Development of Learning Innovation on Digital Learning Ecosystem to Promote Entrepreneurial Intent and Entrepreneur's Professional Skills

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The Asian Conference on Education 2024
Official Conference Proceedings

Abstract
This research aims to develop and evaluate learning innovations within a digital learning ecosystem to promote entrepreneurial intentions and skills among diverse target groups, including the unemployed, farmers, the elderly, and families seeking income generation. The study's objectives are to develop digital learning innovations, assess their impact on entrepreneurial intentions and skills, and examine learning participation. Utilizing technologies like ZOOM and LINE, along with community libraries, the research supports the Next Normal transition with modern teaching media covering at least 10 occupations in Bangkok and local agencies. The mixed-method study, involving an initial 100 participants with plans for expansion to thousands of unemployed and 8,930 elderly individuals, collaborates with vocational training schools and local agencies. Key findings reveal excellent ratings for the developed innovations (mean=4.51, SD=0.43), high satisfaction with occupational media (mea=4.82, SD=0.41), and increased entrepreneurial intentions among participants. This research contributes to sustainable career development, enhances reading skills, and promotes self-development, ultimately benefiting both individuals and the nation through innovative learning approaches in the digital ecosystem.

Keywords: Digital Learning Ecosystem, Promote Entrepreneurial Intent, Entrepreneur's Professional Skill

Introduction

The development of individuals' initial skills in studying basic information primarily comes from reading books to acquire knowledge in areas of their interest. This is considered crucial for the future development of education in Thailand. Reading skills are a fundamental base for analyzing various lesson contents, enabling the application of learned concepts to different fields of study. This aligns with research findings from academics and medical experts, who affirm that books are essential tools for promoting learning and enhancing life skills. Reading fosters brain development in various aspects, leading to a better quality of life, robust health, mental strength, critical thinking, and analysis skills, as well as mindfulness, adaptability, and good interpersonal relationships. Those who can read independently can seek knowledge on their own. However, Thailand faces a reading crisis primarily due to the lack of high-quality and appropriate books that meet the needs of people in different areas. Unlike TV or digital media, which are easily accessible and delivered directly to homes, books require motivation and reading promotion processes. There are challenges in sourcing quality books for target areas to conduct reading skill development activities. Moreover, the reading habits of urban populations have shifted from print media to digital media. Therefore, promoting reading among urban populations must adapt to the times. This research project recognizes the necessity and importance of improving reading skills across all age groups. By employing mixed-method research to create learning innovations within a digital learning ecosystem, the project aims to study the effects of developing learning innovations on this ecosystem. It also examines the learning engagement of these innovations in promoting entrepreneurial intentions and skills. The learning characteristics and structures of developing innovations in the digital learning ecosystem are emphasized in fostering entrepreneurial intentions and skills.

The research team has experience in academic service, integrating various disciplines, and receiving significant cooperation from local educational, social, governmental, private, and local administrative organizations. This research project will produce knowledge that benefits the unemployed, aiming to foster a reading culture, vocational skills, and learning engagement, leading to suitable career creation and sustainable income. The innovative outputs include learning innovations within the digital learning ecosystem to promote entrepreneurial intentions and skills. These innovations will cater to vocational training interests for sustainable learning. Individuals will be able to build upon their knowledge to design and create digital learning materials, sharing skills within the same field in a virtual environment. This exchange of learning experiences helps enhance vocational skills for income generation through digital learning material development. In terms of academic benefits, the research project will result in new innovations in vocational skill development, enhancing the learning structure within the digital learning ecosystem. This allows beneficiaries to apply this knowledge in daily life, further developing innovations that contribute to the country's future benefits. The policy benefits include supporting knowledge creation through diverse activities for sustainable vocational development.

The project aims to drive the development of digital learning ecosystem innovations to promote entrepreneurial intentions and skills in Thailand, with funding support from the New Career Path Development Fund for New Researchers. This supports research and innovation excellence for urban social development and decentralization of prosperity using science, research, and innovation. Under the research framework "Learning City Development," it aims to manage urban growth, income distribution, employment systems, and improve the quality of life for citizens, leading to sustainable urban growth. The project will continuously

support various activities, targeting the unemployed, subsistence farming, and elderly groups interested in generating family income. The initial phase will involve 100 participants from target groups, with plans to cover thousands of unemployed individuals, 8,930 elderly people, and those seeking additional income. Participants can select their books through various planned activities. The benefits of these activities include experience exchange and self-designed content creation to build new knowledge, shared with those interested in the same career through developed learning innovations.

Technology and innovations used include training tools through programs or applications such as ZOOM or LINE, utilizing community libraries to disseminate knowledge. This supports the Next Normal (transition period) by providing modern and relevant teaching materials. At least ten related professions include organic farming, local trades in Bangkok, makeup and beauty training, ornamental plant cultivation, fish farming, Thailand and international cooking, creating local products for family income, subsistence agriculture, tourism business, and selling coffee and beverages in cafes. This information comes from collaborations with the Bangkok Vocational Training School, Athon Sangkhawatana, and local organizations.

