, this shows that more students in the 2023 cohort have a higher level of intrinsic motivation.

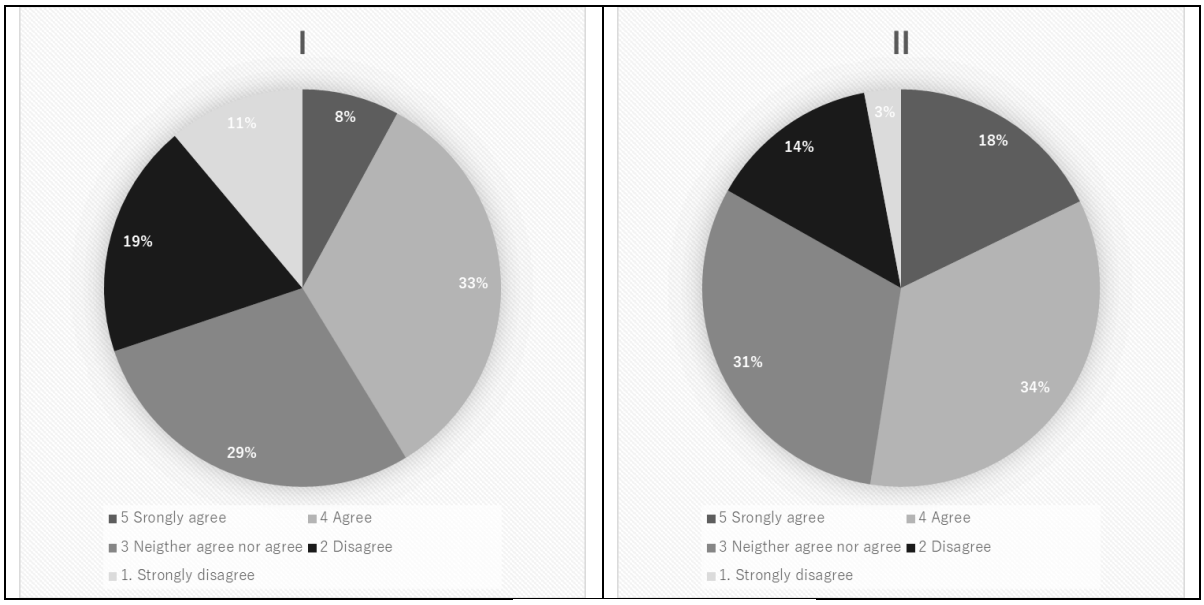

Figure 8: Intrinsic Motivation (2)

Figure 9 depicts the students' intrinsic motivation based on their response to the statement, "I study English out of necessity to pass exams." 39% of the 23 cohort and 30% of the 22 cohort gave positive answers to this statement. Notably, 2023 students show higher levels of extrinsic motivation.

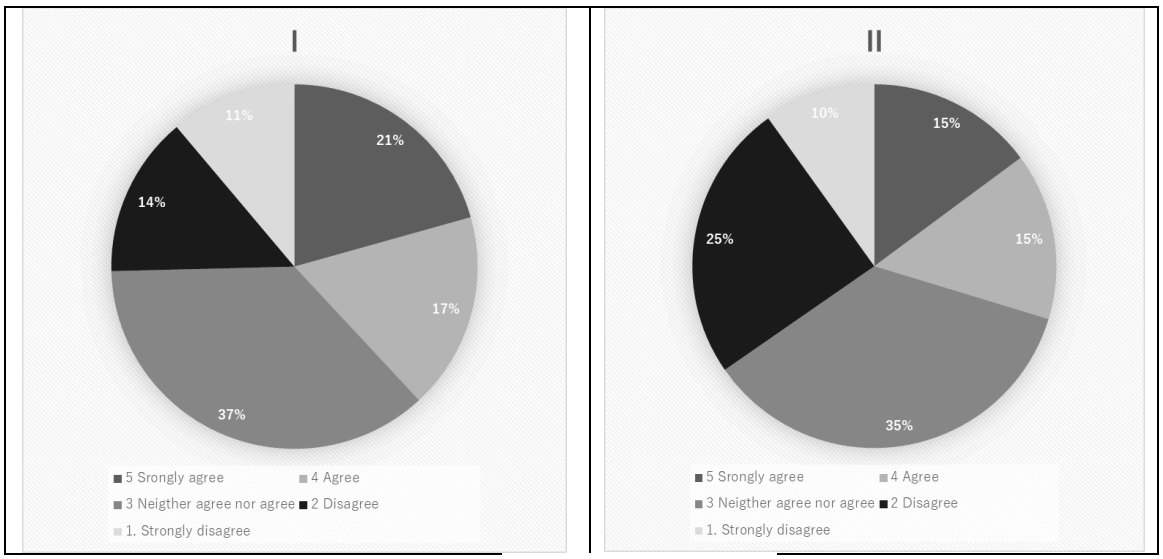

Figure 9: Extrinsic Motivation

Figure 10 shows the students' responses to the statement, "If I did not have to learn English, I would not." It reflects a negative attitude toward English learning. As shown, 36% of the 23 cohort and 29% of the 22 cohort responded positively to this statement.

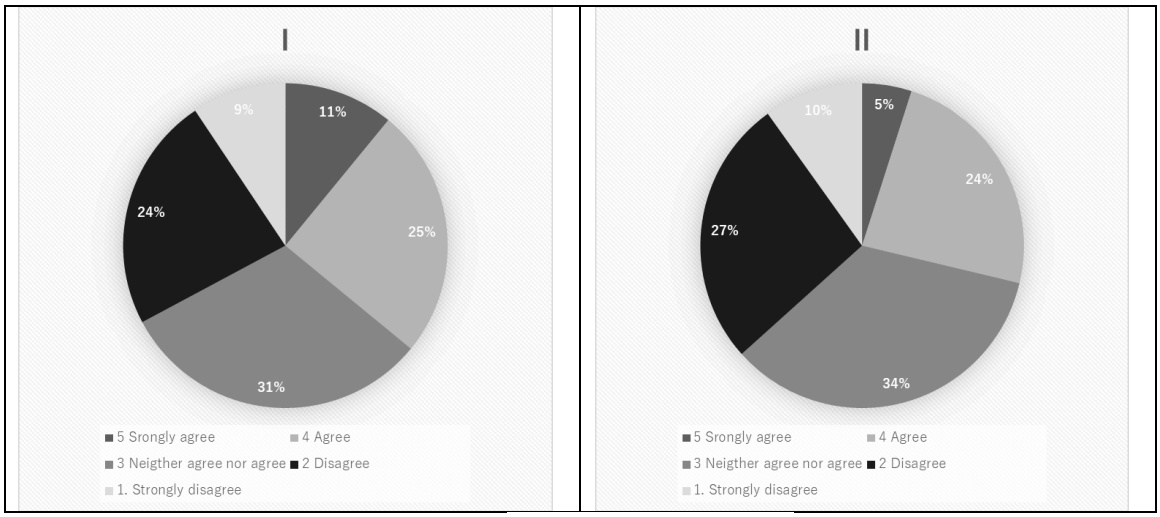

Figure 10: Negative Attitudes (1)

Figure 11 depicts the students' response to the statement, "I simply don't want to study English anymore." It is also a negative statement toward English learning. As indicated, 13% of the 23 cohort and 5% of the 22 cohort gave positive answers to this statement.

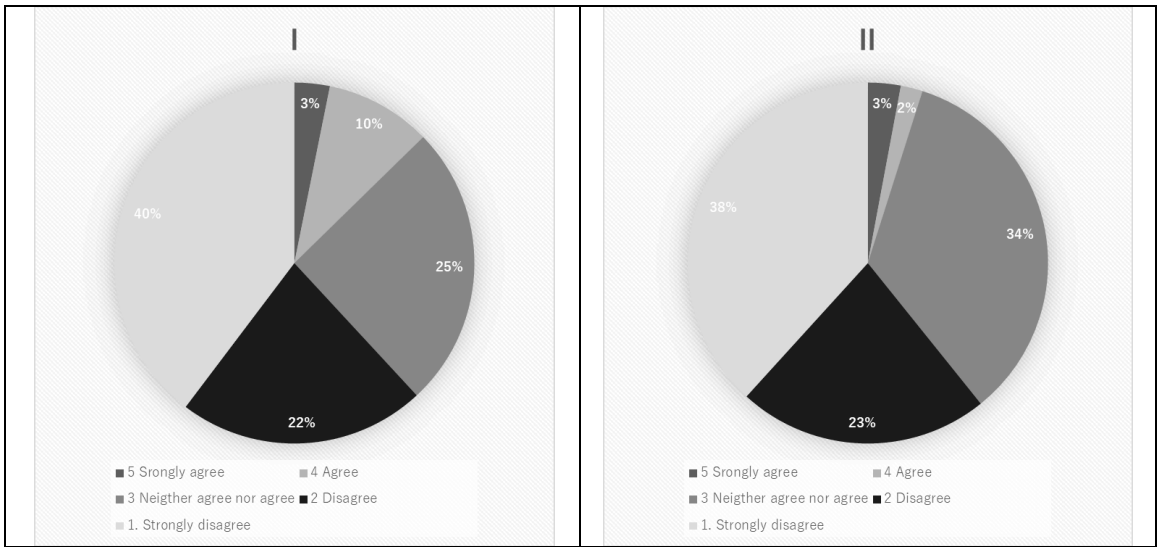

Figure 11: Negative Attitude (2)

Summary of Findings

The placement test score for the 23 cohort fell sharply, setting a record low. Moreover, the percentage of students with lower scores rose considerably in 2023. For vocabulary size, the average of the 23 cohort was 1639, whereas the 22 cohort averaged 2436. In daily conversation, a 2000 to 3000 vocabulary size is said to be needed, whereas reading authentic text requires 5000. However, the VST results in the 23 cohort revealed a significantly lower average than such scores, indicating insufficient vocabulary size.

Regarding GPA, the 23 cohorts tend to have students with lower GPA scores. Although the correlational analysis revealed that there are strong to weak correlations among variables, such as placement test score, vocabulary size, and GPA, the 23 cohort had slightly stronger correlations.

In terms of perception and attitudes, both groups responded similarly to several questions; however, the 23 cohort showed a tendency for extrinsic motivation and negative attitudes and perceptions toward English learning. More students in the 22 cohort have a higher level of intrinsic motivation. Furthermore, more students in the 23 cohort have negative attitudes or feelings toward learning English compared to the 22 cohort.

Although the new Course of Study intends to support students in actively engaging in their learning and being interested in and motivated to learn English, the findings of this study contradict such intentions. Without the necessary knowledge or vocabulary, it appears difficult to nurture productive or practical abilities, as well as positive perceptions or attitudes toward English learning.

Limitations of the Study

As this study focused on a small university, the sample size was relatively small. Such limitations tend to affect the generalizability of the study results. However, as stated before, this is a pilot study intended to accumulate more data for further investigation. Therefore, the study should be ongoing, with new data being added every year.

Implications and Further Study

This is a pilot study, and a similar investigation should be conducted among the 2024 and 2025 cohorts. These students will be more exposed to English under the new Course of Study. However, the speculation remains that the sharp drop in placement test scores or vocabulary sizes or even negative attitudes and perceptions toward English learning could be the influence of COVID-19. The 23 cohort started their high school with school closures and gradually transitioned to online learning, resulting in staggered attendance. In May 2023, Japan downgraded COVID-19 to a “common infectious disease.” Notably, this 23 cohort was fully exposed to the COVID-19 situation during their 3 years of high school.

Furthermore, detailed analysis, such as examining the relationship between students’ level of proficiency and their attitudes or perceptions toward English learning, should be required for further research. This data collection can be beneficial not only to provide an effective support system for students with low language proficiency and low motivation but also to improve the next revision of the Course of Study.

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Empowering Multiculturalism: Community Interpreter Training Programme

Akiko Sato, Kyoto University of Foreign Studies, Japan

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Abstract
This paper explores what the Community Interpreter Training Program should provide its objectives, features, assessment methods, and benefits. The program's core mission is to cultivate interpreters who play an indispensable role in multicultural societies by elevating students' language proficiency and communication skills fostering multicultural coexistence. A distinctive facet of this program is its adoption of a multilingual and multicultural approach, providing students with opportunities to refine their communication skills across diverse cultural backgrounds and enhancing their interpretative capabilities in various contexts. Furthermore, proficiency tests evaluate and impartially gauge students' language competencies, enabling tailored learning plans to address individual strengths and weaknesses. The program's sponsorship offers numerous advantages, including the elevation of the university's brand recognition through proficiency tests, the enhancement of overall education quality by customizing it to each student's aptitudes, and continuous curriculum enhancements guided by test outcomes. In conclusion, the Community Interpreter Training Program represents a pivotal initiative poised to contribute substantially to multicultural societies. The introduction of proficiency tests and the comprehensive deployment of the Community Interpreter Study Group will fortify multilingual education and further promote contributions to multicultural coexistence. This program equips students with vital skills for promoting multicultural coexistence, nurturing social connections, and playing pivotal societal roles.

Keywords: Community Interpreting, Community Interpreter Training Program, Language Proficiency Test

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Introduction

In today's globalised world, the movement of people across borders is commonplace and societies are more diverse than ever before. While this diversity brings affluence, it also brings challenges, particularly in communication. The right that many people take for granted to receive the services they need can be severely hampered by language barriers. This problem affects not only the people concerned, but also the cohesion and functionality of the community as a whole. The Community Interpreter Training Programme aims to tackle these issues head-on and plays a crucial role in promoting multicultural conviviality by training interpreters to facilitate communication in a variety of settings.

The aim of this paper is to explore the different aspects of community interpreter training programmes and to identify their objectives, main features, evaluation methods and the benefits they bring to both individuals and communities. In doing so, it aims to emphasise the programme's essential role in developing a class of interpreters who are not merely linguistically competent, but also culturally sensitive communicators who are able to skillfully navigate the complexities of a multicultural society.

The first Chapter of this paper discusses the “needs for community interpreters” in multicultural societies, including Japan, and gives examples of how the terminology used for the concept of 'community interpreting' differs slightly from country to country, and discusses the importance of community interpreter training programmes.

The second Chapter discusses the Community Interpreter Training Programme implemented by the University and considers what points should be kept in mind when the Community Interpreter Training Programme is incorporated into the curriculum of a higher education institution such as a university, by introducing the results of a questionnaire conducted after the students who actually took the Advanced Community Interpreting I course. The results of a questionnaire conducted after the students had given their informed consent will be presented and discussed.

In the third Chapter, as a discussion, the improvements and benefits and impacts of the University's interpreter training programme in the development of pre-sessional classes are described.

In the conclusion, the notes in the Community Interpreter Training Programme and directions on how to improve the programme for its continuation are discussed.

1. Needs for Community Interpreters

1.1 Definition of Community Interpreting

Community interpreters are important bridges in multicultural societies, enabling migrants and foreign residents to access public services inaccessible due to language barriers. These services cover a wide range of areas, including healthcare, education, social welfare, administration and justice (Kyoto University of Foreign Studies, 2023, Teams).

The International Organisation for Standardisation (ISO) defines community interpreting as “two-way interpreting that takes place in communication between speakers of different languages to access community services” (ISO, 2014, p.2).

This definition emphasises that community interpreting has a broad scope that includes not only social services but also assistance to tourists and disaster victims.

1.2 Different Names for Community Interpreting in Different Countries

It is important to point out that the regional diversity is closely related to the cultural and social needs of the respective societies when people call the services of community interpreting as follows: Public service interpreting in the United Kingdom, Community interpreting in the United States, Liaison interpreting in South Africa, Language and cultural/ Integration mediation in Germany, Social setting interpreting in France and others. Therefore, Names for interpreting services reflect the specific linguistic and cultural challenges faced by each region (Tipton and Furmanek: 2016, p.3). For example, in some countries, the focus on integration of migrants and refugees has led to the naming and focus of such services as "integration mediation". Others may focus on removing language barriers, particularly in accessing public and social services.

Furthermore, this diversity shows that, despite sharing the same basic mission - ensuring that language is not a barrier to accessing services - interpreting services should be provided in accordance with the specific challenges and needs faced by each region It shows that there are different understandings of how interpreting services should be provided and what skills interpreters should have. This may lead to regional differences in the content and approach to interpreter education.

Therefore, it is essential for language service providers and interpreters to have a deep understanding of the local context of the services they offer and the social role they play. This understanding plays a key role in helping them respond more effectively to community needs and build language and cultural bridges. This local diversity and specific needs must also be taken into account in the design and implementation of professional training programmes.

1.3 Community Interpreters Needed in a Multicultural Society

Community interpreting is becoming increasingly important in a rapidly growing multicultural society. Unlike conference interpreting, which often focuses on international, professional-level communication, community interpreting provides an important bridge between public service providers and diverse populations, including migrants and foreign residents. This fundamental difference in audience highlights the unique challenges and objectives faced by community interpreters, who must consider not only linguistic issues but also cultural, social and power relations (KUFS, 2023. p.1).

It is important to emphasise that the unique challenges faced by community interpreters involve more than simply facilitating interlanguage communication. These challenges include developing a deep intercultural understanding and sensitivity, as well as being sensitive to the personal experiences and backgrounds of the interpreting audience. Community interpreters do not simply translate messages into other languages, but also play a role in promoting mutual understanding between people from different cultural backgrounds (Yoshida et al., 2019).

Removing language barriers in accessing public services is also essential to ensure equal service provision and promote social inclusion. In this regard, community interpreters provide important support to migrants and foreign residents to enable them to function as full

members of the community. This includes not only access to basic services such as healthcare, legal and education, but also ensuring that these individuals understand their rights and have opportunities for self-realisation (ISO, 2014, p.2).

Furthermore, the training and education of community interpreters needs to go beyond technical skills. They need to ensure linguistic accuracy, as well as the ability to read and respond appropriately to cultural subtleties. This requires an environment in which interpreters can continue to hone their skills by being provided with opportunities for ongoing education and practice (ISO, 2014, p.2).

In summary, the role of community interpreters in a multicultural society goes beyond the mere transmission of information between different languages, and involves an important role as a bridge between different cultures. In order to fulfil this responsibility, interpreters must have cultural understanding and sensitivity in addition to advanced linguistic skills.