The COVID-19 crisis has exacerbated challenges faced by unemployed and out-of-school youth, highlighting a critical issue that remains inadequately addressed by the state. The causes of unemployment in the country may be numerous, including labor market shortages, inadequate national workforce planning, and an imbalance between vocational education graduates and the actual needs of the labor market. The development of children and youth is multifaceted, encompassing improvements in learning abilities, psychological well-being, and social skills, all of which contribute to their overall growth and adaptation to the world around them.

This encompasses various aspects, such as learning capabilities, which have shown improvement, psychological aspects like increased relaxation and reduced feelings of loneliness, and social aspects, including enhanced social interactions and broadened worldviews. Quality of life for adults is significantly influenced by factors such as workplace skills, particularly literacy, which enhances job performance, as well as by aspects that contribute to mental well-being, including stress reduction, decreased loneliness, and a lower risk of depression. In the work context, literacy skills significantly influence job performance, and in terms of overall quality of life, they particularly help in reducing stress, feelings of loneliness, and the risk of depression. The overall economic and social impact is profound, as limited literacy among adults not only reduces their participation in political and public policy changes but also hinders their ability to contribute effectively to societal progress. International studies have shown that adults who read less are less likely to believe they can participate in political changes, including public policy shifts, leading to lower engagement in political activities compared to those who read more.

In the digital age, learning resources have evolved to support digital workforce learners by providing accessible and flexible learning opportunities. These resources include online courses, webinars, and e-books that allow learners to study at their own pace. Interactive tools, such as simulations and virtual reality, enhance the learning experience by offering practical, hands-on training. Digital learning platforms also enable collaboration through discussion forums and peer-to-peer learning.

The adaptability of these resources ensures that they cater to various learning styles, promoting lifelong learning and continuous skill development essential in today's fast-paced, technology-driven world. As the digital workforce continues to grow, the focus on developing high-quality digital learning resources remains crucial to ensuring a well-equipped and adaptable workforce. Learning resources in the digital age are increasingly tailored to meet the needs of digital workforce learners, emphasizing flexibility, accessibility, and engagement through online platforms, multimedia content, and interactive tools Figure.1.

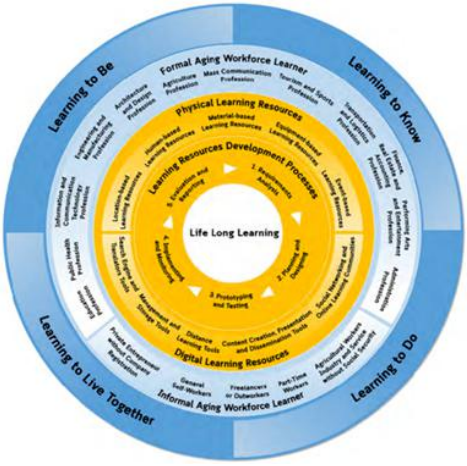

Figure 1: The Learning Resources in the Digital Age Suitable for Digital Workforce Learners

Reviewing Research Literature

Development of assessment model based on actual conditions for career learning and technology subject 3 information and communication technology grade 4 secondary education area office district 33. Srithai (2014) developed an assessment model based on the actual conditions of the career and technology learning group. Theme 3 information and communication technology by conducting research in 4 stages basic data study, creation and development of models, etc. Experiment with the model and improve the model into a complete format. The results of the research show that the developed model has 4 complete elements reason and background. Objective the method of assessment based on the actual conditions and the application approach by the model are of high quality in terms of composition. It has the most completeness in the 4 elements and good characteristics in terms of accuracy. The suitability, consistency, and feasibility are at the highest level. The confidence in the results of the model learner assessment is high, and the application process is convenient and streamlined, and the participants in the assessment include teachers, students and parents. The results showed that there was a high to the highest level of satisfaction. Reading behavior of graphic novel students at Chulalongkorn University demonstration elementary school. Samart (2017) conducted a study on the reading behavior of graphic novels among students at Chulalongkorn University demonstration elementary school, focusing on the reasons for reading, methods of obtaining graphic novels, language, content, types of graphic novels read, and the places and times of reading. The study employed a survey research method. The research findings revealed that most students at Chulalongkorn University demonstration elementary school read graphic novels in the science fiction genre, with the "Why? encyclopedia of scientific knowledge" series being the most popular. The content of the graphic novels primarily focused on science, mathematics, and technology. The graphic novels were in Thai. Students read these novels because of their interesting content. The methods of obtaining graphic novels included purchasing them and

borrowing them from the school library. Students typically read at home and in the school library. The time spent reading graphic novels was mainly during the lunch break on school days, with an average reading time of 6–10 hours per week. Components and system architecture of the digital learning ecosystem for managing teaching and learning through digital storytelling for teacher education students. Sarnok (2019) conducted a study on the model of a digital learning ecosystem for the design and definition of the components of the digital learning ecosystem for teacher education students, as well as the design of the system architecture for this ecosystem. The study's results revealed that learners are able to control the time, place, and direction of their learning independently. In this learning process, students have the opportunity to participate actively, presenting their own work through digital storytelling. This approach allows students to recognize their potential and develop skills in information search, storytelling, data analysis, data synthesis, communication, presentation, organizing thoughts, questioning, and teamwork. It also fosters awareness of lifelong learning. This system serves as a management tool for learning through digital storytelling within the digital learning ecosystem, designed for the teaching and learning of teacher education students in a digital ecosystem. Action research and collaborative research processes research methodology for stem education research in professional learning communities. Chaisat (2021) developed the human resources for STEM education, focusing on the development of the ability to integrate knowledge, skills, attitudes, and various characteristics in a holistic manner for work, problem-solving, and life. This teaching approach is connected to real-life experiences, where students work together in learning teams, with teachers as co-leaders and administrators serving as supporters to facilitate learning and professional development. This model aims to enhance personal quality and improve the quality of learning management, focusing on student success and learning outcomes, as well as the happiness of working together as members of a learning community. The appropriate research methodology for developing STEM education students consists of Action Research and Collaborative Research. Development of SQ4R format on social networks to promote reading culture. Thepnuan (2014) created the SQ4R model on social networks to promote reading culture to study the results of using the SQ4R format on social networks to promote reading culture with undergraduate students in the field of educational technology and computer education, faculty of education, Naresuan University. The results of the study showed that the SQ4R model on social networks to promote reading culture was appropriate. Students had a reading culture after school with the SQ4R model on social networks to promote a reading culture, which was statistically significantly higher than before class at the level of 0.05 and students are satisfied with teaching and learning with the SQ4R model on social networks to promote a reading culture at a high level.

Careers in the Digital Ecosystem

In today’s rapidly evolving digital world, new and innovative careers are emerging that combine technology with creativity. These careers not only offer opportunities for financial growth but also allow individuals to develop and enhance their professional skills. Whether it's in agriculture, culinary arts, beauty, or sustainable practices, each profession showcases how modern advancements can be leveraged to create sustainable and rewarding livelihoods. From hydroponic farming to digital marketing, these careers represent the diverse opportunities available in the digital era, making them both exciting and relevant for the future.

10 Interesting Careers in the Digital Era

10 Interesting Careers in the Digital Era, (1) Salad Vegetable Farming, this career is perfect for those with a passion for agriculture. Hydroponic salad farming is very popular nowadays because it's pesticide-free and easy to maintain. The produce can be sold to restaurants or delivered to supermarkets. (2) Vermicomposting**,** using earthworms to create compost is an emerging career, as it's environmentally friendly. The organic fertilizer produced can reduce costs and boost plant yields. (3) Banana Cake Baking**,** making banana cakes is a side job that can be done from home. With online marketing, your cakes can easily reach customers, and there's a high demand in the market. (4) Savory Dishes with Sweet Fish Sauce, Thailand dishes with a sweet and salty taste, like those made with sweet fish sauce, are popular with fruits or sticky rice. Selling them online can easily generate income. (5) Selling Tofu with Fruit Salad**,** tofu with fruit salad is a simple and popular dessert, especially during hot weather. This career can be profitable by selling in dessert shops or through online platforms. (6) Makeup Artist**,** makeup artistry is a craft that helps boost people's confidence. Makeup artists can work in entertainment, weddings, or fashion, promoting their work through social media. (7) Nail Technician, nail artistry is in high demand among beauty enthusiasts. Creating unique nail designs can be a lucrative career, both in salons and through mobile services. (8) Tie-Dyeing and Printing on Raw Fabric**,** the art of tie-dyeing is back in style. This career can generate income by selling beautifully dyed fabrics both domestically and internationally. (9) Fishing and Ecotourism**,** fishing remains a major occupation for Thais. Sustainable fishing combined with ecotourism related to fishing creates a stable income source. (10) Selling Drip Coffee**,** drip coffee is becoming increasingly popular. Selling drip coffee offers a unique experience for customers and can be easily marketed online or in cafés.

Summary, these 10 careers are great examples of how technology and creativity can be applied to various professions, enabling sustainable income and enhancing professional skills in the digital age (Figure 2).