1.4 Community Interpreting Versus Conference Interpreting

Community interpreting is inherently interactive and facilitates two-way communication involving highly personal and sensitive issues. This is in contrast to the monologue-like nature of conference interpreting, where the flow of information is generally in one direction. Furthermore, community interpreting often involves consecutive interpretation and two-way translation, and is able to address a wider range of languages, including those of ethnic minorities. Conference interpreting, on the other hand, leans towards simultaneous interpretation, which reflects the official and international context and prioritises official languages (Mizuno et al., 2011, p.161).

1.5 Community Interpreter Training Programme

The Community Interpreter Training Programme is designed to train interpreters to facilitate communication between service providers and recipients from different linguistic and cultural backgrounds. This mission is rooted in the understanding that effective communication is more than simply translating words from one language to another. It requires an understanding of cultural nuances, the ability to convey meaning in different contexts accurately, and a commitment to ethical principles（Aichi Prefectural University, 2022).

The programme focuses on taking students' language skills to a professional level, improving their communication skills and developing their understanding of cultural dynamics. This comprehensive approach prepares graduates to handle complex real-world interpreting scenarios, from medical consultations and legal procedures to educational settings and social services. In doing so, the programme contributes to its participants' personal and professional development and plays a vital role in building a more inclusive society.

The training programme is characterised by several key features, including a curriculum that covers a wide range of interpreting contexts, forms of interpreting (e.g., consecutive, simultaneous, and sight translation), and specialisations (e.g., legal, medical, and educational interpreting). The programme also emphasises the importance of ethical considerations and cultural competence and prepares students to handle sensitive information with discretion and respect for diversity.

Assessment methods within the programme are designed to assess students' proficiency in both source and target language, their ability to communicate messages accurately and effectively across cultural boundaries, and their adherence to professional and ethical standards. These assessments take various forms, including practical interpreting exercises, written tests, and reflective assignments that encourage students to engage critically with their role as intercultural mediators (Naito, 2013, pp.31-56).

The Community Interpreter Training Programme is a beacon of hope in this multicultural world. Its mission to develop skilled interpreters who foster multiculturalism is more relevant today than ever. With a comprehensive curriculum, rigorous assessment methods, and a focus on ethical and cultural competence, the programme prepares students for a career in interpreting and assists them in advancing their careers as interpreters.

2. Kyoto University of Foreign Studies Community Interpreter Training Programme

2.1 Community Interpreter Training Programmes Integrated Into the Curriculum

The Kyoto University of Foreign Studies' Community Interpreters Training Program related to the ISO certification programme is currently considered to include the following requirements as of February 2024:

(1) Foreign language proficiency: CEFR B2 level or above. Language proficiency test (90 minutes) in several languages: Date and frequency to be determined. Student year taking tests: voluntary.
(2) Classroom study: 2 courses and 4 credits. This subject is classified as an advanced-level subject. "Community Interpreting Study I and II", for the 3rd year students and above in all departments of the Kyoto University of Foreign Studies.
(3) Interpreting practice: 60 hours. Students report on activities (paid or unpaid) that they have sought out on their own. The teacher in charge approves this, with the proof of supervision.

The curriculum covers a wide range of topics, from international standards and disaster management to specific social issues such as healthcare, education, and justice. This wide range of subjects is designed to prepare students for the many situations they will encounter as community interpreters. The programme also strongly emphasizes practical experience (KUFS, 2023a).

The programme aligns with Kyoto University's broad educational mission to develop humanistic leaders who can contribute to international peace and understanding. With an emphasis on advanced language skills, digital literacy, and the ability to promote multicultural conviviality, the programme develops students to be effective mediators in a globalised world. The ultimate goal is to equip future generations with the skills and sensitivities necessary to thrive and contribute to a multicultural society (KUFS, 2023b).

3. Community Interpreting Study I From the Perspective of Students

3.1 Benefits and Impact

The benefits of the Community Interpreter Training Programme extend far beyond individual participants. Those who complete the programme play an indispensable role in their communities, ensuring that those with language barriers, who would otherwise be

marginalised, receive the needed services. That enhances the quality of life of individuals and contributes to the social and economic well-being of the community as a whole.

Furthermore, by promoting multicultural co-existence and understanding, the programme helps to build a more cohesive society. The interpreters trained through the programme are not just language specialists but ambassadors of cultural understanding who bridge gaps and facilitate dialogue in diverse communities (Sato, 2024a).

3.2 Analysis of the Questionnaire for Students and Non-students of Community Interpreting Study I With Informed Consent

3.2.1 Questionnaire for Students Who Took Community Interpreting Study I

A comprehensive questionnaire with informed consent was administered in the Community Interpreting Studies I course at Kyoto University of Foreign Studies to gauge students' interest, understanding and motivation regarding community interpreting. Based on the data collected, this chapter delves into the students' attributes, motivations for enrolment, depth of understanding gained, future aspirations and overall impressions of the course. This analysis aims to determine the effectiveness of community interpreting education and its impact on student's academic and professional perspectives.

The course attracted students from foreign language faculties, with English and American departments accounting for the majority (70%). Interest, albeit small, also came from other faculties, such as German and Russian. This diversity highlights the broad appeal of community interpreting across linguistic disciplines.

When asked why they registered, opinions were divided, with 43% of students saying they were genuinely interested in community interpreting and a similar proportion saying they registered to gain credits. Significantly, some students were influenced by the instructor's good reputation or recommendations from other teachers. This division suggests a need to clarify further the intrinsic value and career potential of community interpreting and increase the number of genuinely interested students in the field.

Post-course feedback showed that 95% of participants reported a greater understanding of community interpreting, suggesting that the course went beyond mere language translation and effectively demystified the field. Participants learnt about the practical role of community interpreters and highlighted the importance of adaptability and cultural sensitivity in communication. These observations confirm the success of the course in broadening students' perspectives on the nuances of community interpreting.

Future interest in pursuing a career in community interpreting varied, with only 20% of students expressing strong interest and a significant majority (62%) still deciding. This uncertainty indicates that the curriculum provides opportunities to demonstrate further the relevance and fulfilment of a career in community interpreting.

Student feedback on Community Interpreting Studies was overwhelmingly positive, with many appreciating the dynamic and interactive learning environment. The course was also praised for its comprehensive approach, covering not only technical interpreting skills but also the ethical and cultural aspects of the profession. Suggestions for this course's future

included including more advanced interpreting classes and teaching that would cater to both enthusiastic and credit-bearing students.

The insights from the survey point to several areas for future research, including developing advanced interpreting courses tailored to students' preferences, tailoring course content to balance professional training and academic demands, and creating an environment for students to become community interpreters. These research areas are crucial in refining curricula and support structures for students aspiring to become community interpreters.

Valuable insights were gained into students' motivations, experiences and aspirations in community interpreting education. Positive feedback and constructive suggestions emphasise the importance of continuous curricular enhancement to meet student needs and industry demands. As Kyoto University of Foreign Studies strives to develop future leaders in multiculturalism, improving the community interpreter training programme will remain a crucial focus (Sato, 2024a).

3.2.2 Questionnaire for Students Who Did Not Take Community Interpreting Study I

A questionnaire with informed consent was conducted to gather insights on students' awareness and engagement with community interpreting. The survey carried out after obtaining informed consent, received 83 responses from students across various departments, predominantly from the Department of English and American Languages. The respondents included students from different academic years, primarily Japanese native speakers, followed by Chinese, English, Spanish, and Portuguese.

Key findings include:

- Respondents have yet to take the course “Advanced Community Interpreting”.
- A significant majority, 63 respondents, need to become more familiar with the term “community interpreter”, while 20 respondents have some limited awareness.

Few are aware of community interpreting, and few have direct exposure to the field. Only three have seen community interpreting in action, and only one student has provided community interpreting services for a fee. Engagement with community interpreting is minimal. Only two students in their fourth year of postgraduate studies offer community interpreting services for free.

The data suggests a pressing need to increase awareness and understanding of community interpreting among students early in their academic careers, particularly before they reach their senior year when they are eligible to take specialized courses on the subject. The Community Interpreter Training Programme aims to achieve academic success and equip students with the skills and ethics necessary to contribute positively to a multicultural society.

The programme emphasizes fostering social connections and developing cultural understanding, preparing students to be ambassadors of cultural sensitivity and mutual respect. Graduates are expected to be crucial in bridging cultural gaps, promoting inclusive dialogue, and facilitating harmonious coexistence among diverse communities.

Conclusion

In summary, the Community Interpreter Training Programme is a holistic approach to meeting the multifaceted demands of a multicultural society. Through the strategic integration of proficiency testing and the establishment of study groups, the programme promotes multilingual education and champions the cause of multicultural co-existence.

The programme equips students with the skills, knowledge and ethical understanding necessary to make a meaningful contribution to society.

Therefore, the Community Interpreter Training Programme at Kyoto University of Foreign Studies represents a progressive response to the growing need for skilled interpreters who can deal with the complexities of multicultural communication.

Acknowledgements

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Needs Assessment for Buru Language Training

Nurbaya Pulhehe, Universitas Pendidikan Indonesia, Indonesia
Riche Cynthia Johan, Universitas Pendidikan Indonesia, Indonesia

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Abstract
One of the indigenous communities on Buru Island, Maluku, East Indonesia, that uses the Buru language as its native language of communication is now extinct. The Buru language, which is part of the Austronesian language, is spoken by approximately 45,000 people on the island of Buru, with a current population of 136,757. At least, there are some factors that cause the Buru language to decline: *First*, the language's vital entity has declined and is in critical extinction. *Second*, the conversation that takes place in the family is not entirely in the Buru language but in Indonesian. *Finally*, there are limited human resources. The way to respond to this is to implement Buru language training. This training activity will begin with an analysis of training needs. The aim is to identify gaps in the use of the Buru language as well as the competencies needed to improve its usage. Therefore, this study will use the Delphi method in the analysis phase of training needs. In its implementation, Indigenous Buru leaders, Buru language teachers, and the Buru cultural community were used as samples to ask their opinions by answering questionnaires. The results show that there is the need for a training program to preserve the Buru language, which should focus on improving the language proficiency of the Buru people and can be carried out online. The program should emphasize the practical use of the language in everyday life, creative learning methods, and specialized language teachers.

Keywords: Training Needs Assessment, Buru Language, Indigenous Community

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Introduction

The education of indigenous peoples can be described as an educational process that is based on the existence of local wisdom or customary knowledge in the respective distribution of indigenous territories. The uniqueness and peculiarity of the existence of those activities are able to sustain the existence of indigenous society. Garcia-Olp et al. (2022) believes that education for indigenous communities is the center of cultural preservation and the development of skills and expertise needed to be an essential part of the twenty-first century. In his study on the contextual education of indigenous peoples in Indonesia, Bintoro (2021) stated that there are at least four models of indigenous education: integrative, conservative, complementary, and transformative. *The first model* is integrated formal education through subjects. It's seen in local loading subjects, which are usually taught only once a week. *The second model* is outside the national education system. Because it does not incorporate the national education system into its educational model, it is called a conservative model. *Thirdly*, a service-based education model that complements formal education with indigenous education. *The last* is the education model transformative. This model is almost identical to the conservative model, but it opens up opportunities for its pupils to move on to formal education. The right to education for indigenous peoples in Indonesia is governed by a number of regulations, such as the right to education (Christianto et al.2022; Kholiq et al., 2022). Then, there is the right to existence and indigenous education. Kemdikbud, through the Directorate of Faith in One God and Tradition, recorded at least 2004 indigenous communities in Indonesia in 2013. This data is not total data but is based on numbers that have been successfully identified. Later, the Indigenous Peoples Alliance of the Nusantara, or AMAN, also noted that there were about 15 million souls gathering or joining in AMAN. In order to fulfill the right to education for indigenous peoples, the Government of Indonesia, through various policies such as the special education services (PLK), the local curriculum that covers the native language, and the current policy for revitalizing native languages in Merdeka curriculum in 2022 (Pulhehe, 2024). Both special services education (PLK) and inclusive education are provided to indigents with reference to national standards of education. However, the proposed implementation of special service education is not optimal because it does not have the necessary technical guidelines or is not used in the field (Head of Puslitjak Dikbud in Biantoro, 2019; Sugih, 2021).

Biantoro et al. (2019), in their study on the contextual education of indigenous peoples in Indonesia, noted two different points of view regarding the existence and implementation of education for indigenous peoples. *First,* indigenous education is understood as education with common principles in the general society that is based on the national curriculum and national standards of education by applying through the formal, non-formal, or informal educational path. Examples of programs developed are distance education through branch schools and the Center for Learning Activities of the Society, or PKBM. *Secondly*, the education of indigenous communities is an education that adapts to the environment and is based on the principles of national standard education that is contextual in accordance with the character of the indigenous communities. Examples of this second type of implication are usually done by non-governmental organizations that operate in the field of education. To harmonize the education of indigenous peoples in accordance with the ultimatum of global tribal communities and also in conformity with the mandate of the law, there is a need for a model or primary guidance as the primary reference for the conduct of the educational community that is appropriate and targeted (Omulo, 2023).

The Government of Indonesia has introduced changes to the policy on the education of indigenous peoples through Permendikbudristek No. 13 of 2022. Objectives 1 and 3 of this policy focus on expanding access to quality, equitable, and inclusive education while preserving and promoting the culture, languages, and literature of these groups. The policy aims to develop a model for the conservation and revitalization of regional languages with the objective of preserving and developing the region's language heritage for future generations (Siregar et al., 2023). The program targets 13 provinces in Indonesia and involves students from primary and high school. The ultimate goal is to revive regional languages, create a significant number of young local speakers, and promote language diversity. The indigenous people of Buru, Maluku Province, own the Buru language, which has become a target language for revitalization. The language is classified as Model C and is characterized as being in decline, critical, and endangered. The Buru language, which is part of the Austronesian language, is spoken by approximately 45,000 people on the island of Buru, with a current population of 136,757 people (Grimes, 1991; BPS Buru regency, 2020). Some researchers estimate that there are several factors that cause the Buru language to decline, some of which are: *first*, the language's vital entity has declined, is threatened with extinction, or is critical. *Second*, the Buru language is spoken by only a few people and is widespread. The latest data on the decline in the number of Buru speakers currently ranges from 5,000 to 132,100 active Buru communities. *Thirdly*, the conversation that takes place in the family is not entirely in the Buru language but in Indonesian (Erniati, 2022). *Fourthly*, there are advances in information technology and a lack of public and government awareness about preserving local languages as their identity in both formal and non-formal environments (Misrita et al., 2023;Lubis et al., 2023). *Finally*, there are limited human resources (Chew et al., 2022;Hadiwijaya et al., 2022). Due to some of the problems found above, there is a need for a training program that supports the young generation to improve their competence in using Buru. The way to respond to this is to implement Buru language training. This training activity will begin with an analysis of training needs. The aim is to identify gaps in the use of the Buru language as well as the competencies needed to improve its usage.

Method

This study uses the Delphi method in the analysis phase of training needs (Harteis, 2022). In its implementation, three indigenous Buru leaders such as vice of Buru leaders from Leisela, one Hinolong and one Soa, three Buru language teachers, and two representatives of the Buru cultural communities were used as samples to ask their opinions by answering questionnaires. The data collection with the questionnaire is done through a question-answer that uses G-form with some codes such as R1 refers to the vice of Buru leader's answer, R2 refers to the Soa's answer, and R3 refers to Hinolong's answer. Besides, the answers from Buru language teachers are coded such as R4 refers to the first teacher, R5 refers to the second teacher, and R6 refers to the third teacher. While the representatives of Buru cultural communities are referred to R7 and R8 for both representatives. The researcher still put the questionnaire into the data collection section. It aims to ensure that field data is not biased. Some perspectives from other communities on research issues are also needed in order to make it easier for researchers to see and analyze the possibilities that occur in Buru indigenous communities. This is also in line with Muhammad Ali's statement (2014) that information collected through questionnaires is more objective than through interviews. This is because the respondents are free to respond, and the mental attitude of the research participants and their relationship to the survey are not affected. There are more than sixteen questions. The question has three aspects. *The first* aspect is about the fundamental knowledge of the indigenous people of Buru. *The second* aspect is about the main causes of the Buru language. *Lastly*, the third

aspect is about the preservation of Buru languages through training programs. The dissemination of the questionnaire will be done several times, and every time the dissemination is done, each respondent is willing to evaluate and revise the given responses. The results of the need analysis will be used to determine the design of the Buru language training program.