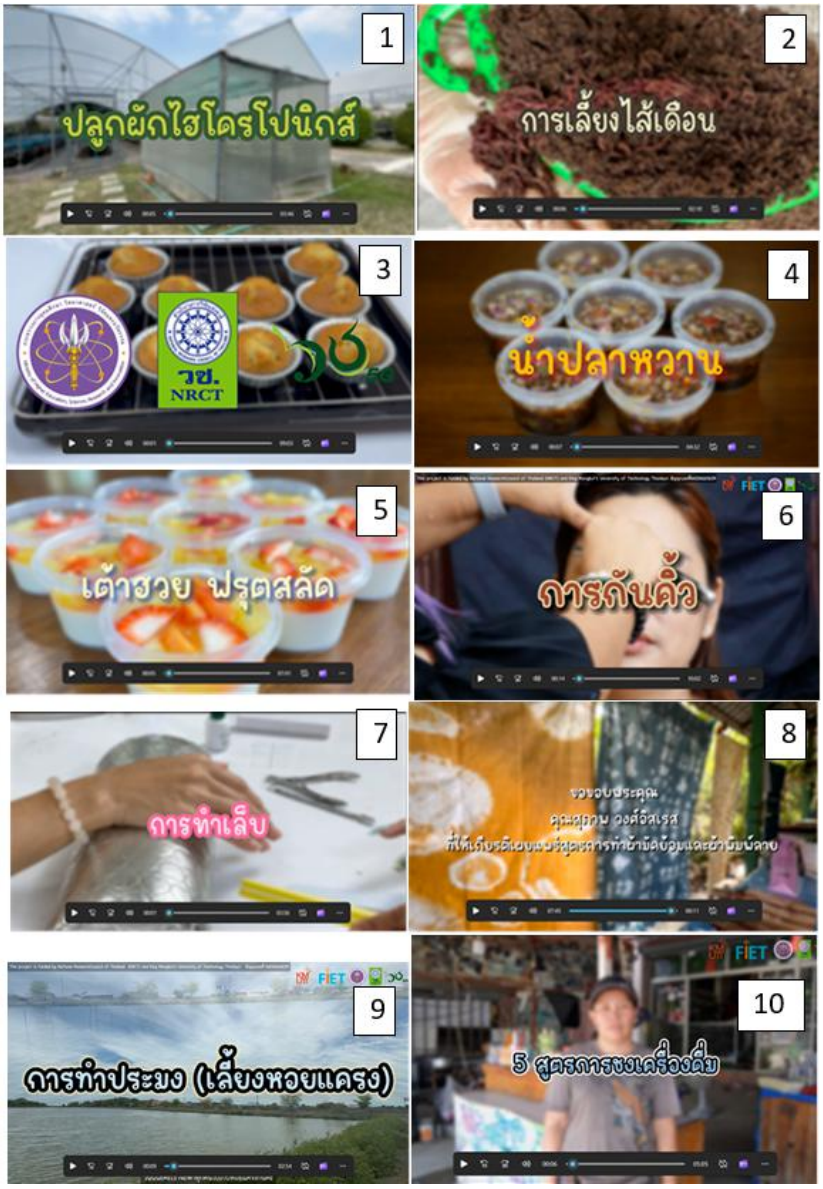

Figure 2: Examples of Infographic Media Used to Share Experiences Across Different Professions