Result and Discussion

The following conclusions were drawn based on the analysis of the program needs obtained from the research subject: the respondents included Buru customary leaders, Buru language teachers, and representatives of the Buru cultural community. The results are described as follows:

The Fundamental Knowledge of the Indigenous People of Buru

In this aspect, there are five questions, such as: *1. I know the customs of the Buru customary community, which consists of 8 types according to the Regulations of the district of Buru Year 2019, consisting of: Buru language, ritual, customary clothing, cultural art, special food, Dulan or Sedekah, Huma Koin and Baileo, and Lestari various forms of bondage.* The result shows that on this question, among the customary practitioners, three customary figures stated that they only knew some customary language, such as the local language (Buru), customary ceremonies, huma coin, and lestari. While Buru language teachers answered this question, they only knew Buru language, cultural art, customary ceremonies, Huma coins, and lestari. Lastly, among cultural activists, there were cultural arts, lestari, and customary clothing. In addition to the answers of the customary figures, only a few elements were mentioned because, according to them, the art of culture already encompasses all the elements that have not been mentioned. *2. The entire element of the Ancient Tradition, consisting of: Hunting Language, Ancestral Ceremony, Traditional Cloth, Cultural Art, Special Food, Dulan or Sedekah, Baileo, and Lestari, is still preserved in every ancient tradition to this day.* To this question, the Buru leaders answer that what is still preserved to this day is only language, customary ceremonies, and cultural art. According to the two Buru leaders, Lestari is usually used when there is a customary ritual, while Buru is used in daily activities at home and when there are customary meetings or other customary activities (Iye, 2022). According to Buru language teachers, Buru language, customary ceremonies, traditional food, and cultural arts are the components of customary art. They are still being carried out under the customary guidance of Buru people (Hidayah, 2020). Last, among cultural and community activists, they replied that Buru languages, lestari,customary clothing, and the art of culture are still preserved. According to R7, customary clothes are typically worn during ceremonies and cultural art performances. *3. The preservation of customs involves only the customs elders of the community in every Buru district.*

Figure 1. The result of respondents

As it shows on figure 1, the majority of respondents disagree with this question. On this question, only one Buru language teacher (R4) agreed, while the Buru leaders and other Buru language teachers as well as representatives of the cultural community disagreed with this question. According to them, this will only narrow the preservation of the custom itself. *4.The development of customary customs includes customary ceremonies, cultural arts, dulan or sedekah, and special meals held every year*. On this question, the Buru language teachers agreed that there was a need to develop Buru customs every year. Meanwhile, five respondents, consisting of Buru cultural activists and Buru leaders, said they disagreed that the development of Baru custom is carried out every year because it will be difficult for them to arrange the agenda. *5. The empowerment of Buru customs involves Buru and non-Buru communities.*

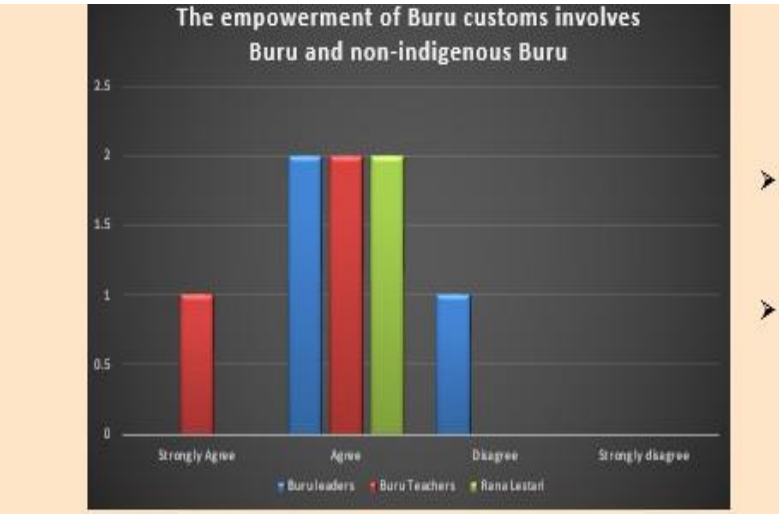

Figure 2. The result of respondents

As the figure shows, it consists of a variety of answers from the respondents. One of the Buru language teachers (R4) expressed strong agreement that Buru customs authorization should involve both Indigenous and non-indigenous Buru communities. Furthermore, the rest of Buru teachers, Rana Lestari from the representatives of Buru cultural community as well as two Buru leaders agree that the empowerment of Buru customs involve Buru and non-indigenous Buru. According to them, involving the entire community is a form of preserving culture as well as customary custom. In other words, the Buru leaders (R1) and (R3) said that it was necessary to involve non-indigenous Buru society because the non-indigenous Buru communities need to adjust to the culture of Buru's customary communities when dealing with Buru.

The Main Causes of the Buru Language

In this aspect, there are five questions, such as: *1. What do you think is the most fundamental factor in the use of Buru language now threatened with extinction?* This question was formed to get the comprehensive knowledge of the respondents about their perspective on the main causes of the Buru language. It might be the lack of speakers or another issue that they find in their environment that is the cause of the usage of the Buru language. The result shows that the most important factor influencing the criticism of the Buru language occurred in the family. Because the family is not accustomed to speaking Buru at home, they mostly use Indonesian rather than Buru. The next cause is the dominant immigrant society from outside Buru. They live with their own culture, so the Buru language, as the identity of indigenous

Buru, is rarely used as a language of daily communication. Then, the local government has not made Buru a compulsory subject in schools, and there is no curriculum for Buru language teaching in schools (Handayani, 2021). *2. Is Buru always used at school or at home?* This question was formed to collect information from the respondents on how intensified the Buru language was spoken. The result shows that many respondents chose to use the Buru language at home rather than in school. This answer was supported by five respondents. In the meantime, the vice of Buru leaders, as one of the customary leaders said that the Buru language is never used at home or in school. This is also proved by what has been found by Erniati (2022). In other words, this answer is also supported by the answer from one of the Buru cultural activists, who stated that they never use Buru language except at home, and only a few areas are still thick with local culture. Finally, the respondent, one of the teachers (R4), replied that the language is rarely used at home or in school. *3. Is there a Buru's language lesson at school?* This question aims to verify the usage of Buru lessons at school. At this question all the respondents answered that there were no Buru courses in the school.

4. What must be done to prevent the criticism of Buru Language? Based on this question, the respondents answered some important elements in the prevention of the extinction of Buru, namely, the local government should create a Buru language curriculum that can be applied in schools. Then, to establish Buru as a compulsory area language subject in schools (Rahabav et al., 2021). 5. *Has the Buru revitalization program been the best solution in saving the Buru language?* This question was formed to verify whether the program, namely revitalization of the mother tongue, which also includes Buru, has been run effectively or has been implemented as its targeted national program. So, the respondents answered varyingly, with one (R4) affirming that the revitalization program for Buru has been the best solution for saving Buru languages. Then, some respondents (R1) and (R7) answered this program as one of them to save Buru. Next, R8, R2, R5, and R6 replied that the program of Buru revitalization language was already implemented but had not been maximized. Lastly, the answer of the respondent (R3) states that they do not know whether this is already the best option for saving the Buru language from extinction. Additionally, in response to the two Buru language teachers, namely (R5) and (R6), this is based on the number of participants in the revitalization program. For example, in following the Buru language revitalization program, each school only sends its 10 representatives to follow the program. So, the learning process at the school is targeted only at the 10 participants, not the whole students. In short, some respondents viewed the Buru language revitalization program as a potential solution, while others believed it was already implemented but not fully utilized, and some were uncertain about its effectiveness.

The Preservation of Buru Languages Through Training Programs

In this aspect, there are five questions, such as: *1. Is it necessary to have a Buru language training program to improve Buru's language proficiency?* This question aims to collect the respondents' perspectives on how important the Buru training program is as a way to preserve the Buru language. Some of the respondents provided their answers in the form of quotes. Here are their answers: R8 stated: "Yes, we can start by providing capacity-building to the teachers, teaching methods to the teachers, and quick language dictionaries as references to the learning materials." R1 suggested: "We can provide facilities to language teachers, improve through examination and discussion, and improve the capacity of language teaching staff." R4 proposed: "We can provide more creative methods of learning Buru language, develop Buru learning skills, and apply practical practice in everyday life to make it more effective and enjoyable." R2 recommended: "It is necessary to learn from school,

have a cultural appearance of language on stage in various moments of activity, and facilitate local language teachers to follow a training course on learning methods." R3 suggested: "We can provide training to language teachers, apply the language in the family, and require the attention of the government." R7 stated: "We need an example because there is an improvement in knowledge of Buru language with training. We can conduct basic Buru language training and make a Buru dictionary that is given in schools." R5 proposed: "We need to increase the capacity of teachers, set a language day in one week, and obtain a speaking dictionary as a reference." R6 emphasized the need for "teachers, technical guidance to language teachers, and a quick dictionary." Based on their answer, it might be concluded that Buru language training is needed. They believe that the training will increase some components, such as teacher capacity in areas such as teaching methods, creative learning, and practical. Then, it can create a Buru language dictionary. Finally, it might boost the language in families as a means of daily communication. *2. Can the Buru language training program be carried out online or through online learning media?* This question aims to provide an appropriate need for how the training will run if it is possible to run both online via Zoom or using online learning media like LMS. All respondents answered that the Buru language training program can be implemented through online learning. This is due to the advancement of the times and technology, so with the implementation of training through the online learning media will make it easier for participants from any distance and location they are. *3. In your opinion, apart from reading, writing, speaking, and listening skills, what kind of Buru language skills are required in the training program?* During a survey, respondents were asked about the required competence for language learning. The answers varied as follows: R8 suggested that everyday conversation and communication should be strengthened. R1 believed that field practice competence or daily dialogue were necessary. R4 recommends creative learning by giving students freedom of expression. R2 emphasized the importance of daily dialogue and communication within the family. R3 suggested the use of daily language that is practical. R7 recommends language practice using a hunting dictionary. R5 believed in using art performances in the language of study, such as songs, poems, speeches, and folk stories, to enhance learning. R6 suggested that the basic practice of speaking quickly would be beneficial. Based on their responses, the majority of suggestions highlight some components, such as strengthening everyday conversation and communication, focusing on field practice competence, and daily dialogue. Then, field practice, creative learning, family dialogue, practical language use by creating poems or speeches, and folk stories, and art performances like traditional dance are recommended for enhancing learning. *4. Do you think that a Buru language training program using an online learning system will help improve your Buru language skills?* From this question, some respondents asserted that Buru language training using online learning systems would help if there were media availability and implementation in the city of Namlea. *5. If there is an education curriculum for indigenous peoples, what program would you like to suggest in this training that is dedicated to Buru Indigenous Peoples*. This question aims to gather information about the essential program they might suggest be included in this training as well as to design the indigenous education curriculum. Some respondents shared their suggestions and input on this question, which are as follows: R8 suggested that every customary activity should use the language of the hurricane, and there should be a parade or government law that obliges citizens to communicate using this language. Additionally, symbols of the area or street names should also use the tongue of the hurricane. R1 suggested making media in the speaking language, creating people's stories in the language, and providing training in the form of dialogue language. R4 recommended including Buru as a local load subject. R2 proposed developing basic languages, practicing speaking rapidly, and creating language rapidly through songs and poetry. R3 suggested training specialized

language teachers. R7 recommended increasing the capacity of teachers and providing Buru language tools. R5 proposed a Buru Cultural Conservation Program. R6 suggested using a culture of Buru in the development of a Buru language. Based on their suggestions, the program mostly consists of, *first*, using the Buru language in customary activities. *Second*, create learning media in Buru. *Third*, including Buru as a compulsory subject. *Fourth*, developing basic languages, training specialized language teachers, and increasing teacher capacity. *Lastly*, providing Buru language tools and implementing a Buru Cultural Conservation Program.

Conclusion

The Buru customary community has eight types of customs, including Buru language, ritual, customary clothing, cultural art, special food, dulan or sedekah, huma koin and baileo, and lestari bondage. These customs are still practiced under the guidance of the Buru people, with preservation involving elders in every district. Furthermore, the empowerment of Buru customs should involve both Buru and non-indigenous Buru communities. The development of customary customs includes customary ceremonies, cultural arts, dulan or sedekah, and traditional food should not be held every year. The empowerment of Buru customs involves both customary and non-Buru communities, as preserving culture and customs is essential.

The use and preservation of the Buru language, which is currently threatened with extinction. The lack of conversation in the family, the evolution of times, the existence of a dominant society non-indigenous Buru, and no Buru language curriculum in schools are the factors most influencing the criticism of Buru language. To prevent the extinction of Buru, respondents suggest creating a Buru language curriculum that can be applied in schools and establishing Buru as a compulsory area language subject. Respondents have varying opinions on the effectiveness of the Buru revitalization program, and some believe that the program has not been maximized. There is a need for a training program to preserve the Buru language. The training program should focus on improving the language proficiency of the Buru people and can be carried out online. The program should emphasize the practical use of the language in everyday life, creative learning methods, and specialized language teachers. Additionally, incorporating the language into customary activities, media, and education curriculums for indigenous peoples are also highly recommended.

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Contact email: nurbayapulhehe@upi.edu

UGC Curriculum and Credit Framework for Undergraduate Programs (CCFUP) Roadmap for Entrepreneurship Development

Kotthireddy Malla Reddy, S.R.R. Government Arts & Science College, India

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Abstract
Curriculum is to provide learning paths to become the citizen of their communities, countries and of the world. Indian Knowledge System established to promote interdisciplinary research for its traditional knowledge of various domains for societal applications and to make India Self Reliant. As per National Education Policy 2020 recommendations UGC developed a new CCFUP. The CCFUP main objectives are to give equal emphasis on all disciplines for integration of general and vocational education. It aims at community learning and all-round development to meet cutting-edge Entrepreneurship Development and startups ecosystem to bring ethical, emotional balanced sustainable Society and peaceful quality life. This paper intended to reveal the importance of Curriculum Design for Entrepreneurship development in the light of SDGs. Objectives of CCFUP are Capacity to extrapolate application in unfamiliar context to generate solutions to specific problems in real life citations rather than replicate curriculum content knowledge. Outcome based education aims to achieve expected results the Universities and Schools should become a facilitator for creating entrepreneurs through support of banking and marketing system. UG Education Curriculum with Accessible, Accountable, Affordable, Quality, Equity education envisages to produce scientific, creative, service-oriented intellectuals. Current challenges for human being are global warming, climate change, antisocial trafficking, drugs, terrorism, poverty, intolerance etc. Having to deal with such complex issues proper Education Policy is required for scientific insight and knowledge intensive enterprise. Research findings applicable for decisions to decision makers and Lab to land and relevance of evidence analysis enable to apply for evaluation of polices and claims.

Keywords: Curriculum Framework, Undergraduate Programs, Qualification Framework, Digitalization, Multidiscipline, Entrepreneurship

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Introduction

UNESCO International Burau of Education (IBE), defines the Curriculum as Dynamic Transformative articulation of collective expectations about the purpose, quality and relevance of education and learning. The main goal of IBE is to transform the curriculum and improve education system to raise the standard, effectiveness, efficiency accessibility for all across the world. Each country in the world has developed its own CFW in accordance with the national needs, context and vision.

21st century skills include life planning, adaptability, self-management, entrepreneurship, social & cultural interaction, leadership etc. Curriculum is to provide learning paths to become the citizen of their communities, countries and of the world. IKS approach in problem solvation is diverse perspective, fostering creativity and scholarly agility.

Flexibility of CCFUP helps in alternative modes of learning like ODL, online and blended learning lead to develop the academic paths of the individuals of their own. Seminars focused on assigned tasks on historical current developments and events. Internship leads to participate in professional activities, work experience, cooperation with external cultural institutions & industries. Studio activities to engage the students in visual, aesthetic focused experimental work in creative activities. Regulation of Academic Bank of Credits (ABC) helps the students to multiple entry and exit and movable in Interstate and International Institutions. Projects involve in field-based learning under expert supervisor. The community engagement and service will involve actual life experience to find solutions for real-life problems.

National Higher Education Qualification Framework (NHEQF) envisages technical and vocational education and training, quality of education, work experience, critical and reflective thinking in chosen field. In addition to chosen field learning with broad multidisciplinary, interdisciplinary, transdisciplinary context and generic learning for responsible citizen in society. Capacity to extrapolate application in unfamiliar context to generate solutions to specific problems in real life citations rather than replicate curriculum content knowledge. Research skills will useful to collaborate with other institutions and Industries.

Curriculum Framework Followed in Various Countries

I have thoroughly studied the major literature regarding various curriculum and its related articles. The curriculum in American Higher Education providing a unique environment for developing skills they need to become, capable of excelling in all subject areas. It gives priority on high standards of achievements and gives more creative freedom based on individual needs. British Education system is harder than that of USA. In Britan there is a strong emphasis independent learning and critical thinking. Profound changes taken place in Canada Curriculum directed towards creating a learning society preferred to accountability, high-quality education, accessibility, mobility and responsiveness to learners needs. Australian education system framed around 3 key policy pillars. High-quality world-class education, transformative partnership at home and abroad, competing globally expand to international education market.

India has its national policy on skill development which creates opportunities to acquire skills throughout life especially for youth, women and disadvantaged groups. NEP 2020 envisages

Outcome based education aims to achieve expected results to be achieved by the students. MHRD have a plan to develop job creators rather than job seekers. It is infusing entrepreneurship into education. It emphasized on the entrepreneurship development and business communication to made a part of curriculum. As per the Annual Report 2022-23 of MSDE India is becoming the Skill capital of the world with its highest young population. MSDE taken up several skill development schemes & programs like PMKVY, PMKK, NSDC, NCVET, IIE, JSS, NIESBUD, DGT, NAPS, EDP, APART. Economic growth and social development of any country depend on knowledge and skills. Better skills will cater the challenges & opportunities effectively in domestic and international platform. "*India aspires to become a 5 trillion GDP economy by 2025. It is essential to achieve excellence in education system by making it globally relevant, competitive and industry oriented while simultaneously promoting self-employment through entrepreneurship development and innovation among students as well as the faculty members" (*Fostering Entrepreneurial Ecosystem in India: *p.no.7).*

Identification of Research Gap

I had studied the same syllabus for more than 15 years and I have been teaching the same syllabus since last 26 years. Still there is a concept of formal education which is content based and used for preparation to get through the final examinations. *"Even though after completion of 15 years of continuous of study in their Mother Tongue, the students are unable to write an application on their own Language without mistakes"* (*Dr. K. Mallareddy, Evolution of Telugu Language Teaching and Challenges to Present Curricular Trends, IOSR Journal of Humanities and Social Science (JHSS), Volume 5, Issue 1 (Nov. - Dec. 2012), PP 33-36).*

Before Christ So many foreigners came to India for their higher education. But now around 6 to 7 lakh students moving abroad every year for their education.

I was astonished when listened to the Brahma Astra, Naga Asra, Pasupatha Astra in stories but never thought the scientific background behind them. I was astonished the Lord Shri Krisna created a long Saree to save Panchali. But never imagine the entrepreneur approach behind it. Whenever I studied NIRUKTAM (Etymology in Sanskrit) written by Yaskacharya(5^{th} Century AD) I never find its Algorithm which is basis for the modern computer Boolean Algebra.

The new Indian Education System must compete with that of Global Education System. NEP 2020 gives scope for modernization of Indian Curriculum Framework. But there should be serious action plans for implementation to get desirable output and learning objectives.

There is a great scope for Entrepreneurship Development in the Agricultural and its allied sectors in Telangana State. Pottery, Silver Filigree, Basket-Mat Making, Toy Making, Saree Designs etc. will provide very big market and solve the unemployment problems. In addition to that Documentation and Safeguard the endangered cultural expressions to create opportunities for internship with industry, business, artists, craftsmen. Research internship with researchers, research institutes provide practical learning employable skills. Preparing professionals in cutting-edge areas like AI, machine learning, data analysis, 3-D machining. Enhancing the application skills to health and employability of genomic studies, biotechnology, nanotechnology, neuroscience forensic science etc. Inclusion of credit-based

courses and projects in the area of community engagement service, environmental and value-based education.

Objectives

The Hon'ble Abdul Kalam says *"the Universities and Schools should become a facilitator for creating entrepreneurs through support of banking and marketing system. This will enhance value to education and create motivation for students"*.