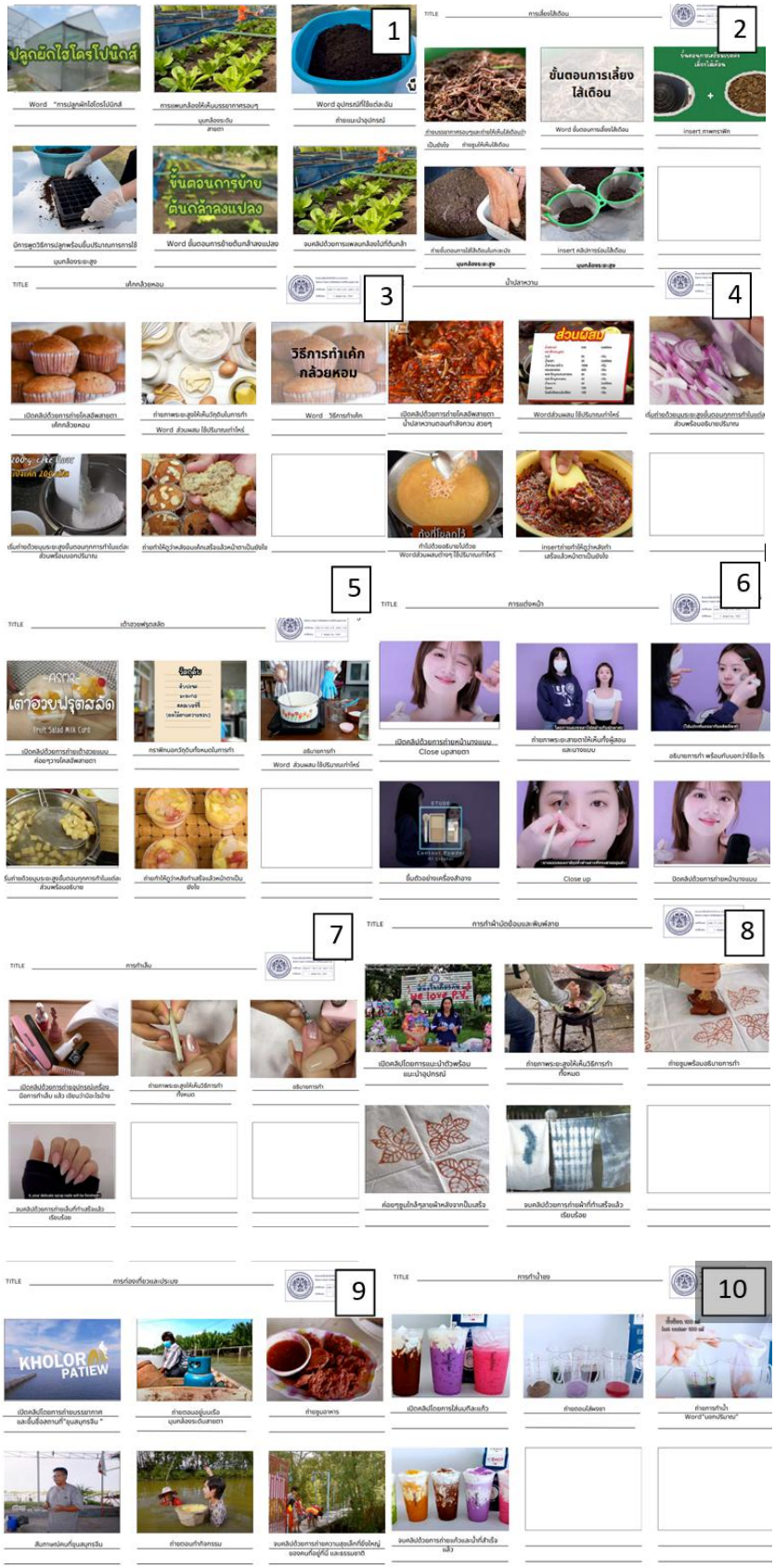

Figure 3: The Media Production Process Uses Storyboards to Convey Professional Experiences Across Various Professions

Learning Engagement

Affective or Emotional Engagement

- I was interested in learning on this learning platform.
- What I learned on this learning platform was interesting.
- I like what I learned on this learning platform.
- I like this learning platform.
- I was proud to have the opportunity to learn on this learning platform.

Behavioral Engagement

- I tried to learn the content taught on this learning platform as hard as I could.
- When I studied on this learning platform, my mind wandered. (R)
- I watched video lessons on this learning platform carefully.
- I kept watching video lessons on this learning platform although some of them were difficult to learn.
- I reviewed what I learned on this learning platform.

Cognitive Engagement

- To understand the content taught on this learning platform better, I tried to relate it with I already know.
- When I studied on this learning platform, I tried to match what I was learning with my own experience.
- I tried to summarize what I learned on this learning platform in my own words.
- I made up my own examples to better understand important ideas or concepts presented on this learning platform.
- When I studied on this learning platform, I tried to identify the similarities and differences between what I was learning and what I already know.

Methodology

Conceptual Framework

The Figure 3 presents a comprehensive framework for the "Development of learning innovation on digital learning ecosystem to promote entrepreneurial intent and entrepreneur's professional skills". This framework is divided into two main branches learning innovation and digital learning ecosystem.

The learning innovation branch encompasses several key components. It includes Aims, which likely define the goals and objectives of the learning process. Contents refer to the subject matter and curriculum. Pedagogies involve the teaching methods and strategies employed. Learning technologies highlight the use of digital tools and platforms to facilitate education. Authentic assessments suggest the use of real-world, practical evaluations to measure learning outcomes. On the digital learning ecosystem side, we see a breakdown of its constituent parts. Living things refers to the human elements, specifically learners and learning facilitators. This acknowledges the crucial role of both students and teachers in the ecosystem. Non-living things are also included, recognizing the importance of physical and digital infrastructure.

This is further clarified by the inclusion of hardware, software, and network systems as essential components. The framework then outlines three main areas of focus, reading

culture, professional skills, and learning engagement. Each of these is further broken down into specific elements. Reading culture encompasses the behavior of accessing learning resources, reading behavior, and utilization of reading. This emphasizes the importance of developing strong reading habits and effectively using available educational materials. Professional skills are developed through seeking information about interested professions, creating suitable career paths for oneself, and planning and deciding on feasible career choices.

This highlights the framework's focus on practical, career-oriented outcomes. Learning engagement is divided into cognitive engagement, emotional engagement, and behavioral engagement. This holistic approach recognizes that effective learning involves intellectual stimulation, emotional connection, and active participation. Overall, this framework presents a comprehensive and integrated approach to digital learning, emphasizing both the technological infrastructure and the human elements necessary for effective education and professional development. It aims to create a learning environment that not only imparts knowledge but also fosters entrepreneurial skills and career readiness.

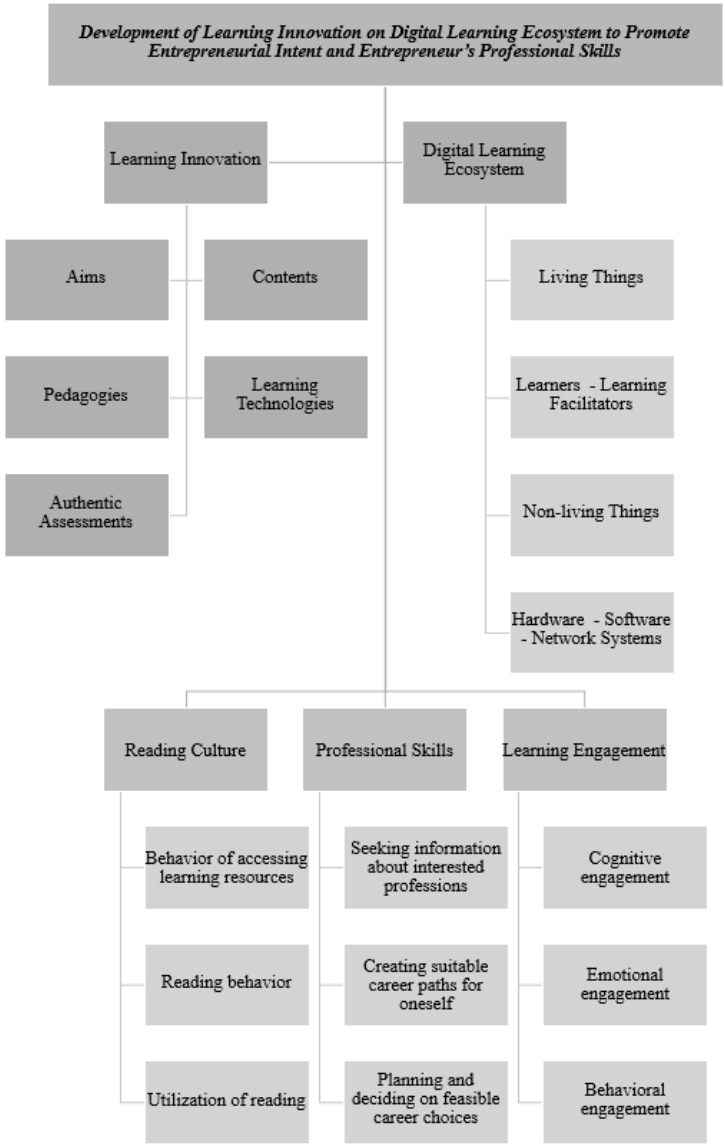

Figure 4: Conceptual Framework

Research Purpose and Questions

Using a multi-stage mixed method research design, this project aims to develop an online learning platform/system that is effective in promoting reading culture, professional skills, and learning engagement among the unemployed in Bangkok, Thailand. This aim falls into two main objectives: (1) evaluating the validity of the online learning platform and (2) implementing the online learning platform and assessing its effectiveness in term of the three types of learning outcomes. To guide this research project, four research questions are delineated. Questions 1 was for Objective 1 and Questions 2, 3, and 4 were for Objective 2.

1) To what extent is the designed learning model appropriate for the improvement in reading culture, professional skills, and learning engagement?
2) Is there a significant difference between pre-test and post-test reading culture?
3) Is there a significant difference between pre-test and post-test professional skills?
4) Is there a significant difference between pre-test and post-test learning engagement?

Figure 5: The Research Design for the Development of Learning Innovation

Methods

Sample and Procedures

This project recruited two groups of participants: (1) four experts in the field of XXX (00 males and 00 females) and (2) 100 participants who are the unemployed, farmers, … (male=00% and female=00%, mean=0.00 and SD=0.00). The experts were involved with the process of evaluating the appropriateness of the designed learning platform/system. The 100 participants were engaged in the process of implementing the model and assessing its effectiveness.

Ethical data collection was prioritized in this study. First, ethic approval was granted by the university's Board of Ethics (Certificate Number: KMUTT-IRB-2024/0806/247. Then, the experts were contacted for the evaluation on the appropriateness of the learning platform/system. After the learning model was hosted, the researchers announced …. Finally, 100 unemployed accessed the learning model to learn various course content. Participation was entirely voluntary and anonymous. The main data collection was administered before and after the implementation of the learning model using Google Forms. The average time used in completing the survey was 40 minutes.

Figure 6: The Rectangular Frame Surrounds the Research Design for the Development of Learning Innovation

Research Methodology

The research methodology focuses on developing learning innovation within a digital learning ecosystem to promote entrepreneurial intent and enhance entrepreneurial skills.

Research Qualitative Before Experiment

Phase 1 Research.

Conduct in-depth interviews with experts, perform a SWOT analysis to identify strengths and weaknesses of the reading culture related to vocational skills for digital citizens in collaboration with educators and academics from the Social Development Office, and facilitate focus group discussions with learners to assess their needs regarding reading culture and vocational skills.