Undergraduate Education plays an important role to achieve UNESCO 17 SDGs and NEP 2020 objectives. Its outcome promotes cultured, social wellbeing and humanistic approach, Sustainable livelihood and all-round advanced development of the Nation. It also leads to quality education for good, thoughtful, well-rounded creative individuals to develop ethical, constitutional values. UG Education Curriculum with Accessible, accountable, affordable, quality, equity education envisages to produce scientific, creative, service-oriented intellectuals. Also, give accomplishment and enlightenment, constructive public engagement and productive contribution to the society. Majority of the industrialized countries reforming their curriculum framework according to the needs of the new demands in society and labor market. Education system changed its paradigm towards linkage between technical and vocational education and training as per industrial needs. Telangana State Government established Entrepreneurship Development Cells (EDC) to encourage students to launch their own enterprises and ventures, motivate them to become Job Creators rather than Job Seekers.

This project revels the importance of CCFUP implementation in Telangana State GDCs and its positive outcomes.

Major Research Findings

The main objective of NEP 2020 aims to develop good, thoughtful, well-rounded and creative individuals. Its importance of Flexibility in Education focuses on research against rote method of content writing. It's also emphasizing to develop intellectual, cognitive, creative and skilled students. The equitable quality education and lifelong learning is only a vehicle to achieve the current needs of the society.

The Department of Higher Education is working with Telangana Sahitya Academy for documenting the history of villages. Under the village mapping program by GDCs in Telangana roped into document cultural and socio-economic aspects of 12769 villages through the 'Mana Ooru Mana Charitra' - 'Our Village Our History' project. Telangana State Innovation Cell focused on developing physical infrastructure, program management capabilities to create sustainable funding models. Telangana Skills and Knowledge Centre (TSKC) encourages the students to improve employable skills. NEP 2020 states, Assessment of Educational Approaches in UG level integrate the Multi-Disciplinary and Holistic approach include Humanities and Arts with Science, Technology, Engineering and Mathematics (STEM). The learning outcome includes social and moral awareness besides increased creativity and innovation and Life skills such as communication, teamwork, leadership and resilience. Despite of multilingualism extensive use of technology will remove language barriers in teaching and learning.

NEP 2020 clearly talks about flexibility in Curriculum so that the students should develop their own academic paths as per their talent and interest. To remove the gaps between Arts

and Science, Academic and Vocational for Holistic education towards innovations and Entrepreneurship. The Honorable Prime Minister talks about Atmanirbhar Bharat in which the education dependents upon research and critical thinking should have options for bringing within the curriculum. Education should provide the human and constitutional values and to empower the youth for improve the economy and development of our country to bring equity, accessibility and inclusion. India is a Multilingual Country have to be own cultural understanding of diverse languages.

Basic knowledge skills are necessary to enable the students to self-directed personal development, formulate management skills, guide to right direction and for pursuing lifelong learning. Require the acquisition of knowledge of facts, concepts, principles, theories processes in multidisciplinary learning context. Understanding linkages between within and across chosen field of study. Acquisition of cognitive and technical skills required for selecting and using relevant methods, tools, materials, organizational skills and time management skills to solve specific problems and find the solutions. Ability to complete the assigned individual and group tasks with desirable output. Able to apply the economic theories to design, guide and interpret social, commercial, environmental policies. Values and beliefs of multicultural competences with inclusive spirit required for global perspective to honor diversity. Capability to engage in multicultural and multilingual society respectful interact with diverse groups. Capacity to lead a diver's teams to attain tasks and goals. Create empathy towards less advantaged and adopting gender approach for respect the diversity in local context and pride in India its rich diver's heritage. Help to develop the soft skills like complex problem-solving, communication skills rigorous specialization in a chosen field of learning.

CCFUP draft prepared by UGC talks about different teaching methods (pedagogy) and teachers training. It has its focus on how to give the conceptual understanding in an analytical thinking of the students. The National Vocational Education Qualifications Framework (NVEQF) provide a Nationally integrated education and competency-based skills for multiple pathways both within vocational and general education link to progress higher levels from any starting point. The implementation is the joint responsibility of stakeholders like National Skill Development Agency (NSDA), Sector Skills Council (SSCs), Regulatory Institutions like UGC, AICTE, NCVT etc. National Skills Qualification Framework (NSQF) provides multiple pathways of learning according to series of levels of knowledge, skills and aptitude horizontal as well as vertical and links the various elements required by businesses and industry.

Most current challenges for human being are global warming, climate change, antisocial trafficking, drugs, terrorism, poverty, intolerance and so on. Having to deal with such complex issues proper Education Policy is required for scientific insight and knowledge intensive enterprise. Research is required to identify new opportunities for cost benefit to eradicate social and economic issues. The qualitative and quantitative policy relevance refers to how efficiently research findings applicable for decisions to decision makers. Lab to land research and relevance of evidence analysis enable to apply for evaluation of polices, claims. View problems from multiple perspectives to think out of box with Innovative interpersonal skills and emotional intelligence to perform tasks in better manner. The Governments are working on Curriculum Framework as a policy tool for reform to enhance the mobility of students National and International. The implementation of Frameworks has been supported by International Organizations like OECD, ILO, WB, EU etc.

Conclusion

In India unorganized labor are more than formal employees. They acquire the skills on their own and lead the life on daily basis. They generally habituated to Gutka, Cigar, Alcohol, Drugs etc. and scope for involvement in antisocial activities. Most of them neither think of their own family nor society. Proper training is needed for skill enhancement and social commitment to involve them in curriculum and community development. Telangana State Innovation Cell (TSIC) was initiated by Telangana Government to build and nurture the culture of innovation. It identifies the innovators, startups, entrepreneurs to foster an inclusive innovation ecosystem with state as a whole approach. Entrepreneurship Development is possible through new approach of CCFUP to linkage between Comminutes, Industries and other Institutions and involvement of all types of people by Adapting a healthy attitude and social, cultural and business objectives. Awareness in Environmental education includes climate change, waste management, sanitation, pollution, conservation and management of biodiversity and its resources, conservation of forest and wild life for sustainable development. Value based education includes the development of humanistic, ethical, constitutional human values, righteous conduct, love, peace, nonviolence and scientific temper. Education for sustainable development produces tolerant, secure and active promoter for Global citizenship.

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Contact email: mallareddy808@gmail.com

Special Education and Shadow Teaching: Practices and Experiences in the Philippines

Janine S. Buenrostro-Jocson, Far Eastern University, Philippines

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Abstract
Inclusive education mandates that learners with disabilities (LWD) attend regular schools instead of special education schools. In the Philippines, while schools started to accept more LWD to study alongside the typical students, support provisions are placed to ensure that educational goals are being met. One such provision is the employ of special education teachers as a "shadow teacher", a one-on-one learning support provider to LWD inside the classroom. This study aimed to determine the teaching practices and priorities of shadow teachers in the regular classrooms. Through phenomenology, data were collected from the lived experiences of six special education teachers who are employed as shadow teachers for more than five years in inclusive schools in Metro Manila. Data were garnered through interviews, observations, and document analysis which were analyzed thematically. The results show that these shadow teachers make use of techniques in (1) curricular and instructional design, (2) behavior management and safety, (3) psychosocial development, and (4) collaboration with parents and school. These reflected that despite collaborating with other teachers in the regular classroom, the shadow teacher acts as the main teacher of the LWD, working beyond being a learning support provider.

Keywords: Inclusive Education, Shadow Teaching, Special Education, Disability

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Introduction

The Philippine Education System has adopted various practices to address the needs of all its learners including Learners with Disabilities (LWD) in response to the global movement of Inclusive Education (Muega, 2016). It is supported mainly by the Philippine Constitution in Article XIV Sections 1 and 2 where all its citizens have the right to quality education at all levels, and by its various laws including the Republic Act. No. 10533, or The Enhanced Basic Education Act of 2013, Republic Act No. 10157 or the Kindergarten Education Act, and the amendment of the Republic Act 7277 or the Magna Carta for Disabled Persons, which is the Republic Act No.9442 in 2007, indicate the promotion of the right of every Filipino citizen to quality education including Persons with Disabilities (PWDs), the acceptance of these learners in all schools particularly public schools shall adhere to the inclusiveness and creating programs for all types of disabilities, the provision of the mandatory and compulsory kindergarten education for all, and the educational assistance for LWDs to purse all levels of education both in public and private schools.

In 2022, The Philippines has passed a law on inclusive education which is the Republic Act 11650, entitled, "An Act Instituting a Policy of Inclusion and Services for Learners with Disabilities in Support of Inclusive Education, Establishing Inclusive Learning Resource Centers of Learners with Disabilities in All School Districts, Municipalities and Cities, Providing for Standards, Appropriating Funds, Therefore, and Other Purposes". This encompasses all the necessary details that would allow the necessary accommodations and support that should be given to LWD to achieve inclusive education.

With this enactment, schools mandatorily accept learners with disability (LWD) and place them in general education classrooms. To achieve inclusion in such, studies have shown that practices that foster inclusion must adapt inclusive practices and pedagogy, increased sensitivity to the day-to-day demand of students, effective response to diversity, as well as cooperation in the classroom (Ainscow, Dyson & Weiner, 2013). These demands on effectiveness in teaching show the depth of responsibilities and expectations from the teachers handling these learners however, these needs are oftentimes unmet due the lack of training and experience in portraying the responsibilities (Mader, 2017; Muega & Echavia, 2017; & NCSE, 2013) and the large number of students in classrooms with insufficient number of teachers (Mader, 2017 & NCSE, 2013).

Due to these challenges an instructional scheme called shadow teaching was conceptualized. The scheme involves a support person called a Shadow Teacher responsible for addressing the behavior and academic needs of a student with special needs inside the general education classroom (Bustos, 2008; Manansala & Dizon, 2008). The scheme has been explored by studies of Manansala and Dizon (2008) which have proven shadow teaching's effectiveness in academics, socialization, and behavioral aspect of an LWD. However, the practice itself coming from the shadow teachers' point of view were limited.

Through phenomenology, the study explored the shadow teaching practice as a phenomenon in special education through the experiences of six special education teachers functioning as shadow teachers. The study aimed to determine their practices and priorities in the general education classrooms. By determining these, the practice will be further promoted into achieving inclusive education in the Philippines.

Methods

Research Design and Instruments

A qualitative research method of phenomenology was employed to answer the research question: What are the practices and priorities of shadow teachers in the general education classrooms?

Data were collected through a series of interviews who have firsthand experiences in shadow teaching in Metro Manila. They were also observed with their students while in school to further determine their practice. The study used interview guide with twenty items and an observation guide.

Participants and Locale of the Study

The participants of the study are six special education teachers functioning as shadow teachers for at least three years in various schools with exemplar and professional competencies as determined by their center administrators and school heads. These set criteria allowed the researcher to ensure that the participants have had sufficient experiences in the practice. The study was conducted in five institutions in Metro Manila, four of which were in Quezon City while one is in Mandaluyong. All institutions mentioned were private and inclusive schools.

Data Collection and Analysis Procedure

A series of interviews were conducted before and after the class observations. This allowed the researcher to determine the ideas of the shadow teachers regarding their practice. The observations were conducted to gather the actual practice, which were transcribed and coded accordingly. Using thematic analysis, recurring themes of the data were coded and analyzed.

Results and Discussion

The participants of the study were interviewed to determine their perceived practices, which were confirmed through a series of observations while they were in practice. The data showed that shadow teachers were involved in the (1) curricular and instructional design, (2) behavior management and safety, and (3) psychosocial development, and (4) collaboration with parents and school.

The shadow teachers, being involved in the curricular and instructional practices design, were included in the process of drafting, and creating the Individualized Education Plan (IEP) of their students who are LWD. While the developmental assessment is being done by other professionals, some shadow teachers are interviewed by the developmental doctors or the educational assessor to determine the skills of their students and current programs that are being implemented. They also receive the assessment reports which they use as a basis of the goals in the IEP. Shadow teachers were also involved in the modification of the lessons should the curriculum or the lessons in the general education classrooms are too difficult or too easy for the LWD by adjusting the lessons, lessening, or giving additional activities. They also give additional instructions for LWD in pull-out or resource room.

The shadow teachers were also practicing behavior management to eliminate the LWD's inappropriate behavior, such as stimulatory behaviors. They employ strategies to develop coping skills for the difficulties of their students. They also ensure the safety of their students from getting hurt from accidents and from various circumstances such as tantrums and meltdowns. They also ensure that the students would not experience getting bullied by his classmates.

Practices in the psychosocial development of their students were also prioritized by the shadow teachers. They develop socialization skills of their students by training them to speak polite terms and proper conversation with their peers. They also create activities such role-playing which would allow their students to practice responses in various situations and play activities that open avenues for their students and peers to spend time together. They also make sure that they can be trusted and be friends with their students for them to feel comfortable with each other. This practice is specifically prioritized by shadow teachers with students who are in the adolescent stages where their development requires the sense of belongingness.

Lastly, the shadow teachers practice collaboration with their students' parents and school. They regularly report to the parents about the activities of their students which include the lessons, peer interactions, and behavior. Aside from reporting, they also give suggestions, and activities that the parents may do at home to continue the intervention given to the student in school. Aside from parents, it was also observed that the shadow teachers establish and maintain good working relationships and even friendships with the general education teachers and other school personnel. They also aid in planning and implementing school activities including Christmas programs, graduation, and presentations where they handle not just their students but also the students from the general education classes.

Conclusion

From the results of the study, it was shown that the shadow teachers practice and prioritize the holistic development of their students in terms of curriculum, instruction, behavior management, and socialization. They also collaborate with the parents, and other personnel involved in the students' lives to ensure the continuation of the programs given. This data showed the range of involvement of shadow teachers in the academic lives of their students. These expectations showed that special education teachers functioning as shadow teachers must possess these skills making them not just support and assistance providers for the LWD in the general education classroom but are the game changers in achieving their inclusion. And in order to achieve this, it must be ensured that shadow teachers have a streamline of skills making their depth of training crucial in the practice.

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Contact email: jbuenrostrojocson@feu.edu.ph

Pedagogical Practices in Teaching Institution-Reared Children With Disabilities in the Philippines

Ellisiah U. Jocson, National Teachers College, Philippines

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Abstract
Children with disabilities (CWD), depending on the need and the circumstance, may be placed in different living conditions outside of the typical family set-up. For instance, the Philippine government mandates that child-caring agencies (CCAs) and institutions to take care of orphaned, abandoned, and neglected individuals. This involves the need to ensure that the children under their care are receiving and enjoying the same rights as typically developing children, including, education. To do so, they have adopted the use and employ of educational programs both within the institution, and outside of it. This study sought to determine the pedagogical practices used by these institutions, in light with inclusion and inclusive education principles that are in-trend today. Using qualitative method, the participants of the study were 6 teaching and non-teaching personnel from a public and private child-caring institutions in Metro Manila. Interviews, observations, and document analysis were used to gather the data, which were transcribed and analyzed thematically. The results show the stark differences between the competencies taught in regular schools and the targeted competencies within the institutions. Heavy focus were observed on teaching and training basic life skills and independent living. Furthermore, the practices also reflected the tendency to aim for social acceptance, indicating how the nature of pedagogy within these institutions are far from the aims of inclusion and inclusive education.

Keywords: Inclusive Education, Institution-Reared, Children With Disabilities, Special Education

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Introduction

For this study, it is important to encapsulate the population of people with disabilities. Globally, there is an estimated 3.3 million children with disabilities, amounting to 8% of the total population. (UNCRPD, 2008). In the Philippines, the number is estimated to be about 1.44 million, based on the 2010 Census of Population and Housing (TESDA, 2020). The most recent data states that there are at least 5.1 million Filipino children living with disabilities (UNICEF, 2018).

Institutionalization of the Disabled

Institutionalization, or the manner of implementing custodial care for people with disabilities in facilities, is well established in history. The response to disability had been varied, but institutionalization had been favored for years. For instance, between 1890 and 1905, the number of people in public institutions in the United States rose, from 250 to 500 persons per institution. The number of institutions also rose between 10 institutions in 1900, to 80 institutions in 1923.

In the Philippines, formal education was provided to the general public during the American occupation (1901 – 1945) (PQF, 2024). By 1902, Mr. Fred Atkinson expressed an interest to educate Filipino CWDs to the General Superintendent of Education (Inciong et al, 2007). Meanwhile, Special Education in the country can be traced to the establishing of the Insular School for the Deaf and Blind in Manila, in 1907 (Yap & Adorio, 2008). Through the years, several other institutions were established with the same intent in mind – to provide care and custody to children with disabilities in the country. Currently, there is a total of 197 residential care facilities for children, but the nature of child-care in these institution, that is, if they cater to people with disabilities, are unclear (DSWD, 1994).

Inclusion in the Philippines

Several mandates were established to promote and protect the rights of people with disabilities. The Republict Act No. 7277 or *An Act Providing For The Rehabilitation, Self-Development And Self-Reliance Of Disabled Person And Their Integration Into The Mainstream Of Society And For Other Purposes* otherwise known as the Magna Carta for Disabled Persons is considered the hallmark legislation for this area, particularly with its provision towards access to quality education, special education, vocational/technical training, and non-formal education (RA 7277, 1992). Later acts and mandates reinforce the Magna Carta, and provides additional coverages for other essential benefits and privileges (NCDA, 2024).

The most recent of the long list of legislation is the Republic Act 11650, entitled *An Act Instituting A Policy Of Inclusion And Services For Learners With Disabilities In Support Of Inclusive Education, Establishing Inclusive Learning Resource Centers Of Learners With Disabilities In All School Districts, Municipalities And Cities, Providing For Standards, Appropriating Funds Therefor, And For Other Purposes,* otherwise known as the *Instituting a Policy of Inclusion and Services for Learners with Disabilities in Support of Inclusive Education Act.* RA 11650 and the promise of inclusion. is the most recent culmination of all the mandates related to the education of people with disabilities in the Philippines. Through it, inclusive education is intended to be fully attained. (RA 11650, 2022). However, as of this writing, the law is yet to be implemented (Chi, 2023).

Interestingly, very little data is present regarding the state of institution-reared children with disabilities, especially in light of the newer mandates that call for inclusion and inclusive education. This study is undertaken to trace the status of the aforementioned demographics, and to see how inclusion and inclusive education is practiced in said institutions.

Methodology

The study utilized the qualitative approach, comparing data between a public and a private residential institution. Data was gathered primarily through structured interviews, observations, and document analysis. The following research questions were asked:

- What teaching practices exist within the residential institutions?
- What was the focus of the teaching and training process?
- How were these implemented/carried out?

The garnered data were likewise coded and analyzed, yielding the following results:

Scope of Teaching and Training Services

In terms of pedagogy, children with disabilities reared in institutions are exposed to several areas of learning that are also enjoyed by regular children, namely: *academics, extracurricular activities, and skills training.* However, it must be noted that the degree of implementation are clearly impacted by the disability type inherent of the student at hand.