Outcomes.

Learning innovations within the digital learning ecosystem include a model of learning activities, evaluation methods, and data collection tools such as a behavioral assessment form for reading practices related to vocational skills, and a knowledge test on vocational skills for digital citizens.

Intervention Design Research (Mixed Method Research)

Phase 2 Research.

Conduct an experiment with an intervention, using pre-test and post-test measures, by implementing the learning innovations and activity models with the experimental group and collecting data.

Outcomes.

Conduct an experiment with an intervention, using pre-test and post-test measures, by implementing the learning innovations and activity models with the experimental group and collecting data.

Qualitative During Experiment Research

Observe participants' learning behaviors during the experimental activities and conduct focus group discussions with the experimental group to gather insights on their experiences using the learning innovations within the digital learning ecosystem.

Outcomes.

Learning behaviors of the participants. Lessons learned from the application of learning innovations within the digital learning ecosystem and participation in learning activities. Leads to Guidelines for disseminating and transferring the learning innovations within the digital learning ecosystem and learning activities to other areas.

Potential and Readiness

Request cooperation from community members and relevant agencies to promote mutual assistance and increase daily reading among people in the Bangkok area. In addition to the design and development of innovations, factors such as flexibility in acquiring specialized materials and equipment for new innovations are considered. Research management strategies are implemented to ensure stability, with the project budget allocated according to the Sufficiency Economy Philosophy. Project progress is reviewed weekly to ensure alignment with the research plan, and a clear implementation plan is defined for each stage. The innovation model is continuously developed to stay aligned with current trends, and knowledge development activities are organized to ensure success within the research team.

Data Analysis

For the first phase, descriptive statistics were used to evaluate the validity of the designed learning platform/system. For the second phase, paired sample t-tests were used to compare pre-test and post-test scores in each subscale of reading culture, professional skills, and learning engagement.

Seedling Planting Guide

Banana Cake Recipe Guide

Ingredients

1. Red Lotus brand wheat flour, 90 grams (g)
2. Baking soda, 1/2 teaspoon
3. Baking powder, 1/2 teaspoon
4. Granulated sugar, 90 grams (g)
5. Salt, 1/4 teaspoon
6. Vegetable oil, 90 grams (g)
7. Large chicken egg, 1 piece
8. Finely mashed ripe banana, 100 grams (g)
9. Plain fresh milk, 30 grams (g)
10. Yogurt, 17 grams (g)

Steps

The Banana Cake Recipe Guide offers a detailed, step-by-step approach to creating a delectable banana cake. It begins with a precise list of ingredients.

1. It starts with preheating the oven to 200-210°C without the fan setting, followed by sifting and mixing the dry ingredients.

Figure 7: Sift the flour into a mixing bowl, then add the sugar and salt, mixing well before setting it aside

2. The next step involves mashing the banana and combining it with milk, yogurt, and banana flavoring.

Figure 8: Next, combine the vegetable oil and eggs in a mixing bowl and mix well

3. The wet ingredients, including oil and egg, are then mixed separately before being incorporated into the dry mixture.
4. The batter is carefully combined until smooth, then distributed into prepared cups, leaving a 2-3mm rim.

Figure 9: Then, distribute the mixture into the prepared cups, leaving a 2-3mm rim at the top

5. The baking process is precisely timed, starting at 200-210°C for 10 minutes, then reducing to 180°C for an additional 5-8 minutes until fully baked.

Figure 10: Then, reduce the temperature to 180°C and bake for an additional 5-8 minutes until fully cooked

This comprehensive guide ensures that even novice bakers can achieve perfect results, producing a moist, flavorful banana cake with a tender crumb and rich banana taste.

Figure 12: A Rectangular Frame surrounds the Research Design for the Development of Learning Innovation

Results of Research

Phase 1: Evaluating the Validity of the Designed Learning Platform

Q1: To what extent is the designed learning model appropriate for the improvement in reading culture, professional skills, and learning engagement?

Results From Expert Evaluation.

The expert evaluation results indicate strong support for the designed learning platform's appropriateness across multiple dimensions:

- Content Validity: The platform demonstrated high content validity with IOC values ranging between 0.80-1.00, confirming its alignment with intended learning outcomes for reading culture development, professional skill enhancement, and engagement promotion.
- Structural Appropriateness: Experts validated the platform's structural design, particularly noting the effective integration of interactive elements, self-paced learning modules, and professional development components.
- Pedagogical Framework: The learning model's pedagogical approach was deemed highly suitable, incorporating evidence-based strategies for adult learning and

professional development while maintaining engagement through varied content delivery methods.

- Technical Design: The platform's technical architecture received positive evaluation for its user-friendly interface, accessibility features, and robust learning management capabilities, though minor refinements were suggested for mobile optimization.
- Assessment Mechanisms: The embedded assessment tools and progress tracking features were validated as appropriate for measuring the three target outcomes (reading culture, professional skills, and engagement).