Academics – the data shows that the responding institutions implement academic activities. However, these are prone to restructuring and other modifications considering the difficulty it may posit to several learners in the area. Several limitations observed include the scope of competencies, the depth of lessons, as well as focus areas. Children were taught, if able, to communicate using Filipino, with conversations ranging in expertise depending on a particular child. Activities that target traditional literacies (reading, writing, and mathematics) could be delivered under various settings, but are mostly taught at a functional level, e.g. children are brought to nearby commercial establishments and even local variety stores and taught to talk and purchase common items. The nature of the teaching process is anchored on need, rather than a prescribed set of competencies from the national curriculum.

Extra-Curricular Activities – Events like sports, celebrations, and even community integration, is conducted within the responding institutions. Children are encouraged to engage in physical activity in various forms, but are often relegated to sports activities. The respondents defined that activities under this banner are effective in reducing idleness, and inadvertently, the risk of misbehaviors and self-stimulatory behaviors from occurring. Children are likewise encouraged to pursue hobbies (drawing, singing, dancing, etc.) and other recreations under the same intention.

Skills Training – Several levels of Activities of Daily Living (ADLs), Basic Civic Training and Values Development are implemented and practiced. Activities of Daily Living (ADLs) are highly integrated into everyday activities. Children in both public and private institutions are exposed to skills training in pursuit of independent life. Those with greater skill and affinity for ADLs are moved up to Instrumental ADLs (household chores) and even advanced ADLs (hobbies) For Basic Civic Training, children are taught day-to-day mannerisms essential for social interactions, including how to show respect and observance of peaceful

communication strategies. Values development are likewise integrated in these activities, as was mentioned previously.

These three areas would be given differing levels of focus. Variables such as disability type, overall capability, retention, and even age are often considered during the implementation phase. Overall, the responding institutions had different practices as well, but are ultimately keen on enabling the children under their care to attain independence, eventually.

Nature of Pedagogical Practice

The institutions employ traditional teaching approaches. Most of the assigned educators utilize a perennialist-essentialist style, preferring lectures and demonstrations over student-centered approaches. Activities are taught through routine-based approaches, scaffolding the use of the law of effect and exercise to ensure retention and mastery of competencies.

As mentioned, the curricular content doesn't adhere to the National Standards. The teacher is often free to make accommodations and modifications to the scope of the competencies, as well as the sequence to take in teaching and delivering it to the student. It was observed, however, that the institutions focus on enabling participation in the implemented activities. On another note, students that are undertaking comparatively higher forms of training, such as attendance to external schools (external schooling program) and internships, are given more freedom to explore personal interests, and are no longer required to attend internal education services unless absolutely necessary. The same children are likewise provided with more responsibilities in the house. Lastly, the assessment types used (formative and summative) are utilized sparingly – teachers are likewise left to their best judgement as to whether conduct these assessments or not.

Conclusion

The garnered data shows how pedagogical practices are manifested in institutions that cater to children with disabilities. To some extent, the conduct of educational services are partly inclusive, especially since the institutions strive to provide educational support and activities to all children. The institutions have allowed normalization to occur to some degree, but again, it is still quite different from what is enjoyed by nondisabled children outside the institution. The pedagogical practices within the responding institutions for this study are aligned with the common practices within the field of special needs education. Some areas, however, are too far from the desired degree of inclusivity. For instance, hiring in-house teachers to deliver educational services and needs are in practice, but the degree of freedom accorded to the teachers in terms of educational decisions can posit risks towards the scope and depth of the taught curriculum. The differences in methods as well as the use of modifications can make the instructional technique rigid and exclusive, and efforts to individualize may make the lessons too disability-related.

In terms of strategies, the use of *traditional* techniques under teacher-centered approaches (perennialism, essentialism) is indeed necessary but is undoubtedly different from the current techniques used in the education field. For years, advocates of learner-centered strategies have lobbied for the use of student-centered techniques. From the outside, this violates that notion of inclusion, where "all means all", and is arguably, one of the many loopholes of inclusive education.

This study, while quite short, paints a preliminary picture of how institutions been faring in terms of the call for inclusion and inclusive education. From the narratives laid out, it is recommended for the following to be done and observed:

1. Comply with newer mandates, especially in the pursuit and conduct of inclusive education. R.A. 11650, while still unimplemented, will be a critical factor towards the pursuit of inclusive education for all children with disabilities. Institutions that cater to children with disabilities may find itself facing difficulties if they fail to fully observe inclusion in its systems.
2. Recalibrate the institution's educational goals, factoring in eventual social integration. Heavy focus was observed towards the use of ADLs and similar activities, but with a lack in appropriate end-goals, these trainings will eventually fall out-of-order. Pursuing higher goals will make both the pedagogue and the student more abreast with the necessary degree of quality to look into.
3. Provide guidance and monitor the quality of educational service and delivery. Aligning the content, scope, breadth, and depth of the learning experiences provided in the institutions with what is currently implemented outside of it will help offer activities that are appropriately inclusive.
4. Open up the community to reduce "exclusivity".
5. Strife for democratic education – children weren't fully consulted as to what they would like to pursue, despite being capable of doing so. This could be an integral first step that the responding institutions could take towards inclusivity.

All in all, reviewing the relationship between inclusion and institution-reared children with disabilities is of timely importance. It is imperative that we observe the notion of "no child left behind" for literally all children, especially for those living in institutional care.

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Brainy: An Innovative Context-Aware Generative AI Engine for Education

Elie Nahas, Augmental Learning Inc., United States
Paul Barakat Diab, Augmental Learning Inc., United States
Talar Atechian, Antonine University, Lebanon

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Abstract
In the realm of education, the integration of Generative AI tools within learning platforms has transformed teaching and learning paradigms. This paper introduces Brainy, a context-aware AI engine integrated into the Augmental Adaptive Learning platform, which implements the concept of Differentiated Instruction. At its core, Brainy employs Generative AI Models, leveraging a variety of Language Learning Models (LLMs), including OpenAI. This integration enables Brainy to generate personalized course materials and assessments tailored to individual learner needs, in addition to offering multiple learning paths. By considering learning objectives, prior knowledge, and learner proficiency levels, Brainy ensures an adaptive learning experience that promotes equity in education. It refines content and learning activities, adjusts to accommodate each learner's learning style and progression and offers feedback on assessments using a supportive educational approach, including clear explanations and analogies that address individual learning needs. This integration not only elevates the learning experience for learners but also empowers Instructors to have complete control to review the AI-generated content, ensuring an alignment with educational goals and principles and a balance between personalization and standardization, essential to maintain integrity and effectiveness of the educational process. In summary, Brainy offers differentiation in terms of content, process, and result assessment, tailoring content to individual learner needs, adapting the learning process to diverse learning styles, and providing personalized feedback that enhances the learning experience for all learners. The implementation results confirm Brainy's personalized learning approach. However, experiments and data analysis are in perspective to better understand the solution's performance in terms of efficacy and accuracy. This involves conducting a more in-depth assessment to evaluate the impact of the solution on learners' learning outcomes.

Keywords: Adaptive Learning, Differentiated Instruction, Personalized Learning, Context-Aware Generative AI

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Introduction

Differentiated Instruction (DI), the pedagogical approach that recognizes and supports the diverse learning needs of learners, has long been valued for its ability to enhance learners' engagement, motivation, and learning outcomes. One of the key benefits of DI is its ability to cater to individual learner needs, allowing each learner to learn at their own pace and in a manner that aligns with their unique learning style. This personalized approach has been shown to improve learner achievement and overall academic performance (Tomlinson, 2017). However, implementing DI in a traditional classroom can be challenging for instructors, as it requires creating and managing multiple lesson plans and learning activities to accommodate diverse learner needs. Additionally, providing timely and meaningful feedback to learners can be difficult, especially when learners are working at different levels or on different tasks.

By leveraging AI and other technologies, these challenges can be mitigated. In this paper, we present Brainy, an AI-powered solution, embedded within Augmental Adaptive Learning platform, that acts as a context-aware engine. It personalizes content and learning experiences while implementing core DI components such as differentiation in terms of content, process, and result assessment.

Brainy's architecture includes the data layer, generative AI engine, learning platform, and evaluation layer, ensuring a comprehensive implementation of DI principles. It provides multiple learning paths, diverse and personalized content, and assists instructors in monitoring learner engagement. Additionally, Brainy offers constructive feedback tailored to individual needs. This introduction sets the stage for exploring AI's transformative impact on DI and educational outcomes.

Background

This section emphasizes the significance of Differentiated Instruction (DI) and its evolution in pedagogy, particularly its integration into digital platforms. This integration offers broader support and strategies to enhance the effectiveness of DI, addressing challenges related to content diversity, instructional processes, and the assessment of learning outcomes.

The study of Lavania and Nor (2020) presents the challenges instructors face in implementing differentiated instruction (DI) in the classroom. One key barrier identified is the lack of DI knowledge among instructors, hindering their ability to customize instruction effectively for diverse student needs. This knowledge gap can limit the instructor's capacity to provide tailored learning experiences. Furthermore, time constraints pose a significant obstacle to DI implementation, restricting instructors' ability to adequately differentiate instruction to meet individual learner requirements.

The limited time available for lesson planning and delivery can impede the implementation of DI strategies effectively. These two essential constraints make the implementation of differentiated instruction challenging, potentially limiting its effectiveness in meeting the diverse needs of students.

In the same context, the study presented by Ginja and Chen (2020) explores instructors' perspectives and experiences toward Differentiated Instruction in the context of higher education. The findings indicate that a significant number of instructors have a limited understanding of DI and rarely differentiate for students. However, there is a positive outlook

on the impact of DI on students' readiness, interests, and learning profiles. Challenges identified include the time-consuming nature of DI, lack of trained instructors, and limited access to professional development on DI topics. Research consistently emphasizes the significance of differentiated instruction (DI) in effectively addressing students' diverse needs by tailoring content and teaching strategies to individual learning styles. Despite its benefits, implementing DI can pose challenges, particularly in developing appropriate content and monitoring student progress to meet their specific requirements.

Recent studies have explored the integration of technology with DI, showcasing how digital platforms can offer more flexible and adaptive implementations. These studies highlight the potential of technology to enhance DI by providing personalized learning experiences and facilitating the tracking of student advancement. By leveraging technology, instructors can overcome logistical hurdles associated with DI, such as creating and delivering varied instructional materials.

In this context, Tahiri, Bennani and Khalidi Idrissi (2017) addresses learner diversity and enhancing educational cooperation in Massive Open Online Courses (MOOCs). The problem statement revolves around the low success rates in MOOCs worldwide, attributed to learners' diversity and discord in educational approaches. The proposed method involves the implementation of a system of differentiated learning paths within MOOCs. The proposed system creates multiple learning paths and ensures all learners have the necessary skills and knowledge to reduce dropout. A key emphasis is placed on using a decision tree approach for clustering learners into homogeneous groups based on predefined rules and objectives. While the method creates multiple learning paths leading to the same objectives, it does not recommend altering or adapting the content. Instead, it emphasizes the process, focusing on the way the learning experience is structured according to students' needs. This approach highlights the importance of customizing the learning process for diverse student needs, ensuring a more engaging and effective educational experience.

Another study explores the use of AI tools in designing MOOC courses, focusing on content creation, interactive learning activities, and student learning outcomes (Morales-Chan, Amado-Salvatierra, & Hernández-Rizzardin, 2023). The authors found that incorporating AI-based tools improved course design quality and effectiveness, reducing time and effort. Tools like ChatGPT and DALL-E 2 were particularly effective in analyzing content, identifying learning objectives, and designing interactive activities. This study introduces an innovative approach to course design, representing a significant paradigm shift. It integrates and leverages AI tools to enhance the efficiency of course design, addressing challenges such as the variety of resources and content for each learner, outcome assessment, and personalized, adapted feedback.

Brainy's Global Architecture

This section presents Brainy, the context-aware engine designed to personalize content and learning experiences. Brainy is integrated into the Augmental Adaptive Learning platform (Augmental, 2024). In Augmental, student initial knowledge is assessed and an adapted learning path is suggested in alignment with his abilities and needs. Initially, implementing Differentiated Instruction in Augmental focused solely on offering multiple learning paths. However, differentiating content remained challenging until the development and implementation of Brainy. Brainy, based on generative AI tools, successfully provides diverse content, tailored evaluation methods, and assists instructors in monitoring the

engagement of students and in providing constructive and adapted feedback. Therefore, the global architecture is composed of four main components such as the data layer, the generative AI engine, the learning platform, and the evaluation layer, which is the implementation of the Differentiated Instruction in terms of content, process, and outcome assessment.

Architecture

The Brainy architecture comprises several key layers that work in harmony to an adaptive and context-aware learning experience. The Data Layer forms the foundation, housing essential information such as learning outcomes, lesson plans, and learner data. It evolves continuously, staying updated with the latest insights to ensure Brainy generates accurate and relevant content.

At the core, the Generative AI Model creatively utilizes deep learning techniques, producing context-aware content that adapts to user needs. It simplifies content creation by eliminating the need for complex prompts. The Learning Platform Layer acts as a user-friendly bridge, providing an intuitive interface for seamless interaction with Brainy.

Finally, the Evaluation Layer gathers feedback and iterates on content, enhancing Brainy's proficiency. This multi-layered approach places the power of context-aware generative AI in educators' and learners' hands, revolutionizing the education landscape.

Below are the figures of Brainy's logic model for both instructors illustrated in Figure 1 and learners illustrated in Figure 2.

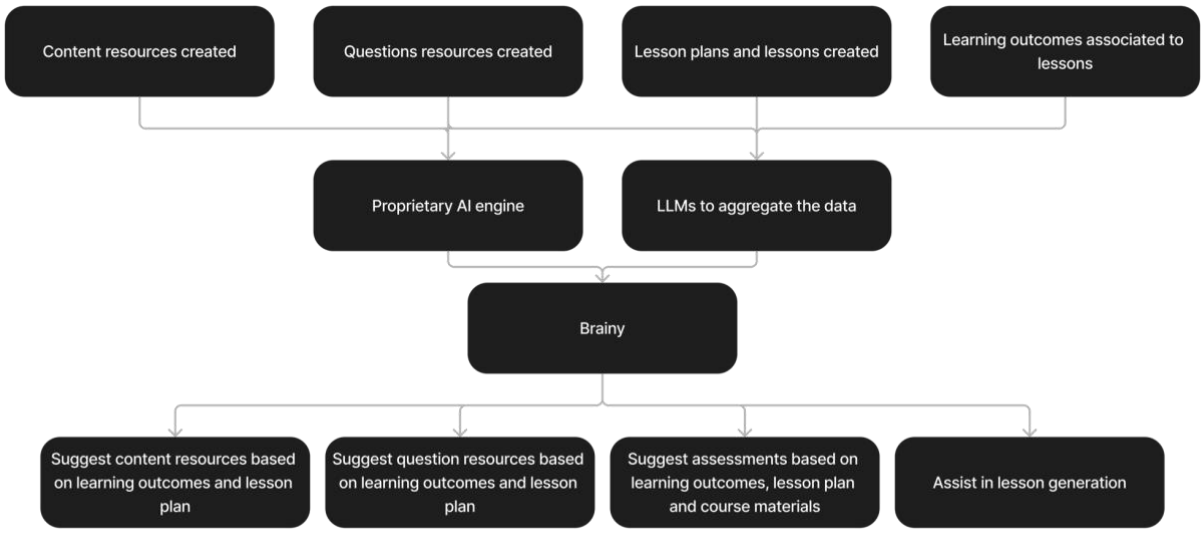

Figure 1: Brainy's logic model for instructors

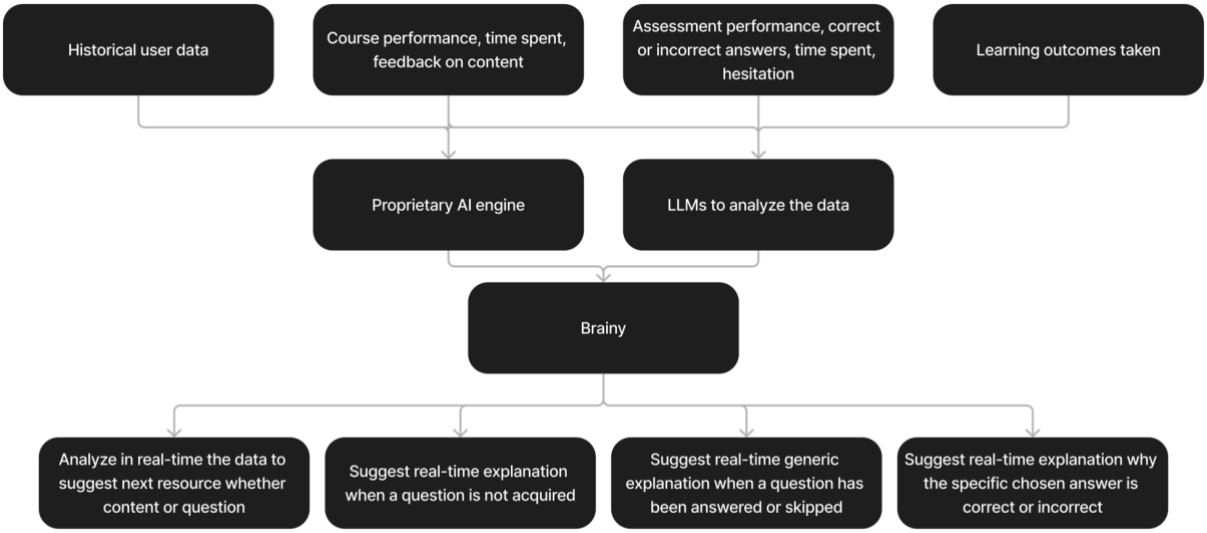

Figure 2: Brainy's logic model for learners

Data Layer

The data layer is the foundation of the Brainy architecture. Within this layer, Brainy stores relevant and useful data including:

- For instructors (Figure 1):The data layer includes the educational materials and question sets they have developed, the structured outlines for teaching (lesson plans), the instructional sessions delivered (lessons), and the educational goals these activities are designed to meet.
- For learners (Figure 2): The data layer contains a record of the learners' historical interactions, their performance in courses, the duration of engagement with educational materials and questions, their feedback on the content, outcomes of assessments, hesitation on questions , as well as the learning goals and objectives they are tackling.

The data layer serves as a constantly evolving repository that is consistently refreshed with the latest educational insights and information. This continuous update process ensures that Brainy is always equipped with the most up-to-date knowledge, enabling it to diagnose the initial knowledge of the learner and to generate content that is not only accurate but also relevant to the specific needs and preferences of instructors and learners. This dynamic nature ensures that Brainy remains at the forefront of delivering cutting-edge educational experiences.

Generative AI Model

At the core of Brainy's architecture lies a crucial layer strategically positioned between the Data layer and the Learning platform, which is the Generative AI layer represented by the "Proprietary AI engine", "LLMs to analyze the data" and "Brainy" in both Figure 1 and 2 . This layer employs advanced generative algorithms to deep learning techniques such as GPT (Generative Pre-trained Transformer), to produce output that is both relevant and engaging. It adapts in real-time to match the evolving needs of users. One of Brainy's distinguishing features is its ability to process contextual input effectively. It considers various factors, including learning outcomes, learner proficiency levels, prior knowledge, and learning styles.

This contextual awareness ensures that the generated educational output aligns perfectly with the unique needs and goals of each user. This is how Brainy integrates the concept of Differentiated Instruction, which involves creating multiple learning paths and generating adapted content and learning activities that fit the learners' needs and abilities. This approach ensures that each learner receives instruction tailored to their individual learning styles and levels of readiness.

AI plays a significant role in educational content generation, careful consideration is given to the ethical implications. Brainy ensures that it complements rather than replaces human involvement in the teaching and learning process. Instructors have complete control to review the AI-generated content, ensuring that it aligns with educational goals and principles. This balance between personalization/adaptation and standardization is essential to maintain the integrity and effectiveness of the educational process.

Learning Platform Layer

The Learning platform layer serves as the bridge between Brainy's powerful Generative AI Model and the users – instructors and learners alike. At Augmental, our commitment to user-friendliness is evident in the design of this layer, ensuring a seamless interaction with Brainy, regardless of the user's technical background.

Within this layer, users find an intuitive and easy-to-navigate interface. Instructors and learners interact with Brainy through the platform, providing input, setting parameters, and receiving output in a straightforward manner in simple and easy steps. This layer encapsulates the complexity of the AI model.

In Figures 1 and 2, the final row illustrates the output received by instructors and learners, showcasing the various suggestions, real-time feedback and analysis.

Evaluation Layer - Feedback and Iteration Mechanisms

To continually improve its performance, Brainy incorporates feedback loops and iteration mechanisms. Instructors can provide feedback, directly on the platform, on the generated content, allowing Brainy to learn from its trials and refine its output over time. This iterative process ensures that Brainy becomes increasingly proficient at tailoring content to specific educational contexts.

Ensuring Ethical Use and Learning Efficacy

In this section, we will discuss the ethical considerations and measures in place within Brainy's architecture to ensure responsible use and optimize learning outcomes.

Brainy's architecture ensures responsible use and learning efficiency. All data sent to the generative AI is anonymized, devoid of personal user information, and designed to prevent any attempts at user identification. Brainy prioritizes ethical AI practices, constantly adapts to evolving educational methodologies, and upholds stringent data privacy and security measures.

Brainy's architecture supports continuous learning and adaptation. It keeps pace with evolving educational methodologies, ensuring that the content it generates remains aligned

with the latest pedagogical insights and practices. Instructors can track learner progress and assess the impact of Brainy on educational success.

Implementation Results and Analysis

This section presents an assessment scenario aimed at determining the learner's ability to perform simple arithmetic calculations. The specific test item is an elementary-level mathematical equation.

Use Case

Equation presented to the student: 5+5
Answer options provided:

Option 1 : 0
Option 2 : 10
Option 3 : 25

Results

Case 1: A student selects the answer "0". This selection indicates a fundamental misunderstanding of addition operation principles or possibly a misinterpretation of the question's format.

The feedback provided by Brainy:

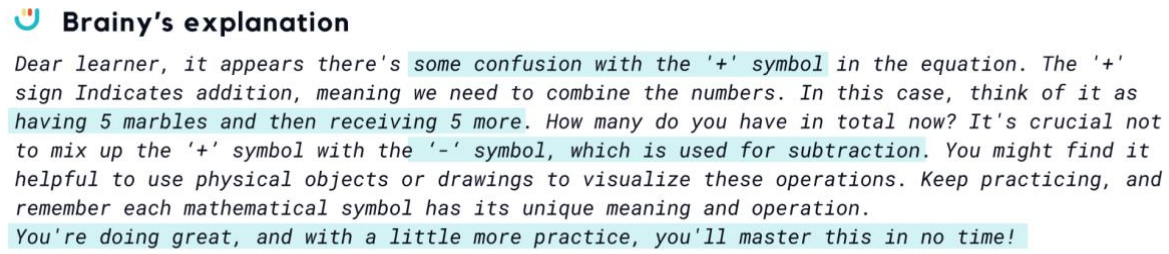

Figure 3: Brainy's feedback for case 1

Case 2: A student selects the answer "25". Similar to Case 1, this selection indicates a fundamental misunderstanding of addition operation principles or possibly a misinterpretation of the question's format.

The feedback provided by Brainy:

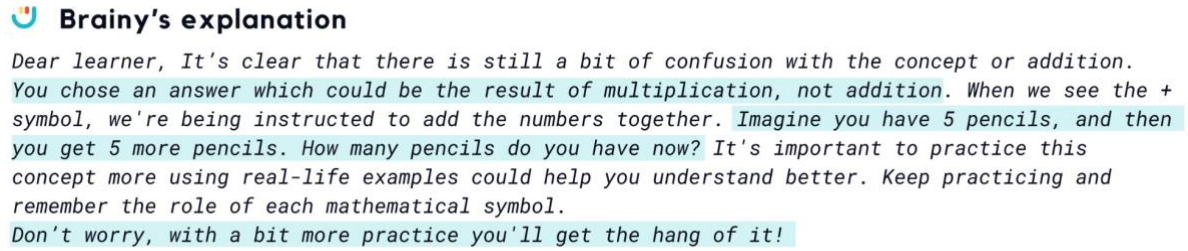

Figure 4: Brainy's feedback for case 2

Results Analysis

Based on the feedback provided by Brainy in both cases (Figure 3 and Figure 4), here are some observations about Brainy, in particular, in alignment with the studied scenario.

- **Educational Approach:** Brainy has a supportive and educational approach to addressing mistakes. The language used is positive and encouraging, aiming to motivate the learner rather than criticize.
- **Conceptual Clarification:** Brainy focuses on clarifying fundamental concepts. In the studied scenario, mathematical operations are explained, especially addition. The feedback is aimed at correcting the learner's misunderstanding of the '+' symbol and its operation.
- **Use of Analogies:** Brainy employs everyday analogies (marbles and pencils) to relate abstract mathematical concepts to tangible items, which can help learners' better visualize and understand the addition process.
- **Attention to Individual Learning Needs:** The feedback is personalized to the learner's particular mistake, showing that Brainy tailors the response to address individual misunderstandings rather than providing generic advice.
- **Differentiation of Symbols:** Brainy clearly differentiates between the '+' and '−' symbols, addressing the possible confusion between addition and subtraction in the first case and addition and multiplication in the second.
- **Reassurance and Confidence Building:** The feedback includes reassuring phrases like "Don't worry" and "You're doing great," which can help build the learners' confidence and reduce any anxiety related to the learning process.
- **Recommendations for Learning Strategies:** Brainy suggests using physical objects or drawings as a strategy for understanding mathematical operations, indicating a preference for interactive and visual learning methods that can aid in comprehension.
- **Emphasis on Practice:** There is an emphasis on the importance of practice and the belief that with continued effort, the learner will improve. Brainy encourages the learner to keep practicing, reinforcing the idea that mastery comes with time and practice.

Conclusion

In this paper, Brainy, a context-aware AI engine integrated into the Augmental Adaptive Learning platform, was introduced as a solution to the challenges of implementing Differentiated Instruction (DI) in traditional classrooms. Brainy personalizes content and learning experiences, implements core DI components, and provides multiple learning paths tailored to individual student needs. Its architecture includes a data layer, generative AI engine, learning platform, and evaluation layer, ensuring comprehensive DI implementation. Brainy offers diverse and personalized content, assists instructors in monitoring student engagement, and provides constructive feedback. The implementation results demonstrate that Brainy has a supportive and educational approach, clarifies fundamental concepts, uses analogies to aid understanding, and tailors feedback to individual learning needs.

Further experiments and data analysis are in perspective to comprehensively evaluate Brainy's efficacy and accuracy in enhancing Differentiated Instruction (DI) and improving educational outcomes. By analyzing the impact of Brainy on learning engagement, motivation, and learning outcomes, instructors can better understand its potential benefits and areas for improvement. Additionally, these evaluations can inform the refinement of Brainy's algorithms and features, ensuring that it remains aligned with educational goals and

principles and maintains a balance between personalization and standardization. This ongoing evaluation process is essential for ensuring that Brainy continues to meet the evolving needs of instructors and learners.

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Contact email: elie@augmental.education

Assessing Student Learning With Anatomical Focus in Oral and Nasal Suction Videos

Kaori Hatanaka, Baika Women's University, Japan
Yoichi Yamano, Ritsumeikan University, Japan
Kaori Yasuda, Baika Women's University, Japan
Emiko Yamamoto, Aichi Medical University, Japan

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Abstract
Understanding suctioning techniques and the cannula structure can be challenging. This study aimed to improve students' understanding through instructional videos on nasal and oral anatomy, evaluating the impact on recognizing anatomical importance, motivation to learn, and medical safety awareness. The study involved 105 nursing college students who were divided into two groups: (1) an experimental group of 38 participants who watched a video with an anatomical perspective and (2) a target group of 46 participants who watched a general video. Both groups completed a self-administered questionnaire before and after viewing the video. The questionnaire included the "Nursing Student Risk Sensitivity Scale", and suction-related items. A two-factor analysis of variance was conducted, using "type of video (between participants)" and "before/after viewing (time: within participants)" as independent variables and the score of each factor as the dependent variable. No interaction effects were observed for any of the eight factors. However, we found a significant main effect of time on all eight factors ($F(1,82)=8.60\sim81.94$, $p<.001$). In the experimental group, free descriptions revealed comments such as "I learned the length of the catheter to be inserted for nasal suction," etc. Over time, the videos' effects became apparent. Though quantitative analysis did not confirm a direct learning impact, qualitative feedback from the experimental group highlights the educational value of anatomical perspective videos. Future research should improve video content and assessment methods to underscore their significance.

Keywords: Suctioning Techniques, Nursing Students, Anatomical Perspective, Videos

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Introduction

In clinical practice, in which medical technology is becoming more sophisticated and complex at an accelerating pace, nursing professionals, who often bear the ultimate responsibility for providing medical care to patients and home care providers, face growing expectations to ensure medical safety and patient-centered care (Iida, 2004). In clinical practice, mastery of nursing skills that involve biological invasion, such as taking blood samples, intravenous infusions, and oral, nasal, and endotracheal suctioning, has become essential and is also assessed as a skill attainment level upon graduation.

However, with patient safety a major concern, it is practically and ethically unrealistic for nursing students to directly utilize bioinvasive nursing skills with patients. The Ministry of Health, Labour, and Welfare (MHLW; 2007) published a "Study Group Report on the Improvement of Basic Nursing Education," which states that (1) the rapid decline in the birthrate and aging population, advances in medical technology, and other factors require nurses to provide high-quality nursing care from the perspective of patients and that (2) nursing tasks are becoming more complex and diverse, and public awareness of medical safety is increasing. The report points out that "the scope and opportunities for students to practice nursing skills tend to be limited" due to (1) the need to clarify the required skill items and the level of achievement at graduation and (2) the need to conduct clinical practice that is in line with the actual conditions in the field. In other words, it can be said that for those skills that are difficult to train on in clinical practice, there is a need to devise ways to learn them in classes and exercises.

In the field of home health care nursing in Japan, expectations for nurses involved in home health care nursing to acquire skills have increased further in recent years as the number of patients who wish to receive home care increases. One of the nursing skills required for home care patients is suctioning. A previous study reported that 63% of patients receiving home care required suctioning and other procedures (MHLW, 2007), and the percentage of patients who experienced problems when these procedures were being performed tended to be higher than for other home nursing skills (Kobayakawa et al., 2016). Furthermore, appropriate guidance for family members and caregivers from home care nurses is also important for home nursing techniques.

Because suctioning is directly related to life support and is a painful procedure, reliable skill acquisition is required. However, only about 70% of students at the end of their basic nursing education have experienced, performed, or observed suctioning during on-site training (Asakawa et al., 2008), and many new nurses (30%) experience difficulties after obtaining employment (Toki, 2008). Furthermore, suctioning techniques are difficult to understand in terms of the cannula structure, how far to insert the catheter tube during suctioning, and confirming that it is inserted. For this reason, the use of a suction model simulator has been practiced at various universities to support learning (Colley, 2015; Nishiyama et al., 2016), with lectures, viewing of VTRs, and technical exercises being conducted. Furthermore, student learning from on-campus technical exercises in oral, nasal, and endotracheal suctioning using model simulators is evident, and students have a better understanding of the physical and psychological situation of the patient being suctioned (Takizawa et al., 2016).

In a survey of nurses working in hospitals, about 90% of the respondents recognized that an anatomical perspective was necessary, with suctioning, puncture, and excretion, in that order, as the most important care. Nurses with further difficulties indicated that they were not

interested in anatomy or did not feel that it was necessary when they were students (Fujii et al., 2004). At present, there is a dearth of previous research on suctioning among nursing students. Moreover, the simulators used for suctioning exercises are designed to help students acquire skills in suctioning phlegm, and no studies focusing on anatomical perspectives have been found. In addition to the acquisition of suctioning skills using simulators, further improvement of students' nursing knowledge, skills, and attitudes through organizing and conducting exercises that incorporate videos focusing on the anatomical viewpoints of the nasal cavity and oral cavity would be beneficial.

Conventional suction technique videos focus on preparation before and after the procedure, talking to the subject, etc., and few focus on anatomical viewpoints. Therefore, we decided to first produce videos of suction techniques that include an anatomical perspective under the supervision of a physician and to verify the learning effect of such videos. We believe that learning through videos that include an anatomical perspective will lead to improved understanding of suction techniques and recognition of safe behavior by students. The purpose of this study was to clarify the effect of the newly produced videos on students' recognition of the importance of anatomical viewpoints, their motivation to learn, and their awareness of medical safety.

Purpose

In this study, the researchers examined the effects of the suction videos they produced on students' awareness of the importance of anatomical perspectives, their motivation to learn, and their awareness of medical safety.

Method

1. Study Design

Experimental study: Randomized controlled trial (RCT), a prospective study comparing experimental and control groups before and after the study

2. Collaborators

One hundred and five third-year students at the Women's College of Nursing

3. Survey Period

June 2023

4. Procedures

1) Recruitment Procedure: During the class guidance for home health care nursing methodology, it was explained that the class unit included a suction exercise. After the ethical screening was completed, we explained that a research survey would be conducted during the suction exercise unit after the class (approximately 10 minutes during lunch break) and invited the students to participate. We also informed them that they could attend the suction exercise as usual even if they did not participate in the survey.

2) Flow of the Day: After the suction lecture on home nursing methodology, the participants were randomly divided into two groups: (1) those who watched the suction video that included an anatomical perspective (experimental group) and (2) those who watched the general suction video (target group). The participants were asked to complete a self-administered, unmarked questionnaire before and after viewing the video. Only those who gave their consent by marking the "consent box" on the paper questionnaire were analyzed for this survey. Questionnaires were collected by placing collection boxes in each room.

5. Video Content

1) Experimental Group: A suction video approximately 5 minutes long was produced in consideration of anatomical viewpoints. In producing this video, we obtained the cooperation of a physician in the Department of Otorhinolaryngology at the University of A, who assisted in filming. The technique of suctioning from the oral and nasal cavities using simulated sputum on an oral simulator was filmed with an endoscopic camera for otorhinolaryngology. The physician provided anatomical rationales and the accompanying validity of the suction technique, and advice was given. The video was edited so that the viewer can focus on areas where phlegm tends to accumulate when suction is performed and can understand the suction technique while checking the areas at risk during suction (uvula, pharynx, vocal cords, etc.). We believed that this video would enable the acquisition of knowledge from an anatomical perspective.

2) Target Group: As a general suctioning technique, we used the oral and nasal suction videos of the e-nurse trainer, which were approximately 5 minutes long. In this video, participants can learn the nurse's movements before and after suctioning, information on suction preparation items, and how to insert a suction catheter.

6. Evaluation

1) Attributes: The respondents were asked about their experience taking suction classes, their interest in suction, their experience watching videos of suction techniques, and whether they had had any near misses. Age was not requested because it would lead to the determination of the participants, such as students in previous years.

2) Risk Sensitivity Scale for Nursing Students: The Risk Sensitivity Scale for Nursing Students was used to determine nursing students' awareness of medical safety. This nursing student risk sensitivity scale was developed by Minami et al. (2015) and consists of 25 items in six subcategories. The Cronbach's alpha coefficient for the entire scale was high at 0.93. Subordinate items include "ability to carry out safe behaviors" (F1, α=.88), "ability to utilize risk experiences" (F2, α=.90), "ability to acquire risk information" (F3, α=.91), "ability to prepare for risk avoidance" (F4, α=.86), "ability to prepare for risk response" (F5, α=.85), and "ability to observe risk perception" (F6, α=.89) are. It uses a six-point Likert scale ranging from "very applicable" to "not applicable at all," with higher scores indicating greater student awareness and perception of risk avoidance.

3) Oral and Nasal Suctioning Skills Evaluation Scale: Evaluation of oral and nasal suctioning techniques was set up with reference to basic nursing faculty with more than 10 years of experience, books on nursing skills, and previous research. Fourteen items were developed based on the “Table of Evaluation Items and Evaluation Criteria for Oral and

Nasal Suctioning" proposed by the Ministry of Health, Labour, and Welfare (2003) and the evaluation item criteria in the "Suctioning through the Mouth and Nose Pamphlet" developed by the National Institute for Longevity Sciences. Each item was rated on a four-point Likert scale from "able" (four points) to "unable" (one point). The higher the score was, the better the skill acquisition.

4) Free Description: Student opinions were sought regarding understanding of the techniques as well as techniques that can be used in practice, anatomical perspectives, and points that were difficult to understand.