Phase 2: Implementing the Online Learning Platform and Assessing Its Effectiveness

Q2: Is there a significant difference between pre-test and post-test reading culture?

Table 1 presents the descriptive statistics for the pre-test and post-test of the subscales of reading culture (i.e., behavior of accessing learning resources, reading behavior, and utilization of reading) and significant levels. Paired sample T-tests revealed that post-test behavior of accessing learning resources, post-test reading behavior, and post-test utilization of reading were significantly higher than pre-test behavior of accessing learning resources, pre-test reading behavior, and pre-test utilization of reading, respectively. This finding suggests that the designed learning platform was effective for improving reading culture in (the sample).

Table 1: Descriptive Statistics for the Pre-test and Post-test of Behavior of Accessing Learning Resources (BALR), Reading Behavior (RB), and Utilization of Reading (UR) and Paired Sample t-Test Results

		Pre-test	Post-test	*t*	*df*			
Variable	N	M	SD	M	SD	*p*		
BALR	100	3.81	0.54	3.89	0.49	4.04	99	0.001
RB	100	3.42	0.66	3.70	0.52	6.79	99	0.001
UR	100	3.73	0.61	4.06	0.50	7.43	99	0.001

Q3: Is there a significant difference between pre-test and post-test professional skills?

Table 2 presents the descriptive statistics for the pre-test and post-test of the subscales of professional skills (i.e., seeking information about interested professions, creating suitable career paths for oneself, and planning and deciding on feasible career choices) and significant levels. Paired sample T-tests revealed that post-test seeking information about interested professions, post-test creating suitable career paths for oneself, and post-test planning and deciding on feasible career choices were significantly higher than pre-test seeking information about interested professions, pre-test creating suitable career paths for oneself, and pre-test planning and deciding on feasible career choices. This finding suggests that the designed learning platform significantly improved professional skills in (the sample).

Table 2: Descriptive Statistics for the Pre-test and Post-test of Seeking Information About Interested Professions (SIIP), Creating Suitable Career Paths for Oneself (CSCP), and Planning and Deciding on Feasible Career Choices (PDFCC) and Paired Sample t-Test Results

		Pre-test	Post-test	*t*	*df*			
Variable	N	M	SD	M	SD	*p*		
SIIP	100	3.70	0.60	3.99	0.38	5.00	99	0.001
CSCP	100	2.82	0.79	3.50	0.49	9.85	99	0.001
PDFCC	100	3.97	0.63	4.24	0.48	5.06	99	0.001

Q4: Is there a significant difference between pre-test and post-test learning engagement?

Table 3 presents the descriptive statistics for the pre-test and post-test of the subscales of learning engagement (i.e., affective or emotional engagement, behavioral engagement, and cognitive engagement) and significant levels. Paired sample T-tests demonstrated that post-test affective engagement, post-test behavioral engagement, and post-test cognitive engagement were significantly higher than pre-test affective engagement, pre-test behavioral engagement, and pre-test cognitive engagement. This finding suggests that the designed learning platform significantly promoted learning engagement in (the sample).

Table 3: Descriptive Statistics for the Pre-test and Post-test of Affective Engagement (AE), Behavioral Engagement (BE), and Cognitive Engagement (CE) and Paired Sample t-Test Results

		Pre-test	Post-test	*t*	*df*			
Variable	N	M	SD	M	SD	*p*		
AE	100	3.99	0.61	4.22	0.48	4.91	99	0.001
BE	100	3.95	0.45	4.15	0.41	4.51	99	0.001
CE	100	3.55	0.64	3.97	0.51	6.14	99	0.001

Conclusions

This research aims to create a learning environment for developing innovative learning on a digital learning ecosystem to promote entrepreneurial intention and entrepreneurial skills. The goal is to excellently enhance the structure of innovative learning ecosystems. This innovation will enable beneficiaries to apply the knowledge gained in their daily lives and further develop it into innovations that can benefit the country in the future. From a policy perspective, it supports the creation of knowledge through diverse activities to build sustainable careers. It also aims to generate new knowledge through more effective reading skills, leading to sustainable self-development.

Figure 14: This Project is Funded by the National Research Council of Thailand (NRCT) and King Mongkut's University of Technology Thonburi, under the NRCT Fiscal Year 2023 Grant (N42A660639)

Acknowledgements

This research project is supported by the National Research Council of Thailand (NRCT) and King Mongkut's University of Technology Thonburi, under the NRCT Fiscal Year 2023 Grant (N42A660639). We would like to thank the KMUTT Human Research Ethics Committee for conducting an evaluation of the research project that falls under human research ethics, in order to request an Exemption Review for human research ethics. The project proposal number is KMUTT-IRB-2024/0425/162, The research project on 'Development of learning innovation on the digital learning ecosystem to promote entrepreneurial intention and professional skills of entrepreneurs', with Asst. Prof. Dr. Sirimonpak Suwannakhun as the principal investigator.

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