7. Analysis Methods

Descriptive statistics were calculated for the quantitative data, and the statistical software SPSS ver27 was used. Factor analysis was used for the skill evaluation items related to oral and nasal suctioning. A two-factor analysis of variance (ANOVA) was used to test the difference in means before and after the study, with a significance level of $p<.05$. Free descriptions were grouped into categories based on similarity of semantic content.

8. Ethical Considerations

This study was conducted with approval from the Research Ethics Review Committee of Baika Women's University (2023-0240).

9. Conflicts of Interest

The authors declare no conflicts of interest associated with this manuscript.

Results

1. Attributes

The experimental group consisted of 38 subjects, and the target group consisted of 46 subjects. Chi square test results showed no differences between the groups on the attribute items.

2. Factor Analysis of the Items Evaluating Oral and Nasal Suctioning Techniques

Of the 14 items, one that showed a ceiling effect was deleted, and factor analysis was conducted on the remaining 13 items using the main factor method. The following two factors were extracted by promax rotation based on a fixed value of 1 or more and a factor loading of 0.35 or more (Table 1). Factor 1 was named "Points to Consider During Suction" ($\alpha = .93$) related to the operation during the suctioning procedure, and factor 2 was named "Pre- and Post-Suctioning Coping" ($\alpha = .91$) related to the suctioning procedure.

Table 1: Factor analysis of the items evaluating oral and nasal suctioning techniques

		n =84	
		Suc F1	Suc F2
Points to consider during suction	Suction with understanding of position	1.04	
	Length of catheter insertion from an anatomical perspective	0.98	
	Confirmation upper and lower tongue where phlegm accumulates	0.78	
	Do not place the catheter against the uvula.	0.75	
	Suction with confirmed sputum properties	0.74	
	Proper handling of catheters	0.65	
	Check the position of the nasolarynx, pharynx, and vocal cords and suction	0.57	
	Hold the catheter properly	0.56	
Pre- and post-suctioning coping	Wipe sputum on the outside of the catheter with an alcohol swab		1.06
	Clean catheter with cleaning water.		1.01
	Suction rotated to avoid irritating mucous membranes		0.75
	Adjust suction pressure.		0.71
	Processing of catheter removed from connecting tube		0.63
	Interfactorial Correlation		
	SucF2	0.64	

3. Verification of the Effectiveness of Anatomical Viewpoint Videos and General Videos

To examine the effects of awareness of the importance of anatomical viewpoints, willingness to learn, and awareness of medical safety in the groups viewing (1) suction videos including anatomical viewpoints (experimental group) and (2) general suction videos (target group), a two-factor ANOVA was conducted using "type of video (video: between subjects)" × "before/after video viewing (period: within subjects)" as independent variables and the scores for each factor as dependent variables (Table 2). As a result, no interaction effects were found for any of the eight factors. Of the nursing students' risk sensitivity scale, a total of seven factors—F2 "Ability to utilize risk experience," F3 "Ability to obtain risk information," F4 "Preparation for risk avoidance," F5 "Preparation for risk response," and F6 "Ability to observe risk perception" as well as SucF1 "Points to keep in mind during suctioning" and ScuF2 "Preparedness before suctioning" of the suctioning evaluation—had significant main effects during the period of the study. All seven factors, SucF1 " Points to Consider During Suction," and ScuF2 " Pre- and Post-Suctioning Coping " showed a significant main effect for the period ($F(1,82)=8.60\sim81.94$, $p<.001$).

Table 2: Verification of the effectiveness of anatomical viewpoint videos and general videos

n=84

	General suction (taeget group: n=46)		Anatomical viewpoint (experimental group: n=38)		Main effects of		interaction effects
	pre	post	pre	post	the video	time	
	mean (*SD*)	mean (*SD*)	mean (*SD*)	mean (*SD*)	*df*(1,82) *F* value	*df*(1,82) *F value*	*df*(1,82) *F value*
F1	4.93 (0.7)	4.93 (0.7)	4.79 (0.7)	4.87 (0.8)	0.42 *n.s*	0.67 *n.s*	0.93 *n.s*
F2	3.89 (1.0)	4.03 (1.1)	3.70 (1.1)	3.93 (1.0)	0.39 *n.s*	8.60 ***	0.49 *n.s*
F3	3.64 (1.1)	3.91 (1.1)	3.30 (1.1)	3.70 (1.2)	1.34 *n.s*	28.50 ***	1.14 *n.s*
F4	3.67 (0.7)	3.87 (1.1)	3.41 (1.1)	3.72 (1.2)	0.99 *n.s*	11.65 ***	0.52 *n.s*
F5	3.95 (0.7)	4.29 (0.8)	3.93 (0.8)	4.15 (0.8)	0.26 *n.s*	16.51 ***	0.26 *n.s*
F6	3.86 (0.7)	4.04 (0.9)	3.76 (0.9)	4.16 (0.9)	0.00 *n.s*	26.25 ***	0.00 *n.s*
Suc F1	3.18 (0.5)	3.58 (0.7)	3.13 (0.7)	3.62 (0.5)	0.00 *n.s*	81.95 ***	0.00 *n.s*
Suc F2	3.38 (0.5)	3.70 (0.5)	3.46 (0.5)	3.70 (0.4)	0.16 *n.s*	41.19 ***	0.16 *n.s*

***p<.001

4. Free Description

The table shows the descriptions of the experimental and target groups regarding the anatomical perspective and the techniques that can be used in practice. It also includes excerpts from the students' representative opinions. Supplements by the researcher are added in parentheses.

In the free descriptions of the experimental group, three categories of anatomical viewpoints were listed: "Understanding of anatomy regarding the inside of the oral and nasal cavity," "Points to keep in mind when inserting a catheter based on anatomical viewpoints," and "About the site of sputum retention" (Table 3). The six categories of skills that can be used in practice were "Understanding the suction method from the practitioner's perspective," "Understanding the site where sputum accumulates," "Rotating the catheter while removing it," "Better understanding of precautions when inserting the catheter," "Understanding the length of the catheter to be inserted," and "Techniques that do not cause pain to the patient" (Table 4).

In the target group, two categories of anatomical perspective—"Easier understanding of anatomical models" and "More suction images with anatomical models"—were listed (Table 5). The five categories of techniques that could be used in practice were "How to insert a catheter," "Caring for the patient," "Points to consider when suctioning," "Points to consider when removing a catheter," and "No techniques that could be used" (Table 6).

Table 3: Experimental group: Description of anatomical viewpoints

Categories	Representative code
Understanding of anatomy regarding the inside of the oral and nasal cavity	I think it will lead to suctioning areas that should not be stimulated, nasal cavity, oral cavity, length of catheter insertion, etc. The camera in the oral cavity made it easier to understand from an anatomical point of view. By looking at the uvula and vocal cords, I believe that inhalation can be done to prevent the vomiting reflex from occurring. I knew what was going on in the mouth, how to facilitate insertion, and where to hit to induce bleeding and vomiting. The fiber perspective was available and easy to understand. In addition to the trachea, patients who are unable to expectorate sputum on their own are prone to sputum accumulation in the airways and pharynx.
Points to keep in mind when inserting a catheter based on anatomical viewpoints	I realized that without an anatomical perspective. I knew the length of insertion or the areas that should not be stimulated. I found that inserting the tube downward into the nasal cavity made it easier to insert. I now know where the catheter stops, how to rotate it to make it easier to aspirate phlegm, and where it gets stuck. Knowing the position of the pharynx, glottis, and glottis can help alleviate the patient's distress. Since we don't often see video of the oral cavity during inhalation, I thought it was necessary to link it to the hand movements. Stimulation of the uvula with a catheter can cause the vomiting reflex and patient distress.
About the site of sputum retention	What is the most likely site for sputum production, laryngeal area. I understood in what kind of places phlegm tends to remain. It was easy to imagine with some real phlegm.

Table 4: Experimental group: Description of techniques that can be used in the practice

Categories	Representative code
Understanding the suction method from the practitioner's perspective	It was from the nurse's point of view, so I could see where the suction was being suctioned and passed through and could understand it better. Where you could actually see inside the mouth and see the tube going through. From the implementer's perspective, it was easy to see the point that he was in the pharynx with the camera on. It was easy to understand the actual model with the camera, and it was easy to get an idea of what the suction would look like.
Understanding the site where sputum accumulates	It was easy to understand with specifics on where they tend to accumulate and why they should not be stimulated. Aspirate not only phlegm but also residuals. I thought understanding where sputum tends to accumulate and the position of insertion could be used in practice. Effective use of the tongue depressor to suction the phlegm stored inside both cheeks and on the tongue.
Rotating the catheter while removing it	When suctioning phlegm with a catheter, rotate it so as not to irritate mucous membranes. How to move the catheter at the site of phlegm accumulation Suction is applied while rotating the tube to promote phlegm ejection. Aspirate while rotating the catheter to avoid irritating the mucosa.
Better understanding of precautions when inserting the catheter	The textbook only covered the procedure, but the video was easy to understand with points to keep in mind. It was found that if they hit the epiglottis or other parts of the body, they could cause pain, bleeding, and a vomiting reflex. It was easy to see which one was the epiglottis because it was shown in images, etc., and it was linked to the catheter insertion procedure and dissection. I now understand the suctioning technique, the length of the catheter to be inserted, things to be careful about, and the reason why it can be done in a short time. By checking and observing the actual condition of the airway, I was able to imagine the induction of the vomiting reflex and inflammation of the airway mucosa.
Understanding the length of the catheter to be inserted	Insert catheter 10-15 cm. The catheter should be inserted into the nasal cavity about 15 cm. I understood how to insert the tube and how many cm to insert.
Techniques that do not cause pain to the patient	Note that the tube hitting the uvula can be painful for the patient and cause vomiting reflex, etc. He felt that he needed to learn techniques to avoid causing pain. It was found that when applied to the uvula, it causes a vomiting reflex, which damages the mucous membranes and causes bleeding. Pull the catheter out while rotating it slowly during removal to avoid irritating the mucosa.

Table 5: Target group: Description of anatomical viewpoints

Categories	Typical codes
Easier understanding of anatomical models	The use of anatomical models made it easy to understand. (Dissection model) Since the model was transparent, I thought it would be connected to anatomy. Where I found that I could suction from the side using a model.
More suction images with anatomical models	It was easy to understand where to suction (with the anatomical model). (The anatomy model) gave me an image of the structure of the airway. Since there was a dissection scene in the video, I thought it could be used for the next implementation. I wondered if not knowing the anatomy could easily lead to the risk of breathing problems.

Table 6: Target group: Description of techniques that can be used in the practice

Categories	Typical codes
How to insert a catheter	The site and length of insertion (of the suction tube). It was good to see objectively how to fold the catheter by hand and turn suction on and off. I understood how the catheter was going through the body and noticed the different angles of the catheter, etc. How to proceed with a suction catheter.
Caring for the patient	Talking to the patient before insertion, suctioning procedures. I was able to see the ideal form of nursing by watching them talk to patients and provide assistance smoothly. Call out to the patient, "You will suffer a little," "Please take a deep breath slowly," etc.
Points to consider when suctioning	Do not force them, and do suction with consideration for their sense of shame. How long to insert the catheter, how to hold it, and how to move the hand for suction. To remove the catheter while turning it. Protect myself and my patients by using hand sanitizer and other infection control measures. Connect tubing quickly with aseptic manipulation.
Points to consider when removing a catheter	Pull the catheter while turning it slightly during suctioning. (When suctioning), pull out the catheter while twirling it around. Pull out (the catheter) with a twist.
No techniques that could be used	I couldn't find any techniques (that could be used in actual competition). It does not seem to lead to having an anatomical viewpoint and aspiration. No added knowledge.

Discussion

This study examined the effect of videos on students' recognition of the importance of anatomical perspectives, their willingness to learn, and their awareness of medical safety when suction videos including anatomical perspectives produced by the researchers were used. The following section discusses the effects of the researcher's videos used in the experimental group.

Verification of the Effects of Anatomical Viewpoint Videos and General Videos

In this study, recognition of the importance of anatomical viewpoints and motivation to learn were examined using the "Oral and Nasal Suctioning Skills Evaluation Scale", and the effect of awareness of medical safety was examined using the "Nursing Student Risk Sensitivity Scale". The results of the "type of video (video: between subjects)" × "before/after (time period: within subjects)" analysis showed that the understanding of the suctioning technique and risk sensitivity awareness tended to increase over time, regardless of the type of video, whether it was the researcher's experimental video or a conventional general video. These findings suggest that video viewing has a possible educational effect.

Because no interaction between the two factors was observed in this study, it is difficult to evaluate whether the researcher's videos had an effect on students' perception of technique and medical safety behavior. One reason may be that the students did not develop technical exercises using simulators or other equipment after viewing the videos. In a study by Imai et

al. (2020), the effect of the simulator on nursing students' skills was noted to be linked to "promotion of imaging through actual experience" and "improvement of nursing skills and assessment abilities." Shin et al. (2015) noted in their study that simulation education improves student performance and strengthens mental assessment skills. Currently, time limitations and faculty shortages are major challenges at the colleges. However, by planning classes that combine video viewing and technical exercises, we can expect to maximize the effects of videos and increase students' awareness of the importance of anatomical perspectives, their motivation to learn, and their awareness of medical safety.

Effects of Learning From Free-Text Descriptions

Validation of the scale revealed no direct effect of the researcher's videos on learning effects or awareness of medical safety. However, based on the categories and representative code of the free descriptions, it may be inferred that the awareness of the anatomical perspective was deeper in the experimental group than in the target group.

Suctioning is an important life-support-related care that requires precise techniques. Currently, it is not possible for students to perform suction during exercises. Free descriptions of the target group indicated that training deepened the understanding of basic nursing skills, such as patient care, cleanliness, and how to hold a catheter. In the target group, the model used for suctioning was transparent across the body to introduce the suctioning technique. Although several participants commented that the model was easy to understand, they did not mention it deepening their anatomical understanding of the location of the uvula and vocal cords, which induce bleeding and vomiting reflexes during suctioning. However, in the description of the experimental group, by watching the video using microfibers, students were able to identify the areas where sputum was easily sputumized, such as the laryngeal area, and the areas where sputum tended to remain. Furthermore, the students were able to recognize the high risks associated with suctioning techniques, such as "by looking at the uvula and vocal cords, they can inhale without causing vomiting," and "knowing the position of the pharynx, uvula, and glottis can help alleviate patient distress." In a suctioning survey by Hayashi et al. (2018), nursing students indicated that "understanding the patient receiving suction" was their top priority regarding important factors to consider when performing suction as a nurse. In the experimental group, it is believed that students gained a better understanding of catheter manipulation while considering the risk of bleeding in the uvula, pharynx, and larynx and irritation of the mucous membranes associated with actual suctioning. This may be inferred from the fact that the students were able to learn the suctioning technique based on evidence and have a concrete image of suctioning along with an understanding of its complications, leading to consideration of the patients' pain during suctioning.

Many conventional suctioning videos have introduced basic nursing techniques from the perspective of healthcare professionals. The researcher's video may have led to "understanding of suctioning methods from the practitioner's perspective," as stated by the researcher, "It was easy to understand because it was from the practitioner's perspective and the camera was attached to the pharynx." Regarding videos from the first-person perspective, Komizunai et al. (2019) indicated that teaching suctioning techniques using virtual reality has the effect of enabling participants to relive the modeled technique. Apsari et al. (2023) examined the effect of learning suction techniques using virtual reality and showed an improvement in self-efficacy in performing suction nursing actions. In the future, researcher videos may supplement the lack of learning in textbooks and traditional videos, deepen

students' interest in anatomical perspectives, and lead to patient-oriented and patient-focused assistance as they grow as new nurses.

However, the videos we produced lack some aspects of preparation and consideration before and after suction, such as the perspective of observing the patient's condition. In the future, it will be necessary to add the viewpoints covered in previous videos, edit the videos to include an anatomical viewpoint, and reconsider the assessment indicators. In addition, by simultaneously developing technical exercises that could not be conducted in this study, it is expected that awareness of the importance of anatomical viewpoints and motivation to learn will increase, which will also raise awareness of medical safety.

Conclusion

Regardless of whether the researcher's experimental videos or conventional general videos of any type were used, a trend toward an increased understanding of the suction technique and risk sensitivity awareness were observed over time. However, there was no direct learning effect of the researchers' videos or its impact on the awareness of medical safety. From the free descriptions, the experimental group showed a deeper understanding of the anatomical viewpoints, whereas the conventional videos of the target group showed an understanding of the pre- and post-suction preparation, technique, and consideration for the patient. The acquisition of oral and nasal suctioning techniques, focused on anatomical perspectives, will lead to the provision of safe nursing care. In the future, we would like to improve the researcher's videos by adding missing perspectives, and improving and developing suctioning techniques based on an understanding of anatomical perspectives.

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Contact email: yukilunarmisty@yahoo.co.jp

Change Leadership in the Development of Digital Learning Ecosystem: A Case Study in an Excellent School

Nur Arifah, Malang State University, Indonesia
Ibrahim Bafadal, Malang State University, Indonesia
Raden Bambang Sumarsono, Malang State University, Indonesia

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Abstract
Digital-based education has become one of the important elements to enhance the quality of learning in various educational institutions, especially in senior high schools. Brawijaya Smart High School Indonesia (BSS) is the subject of this study. The purpose of this study is to describe how the leaders of BSS are leading the change towards a digital learning ecosystem. The research method involves data collection through interviews, observations, and document analysis related to digital change initiatives in the school. The findings of this study reflect how leaders at BSS play a key role in designing, implementing, monitoring, and evaluating the implementation of digital education transformation. This in-depth study explores the motivators, enablers, and inhibitors of transformational leadership and the impact of change on the school's learning ecosystem. In addition, the leaders ensure that integrating digital-based technologies into the curriculum is effective, improves the quality of learning, and meets the expectations of learners and stakeholders. A qualitative approach with a case study design was used to uncover the facts in the field. Data analysis took place in three simultaneous stages, namely data reduction, data presentation, and conclusion (verification) while triangulating sources carried out data validity until the researcher found the desired certainty. This research provides an in-depth insight into how change leadership in developing digital-based learning ecosystems in BSS can positively contribute to modern education's development. The implications of this research can also help other schools to identify the best practices and develop effective leadership strategies in this current era.

Keywords: Change Leadership, Digital-Based Learning Ecosystem, Smart School

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Introduction

One of the key challenges today is the rapid advancement of technology (Dufva & Dufva, 2018). On the other hand, technology offers great opportunities to improve access and quality of education, along with the rapid transformation of technology and the development of technologies that meet the needs of diverse users (Carr´e, 2020; Scheuer et al., 2021; Van Dijk, 2020). Inequalities in access to the internet and digital devices can increase the educational divide. Therefore, strategic measures are needed to ensure technology is used inclusively in the education system (Büyükbaykal, 2015).

In addition to these global challenges, it is also important to note that the COVID-19 pandemic has brought additional challenges to achieving Sustainable Development Goals related to education in Indonesia. According to Ashraf and Cheshmehzangi et al., the COVID-19 pandemic has severely impacted society's transformation (Ashraf, 2020; Cheshmehzangi et al., 2022). In particular, the closure of schools and distance learning has made the educational process difficult, especially for more vulnerable groups. Therefore, post-pandemic restoration of education should be a top priority in Indonesia's efforts to achieve sustainable quality education.

To achieve the 2030 Sustainable Development Goals on quality education in Indonesia, special attention must be paid to eliminating inequalities in access to education, adaptation efforts related to integrating technology in learning, and post-pandemic recovery. This is an effort to achieve equitable and inclusive quality education.

The above efforts can be manifested through the availability of digital learning ecosystems in educational institutions. Digital learning ecosystems are increasingly important in this modern era, as digital technology has become integral to everyday life. Education cannot be separated from this change due to the increasing need for people (in the context of schools, educators, and learners) to use digital platforms to network and complete their responsibilities (Hu, 2015).

To prepare the young generation for a digitally connected future, digital-based learning ecosystems in schools are a necessity and a crucial aspect of the advancement of education. Therefore, this research needs to be conducted to find out how educational institutions can adapt to the challenges of the modern era, which is becoming increasingly dynamic with the development of digital technology, and whether the leadership is successful in organizing the development of a learning ecosystem that maximizes digital resources by involving all existing components.

One key aspect of a digital learning ecosystem is modern hardware, such as computers, tablets, and mobile devices, which enable learners and teachers to access information and educational resources more efficiently. On the other hand, a strong network infrastructure is key to ensuring stable and fast connectivity, enabling access to the Internet and online educational service platforms. School learning provision is expected to provide quality education and encourage active learning so that students can achieve fully. Effective learning certainly requires an integrated service from schools, such as adaptive, creative, and competent teaching resources.

Schools can also integrate digital resources, such as e-books, learning videos, and other digital platforms, to offer services to learners. In this manner, digital learning ecosystems

enable more diverse learning and support individual learning styles as needed. In addition, digital learning ecosystems can improve communication between schools, teachers, learners, and parents. Schools can interact more effectively with all stakeholders through online communication tools such as email, instant messaging, and discussion forums to disseminate information, updates, and reports on learners' progress.

Overall, the digital learning ecosystem is an integral part of the transformation of modern education, opening the door to more interactive, collaborative learning and flexible access to services. However, good management and oversight are needed to ensure these technologies are used effectively and safely in education.

Therefore, the author is interested in investigating the application of change leadership in the context of developing a digital-based learning ecosystem, given the importance of digital literacy today as an effort to participate in supporting the fourth goal of sustainable development by the United Nations (SDG's 2030), namely the realization of quality education. Digitization in educational services is very helpful in enhancing effectiveness and efficiency, so it is assumed that it can positively impact improving the quality of education through the development of digital-based learning ecosystems. A qualitative approach with a case study design is used to uncover the facts in the field. Data analysis takes place simultaneously in three stages, namely data reduction, data presentation, and inference (verification), while data validity is achieved by triangulating sources until the desired certainty is achieved. (Moleong, 2018; Sugiyono, 2015; Ulfatin, 2015).

Change Leadership

The Urgency of Implementation in Educational Institutions

Leadership reflects the assumptions about the deliberate process by which an individual exerts strong influence over others to guide, structure, and facilitate activities and relationships within a group or organization. Gibson defines leadership as an attempt to influence rather than coerce by influencing or motivating individuals to achieve goals. Thus, the definition of leadership is the ability to influence a group toward the achievement of goals and can also be formulated as the process of influencing the activities of a person or group to achieve goals in a particular situation (Gibson et al., 1996; Robbins & Mary C, 2010).

The importance of leadership as a determining factor in an agency's success indicates the urgency of the need for an effective leader figure in an agency or organization by the characteristics of the organization or agency itself. It is assumed that effective leadership has a significant positive relationship with achieving the goals of the agency being led. In educational institutions, it is essential and urgent to have school principals as leaders, especially in the need to innovate learning to achieve the goals and objectives of the establishment of an educational institution. It is a little unfortunate that there are still many schools or educational institutions that do not have a vision-mission; goals and objectives (Bafadal et al., 2019). It is important to solve the collective problems that arise in the formulation of vision and goals that are not well organized. This is because educational institutions need support and appreciation from the community. Therefore, leaders must be innovative in carrying out their leadership roles to produce maximum goals (Juharyanto et al., 2020).

Therefore, leadership is needed that can respond to the challenges and complexities that occur in today's educational context. Change leadership is progressive. It's used in educational institutions as well as in departments to respond to today's world as well as to technological developments. Change leadership is the leader's ability to make decisions based on a change-centered approach. Today's need for leadership is to build the capacity of individuals and organizations to make a change. Cahyono, et al. argue that change leadership is a leader's effort to create some change in an organization that aims to produce transformation and integrate all elements in the organization so that they work together and empathize with each other in driving change to be more useful and have a significant positive impact on the organization. Change leadership in an organizational context includes the steps taken to steer the organization from its current state to a desired future state, intending to improve the accuracy of resource use (Cahyono et al., 2019).

There have been many changes that have occurred and affected education policy today, one of which is the equalization of improving the quality of education (Bafadal et al., 2020; Juharyanto et al., 2020). In responding to these changes, schools will undoubtedly need to adapt and implement the policies that have been enacted, while balancing the existing school ecosystem. This is a real leadership challenge that requires strategies and innovations for school sustainability. Brawijaya Smart High School (BSS), a laboratory school of Brawijaya University, has seen a steady increase in enrolment over the past five years, with an average increase of around ten percent. Despite charging higher tuition fees than public schools, BSS continues to attract more students each year. The institution has several successful programs and has achieved recognition in various competitions, including art, music, class of youth, science, and cultural performances. Additionally, there has been an increase in the number of graduates being accepted into public universities and higher education institutions through computer-based written examinations (UTBK) and student achievement pathways, both domestically and abroad, such as Malaysia, Germany, and the United States.

The Principal's Role as Change Leader

Principals with their role as change agents should have a vision of change. So they can create a clear direction for school (Widodo, 2017). According to Wibowo, change leadership can be viewed from the perspective of existing change, namely strategic, fundamental, cultural, and relational change leadership (Wibowo, 2012). Quality Education Management (QEM), together with the dimensions of school change, can identify principals' four important roles in making change successful: catalysts, creators, facilitators, and stabilizers. Therefore, the principal is expected to communicate the possibilities in the school or to communicate potential opportunities to the school community to improve the school.

In the context of school leadership, it is important to choose leaders who can improve the quality of processes and outcomes of graduates. Not those who use the trust they have been given to impress or to spread negativity about the organization. What educational institutions need in this digital age are leaders of Change. That's why leaders need to build a From-To contrast. Leaders who know where they (and their government) are and the organization's bigger vision (Kasali, 2017).

Therefore, any change leader must have a strategy to ensure the change process goes as expected. According to Wibowo, the strategies that change leaders can use are First, accelerating the intended changes in the future; Second, being able to the center of change or be the center of change; Third, having clear steps in leading a change; Fourth, balance

between change and continuity; and finally, leaders can increase the satisfaction of their staff. The strategy of improving the quality of education in schools through change can also be done by paying attention to the student's discipline (Imron, 2012; Wibowo, 2012).

The inability of leaders to develop change strategies can cause failure. According to Wibowo, several strategies can be used by change leaders, including accelerating future changes; being the center (vortex/motor) of change; providing clear steps in leading change; balancing between change and continuity; and increasing employee satisfaction. Suharsaputra explained that educational innovation includes any new thing that can lead educational institutions to be more qualified in organizing the education or learning process to improve the quality of education, which is reflected in the performance of outstanding graduates, as well as outcomes that are beneficial to society (Suharsaputra, 2016; Wibowo, 2012).

Digital Learning Ecosystem

Digital Ecosystem in Education

Information technology exists to expand the dissemination of knowledge and is a powerful driver of educational reform, hence digital ecosystems have become an integral part of modern education. In the context of education, the digital ecosystem includes various elements such as hardware, software, communication networks, and digital content. It creates a more dynamic and responsive learning environment, which significantly affects learners, teachers, and educational institutions (Dreimane & Upenieks, 2022; Kengwe & Bhargava, 2014).

Digital ecosystems have become an integral part of the education sector, transforming how knowledge is accessed, managed, and delivered. This can be done by creating and using content that students find interesting, and by adding a fun element. In this way, the learning process can become more dynamic, stimulating learners' creativity to develop further (Bilotta et al., 2021; Mikre, 2011). The digital revolution touches several aspects and sectors, including education, which has rapidly and profoundly changed the way students learn. Thus, how technology can improve the face of education with cheaper accessibility may be one of the hopes for developing countries in particular (Qureshi et al., 2021). These aspects are then conceptualized into intelligent learning environments emphasizing flexibility and learning effectiveness, adaptability, and personalization to explore the right formula to implement in digital learning ecosystems to keep them healthy (Spector, 2014).

The Urgency of Implementing Digital Technology in Assisting the Learning Process in School

Technology has played an important role in the educational process both inside and outside the classroom for learners by helping them to create creativity and encourage educational processes with new patterns beyond traditional techniques that make the learning process more interactive because access to sharing and downloading knowledge becomes more flexible and straightforward so that learners become more enthusiastic about learning and sharing knowledge (Grainger et al., 2021; Lacka & Wong T.C, 2021).

Thus, it must be acknowledged that digital technology appeared as a tool for the critical condition of education some time ago (Araújo et al., 2021; Seale et al., 2021). Even the current endemic has not changed the functioning of technological optimization. However,

educational policies are increasingly flexible and oriented towards the effectiveness of learning in each unit of educational institutions. It can also be seen that the government is very supportive of national integration in the education system, especially for areas outside the remote area. This is because digital technology helps to develop students' problem-solving skills, helps them with their thinking structures, and encourages an interesting atmosphere in the learning process.

Another advantage that can be gained by using digital technology is that it provides greater flexibility to educational institutions by accommodating the adjustments needed in implementing the current curriculum, which is of necessity based on students' needs (Dudar et al., 2021; Kosaretsky et al., 2022). The use of digital technology allows learners to become more proactive in the learning process, which is currently designed to be learner-centered, to participate in the development of their potential in the learning process (Kovács et al., 2015).

Some of the above shows how the urgency of digital technology to enhance the educational process in schools through the use of various digital resources provides opportunities for learners to download reference sources, use digital help desks, and upload their creations in the learning process so that they can be used as study materials/references for others through channels such as blogs, wikis, educational videos, and podcasts by getting them used to collaborating and giving each other corrections to achieve constructive learning outcomes for shared learning (Borthwick et al., 2015; Kumar et al., 2022). Thus, it can be concluded that digital technology can facilitate access to education and optimize learning, technology combines inspiration into innovation and the meaningfulness of education becomes a realistic thing to achieve.

Implementation of Developing a Digital Learning Ecosystem

The digital ecosystem in educational institutions is a framework made up of hardware, software, and digital resources that are used for the enhancement of learning experiences, school management, and communication among all stakeholders in educational institutions (Kummanee et al., 2020). Therefore, the development of a digital learning ecosystem is an effort to create an integrated and inclusive learning environment using digital technologies. In this ecosystem, different elements such as learning platforms, content, learners, teachers, and supporting tools are connected to create a more effective, efficient, and engaging learning experience.

The digital ecosystem as an intelligent learning environment has considerable potential to develop personalized learning into adaptive learning. Thus, developing a digital-based learning ecosystem can be done by integrating smart learning, learning resources, physical and digital worlds, involving several types of devices, and integrating different approaches in teaching and learning with personalization and self-regulation of learning (Cheung et al., 2021; Gros, 2016; Peng et al., 2019).

Developing an efficient and effective digital ecosystem requires good planning, investment, and collaboration between all the stakeholders. This is because the ecosystem requires collaboration and integration of teachers, school members, and other stakeholders such as funding agencies and service providers (Benita et al., 2021). It is also crucial how the knowledge of each person or school community can be exchanged and shared to build an existing digital ecosystem (Ali et al., 2017).

Discussions

The COVID-19 pandemic has required schools around the world to adapt to change, which is often accompanied by uncertainty. In response to these changes, there is a need for innovations that are linked to a vision of change that can be responsive to the needs of educational institutions in the delivery of educational services to their students. While talking about educational institutions, it cannot be separated from leaders as the driving force in an educational institution. Successful principal acts as a change leader, always focused on improving the quality of service delivery to students and stakeholders to produce quality graduates with global insight.

The results of this study show that change and uncertainty are challenges that can indeed lead to innovation in the improvement of the educational services provided at the Brawijaya Smart High School (BSS). This school manages educational inputs by managing processes to realize graduates who are religious according to the religion professed by each student, which is in line with three main visions of "Spiritual, Nationalistic, and Smart on a Global Level". To achieve this vision, the school needs effective leadership because the leadership aspect is crucial in achieving the school's vision. Therefore, school leaders need to continuously develop their capacity to improve their competence. Strategies are needed for policymaking, improving the competence of teachers and administrators, and continuous, relevant, and contextualized professional development (Nooruddin & Bhamani, 2019).

In addition, change requires schools to adapt and reform continuously. Principals must be able to read internal and external challenges in the school's sustainability as a place of learning and teaching (Shaked & Schechter, 2016). Therefore, it can be said that principals are reformers and the ability to anticipate various changes is essential. Principals are expected to be good at change management. School organization is a means by which people work together to achieve common goals using their resources. School organizational development is a systematic, integrated, and planned approach to improving organizational effectiveness and solving problems.

In line with Netolicky's view that school leadership is a social practice as well as an individual and collective process, built by individuals but situated in and transformed by the community. Therefore, to build and develop the process, the principal needs to be accepted and loved by the staff for the transformation to take place (Netolicky, 2020). Principals need to promote sustainable solutions that involve the whole school community, including students, teachers, parents, and community members. The aspects of competence and effectiveness influence the principal's competence and success. Aspects of meaningfulness do not influence principals' competence, but principals' success (Bahadoran & Nazari, 2018).

In the context of this research, the uncertain changes since the COVID-19 pandemic have created uncertainty for schools in providing learning services to their students. There are four orientations of the leader's attitude in the face of uncertainty, such as the role of the principal as leader of change, strategies implemented, innovations of change, and supporting and inhibiting factors in the development of a digitally based learning ecosystem. School leaders act immediately to respond to sudden and uncertain changes. The pandemic came suddenly and uncertainly, causing educational elements to adapt and the government to formulate policies to address national educational effectiveness and efficiency. The head of the BSS, in this case, responded by developing an application called SIBRASCHO, which initially meets the needs of online learning and e-report cards, which then continuously develops according

to the needs of digitalization in support of teachers, students' attention, also effectively and intensely communicating with parents. this is in line with the opinion of Gesel, According to him, the thinking, decisions, strategies, and innovations of leaders are very beneficial for the success and sustainability of the organization, in this case, the school (Gesell, 2010). In developing a digital-based learning ecosystem, the BSS Principal's strategy is to take input from teachers, consider the urgency, and identify the weaknesses of the system so that it can be continuously evaluated and developed according to needs. Change leaders are always associated with planned change and deal constructively with human emotions (Senior & Fleming, 2006).

The results of this study also show that the Principal of BSS in his lead changed all learning services and school administration with digital-based services, including exams, classroom learning, extra classes, learning references made by subject teachers, student activity reporting, and student assignment bills to parents, extracurricular management, excellent program management, namely religious based character education with smart kitab according to students' religion. Supervising the discipline of students and teachers, developing the capacity of teachers by allowing them to increase their capacity both independently and collectively, developing the implementation of supervision by entering the tools and results of supervision into the SIBRASCHO application to be followed up by providing performance bonuses to active and outstanding teachers and providing coaching to teachers in need. and services that facilitate the process of researchers and guests to get the best service according to their needs, so that disposition can be provided effectively without disrupting the implementation of teaching and learning activities and without disturbing the concentration of teachers, because the communication process is carried out according to school procedures and policies, taking into account the needs and interests of guests. It is still being analyzed and evaluated and will continue to be developed and improved if there are weaknesses in its implementation. This aligns with the view of Cahyono that change leadership should strive to integrate all elements in the school to create a movement for change (Cahyono et al., 2019).

While there are supportive and inhibiting factors in the context of developing a digitally based learning ecosystem, the enabling factors that play a role in helping leaders are human resources that are quick to adapt and have job loyalty to the institution, so that changes take place with good synergy without hurting the internal organization. Furthermore, parents supported the movement for change by providing learning materials, such as smartphones and laptops, for their children's exams. The main obstacle to implementation thus far has been the slow adaptation to national policies. The development of digitalization in the SIBRASCHO application is tailored to the needs of schools, while the national curriculum change policy requires adjustments that necessitate several tools to accommodate these policy changes. Therefore, it is necessary to formulate the policy following the interests of schools. the challenge that remains to be pursued is how to engage students to minimize inertia in adaptation, especially for students at level X, so that they are accustomed to a competitive, varied, and active learning environment, both individually and in groups. Through the analysis of these factors, as Wibowo argues, principals can act as catalysts, creators, facilitators, and stabilizers to maximize the potential of the school and continuously improve services in a better direction (Wibowo, 2012).

Conclusions

In developing a digital learning ecosystem, change leadership is needed to organize students, teachers, and the school community to implement digital learning, particularly in designing,

implementing, evaluating, and improving programs, as well as continually innovating and changing in the face of uncertain change phenomena. The attitudinal orientation that can be done is that the principal acts as a change leader by implementing strategies that align with the needs and applicable national policies, innovating changes, and analyzing the supporting and inhibiting factors in developing a digital-based learning ecosystem.

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Contact email: arifahnurafandi@gmail.com

The International Academic Forum (IAFOR)
Sakae 1-16-26-201
Naka Ward, Nagoya, Aichi
Japan 460-0008
www.iafor.org