Development of Microlearning Platform on Concept Proposals for Graduate-Level Research and Thesis Project Designers

Phongsak Phakamach
Rattanakosin International College of Creative Entrepreneurship, Rajamangala University of Technology Rattanakosin, Thailand
E-mail: phongsak.pha@rmutr.ac.th, ORCID ID: https://orcid.org/0009-0002-6387-0292

Nongkran Anukul
Faculty of Education, Northeastern University, Thailand
E-mail: nongkran2499anukul@gmail.com, ORCID ID: https://orcid.org/0009-0005-9253-3115

Natchaya Sommartdejsakul
Advanced Future Talent Academy, Thailand
E-mail: natchayasommart@gmail.com, ORCID ID: https://orcid.org/0009-0002-8871-6697

Abstract
Background and Aim: Addressing the challenges graduate students face in writing concept proposals for their theses is crucial. This research aims to develop and evaluate a microlearning platform that utilizes the ADDIE model to serve as a flexible and effective learning tool, helping graduate students enhance their research design skills and knowledge. The objectives of this research were: 1) to design and construct a microlearning platform for concept proposals for graduate-level research and thesis project designers, and 2) to pilot and evaluate the use of the microlearning platform for concept proposals for graduate-level research and thesis project designers.
Materials and Methods: This research was a research and development study. The sample group consisted of 78 Master's and Doctoral students in Education, and 10 experts in ICT systems and educational innovation. The research procedure involved 4 steps: 1) studying and analyzing user needs for the platform, 2) designing and developing the platform, 3) testing usability and evaluating the platform, and 4) improving the platform's performance. Quantitative data analysis used statistical software to present the mean and standard deviation, while qualitative data analysis used thematic analysis.
Results: The research found that: 1) The construction of a microlearning platform for concept proposals for graduate-level research and thesis project designers involved four key steps: analyzing user needs, designing and developing the platform, testing its usability and evaluating it, and finally improving its performance. The platform was developed using the ADDIE instructional design process. Experts viewed this platform as highly suitable for practical learning related to designing graduate-level research and thesis projects, with quality evaluation results at a high level. 2) Students showed the highest level of satisfaction with the developed microlearning platform. The platform effectively helped graduate-level learners develop practical skills in designing concept proposals for their thesis development, as well as enhancing their skills in using the microlearning platform and AI tools.
Conclusion: The design, construction, testing, piloting, and evaluation of the microlearning platform prototype concerning concept proposals for graduate-level research and thesis project designers, it was found that the platform developed using the presented research and development methodology is sufficiently high in quality to be confidently used for teaching and learning in courses related to graduate-level seminars, for the preparation of graduate-level theses and independent studies, and dissertation in specified courses, and for general researchers who need to write concept proposals for effective research implementation.
Keywords: Microlearning, Concept Proposals, Research and Development Project, Thesis, Graduate Study

Introduction

The Ministry of Higher Education, Science, Research, and Innovation (MHESI) has formally acknowledged the critical role of Information and Communication Technology (ICT) systems as a cornerstone of modern education. This recognition is not merely a short-term initiative but a deliberate policy, fully integrated with the government's 20-Year National Strategy (2017-2036), the national ICT Master Plan, and the Higher Education Act B.E. 2562 (2019). This strategic alignment has led to a significant push for leveraging digital platforms, the internet, and other technologies to create a global knowledge network. By doing so, it facilitates the seamless connection and sharing of educational information, enabling a broader community to engage in and develop innovative learning models that

lead to intellectual growth and advancement. Consequently, MHESI has established clear policies and standards to actively promote and support educational institutions in adopting these ICT development policies. This includes a strong emphasis on enhancing the digital skills of all stakeholders—instructors, educational personnel, and students alike—in using ICT systems, various applications, and emerging technologies like Artificial Intelligence (AI) (Ministry of Higher Education, Science, Research and Innovation, 2019). The ultimate goal is for every educational institution to effectively manage its ICT systems to foster and sustain educational innovation as a standardized practice for continuous quality improvement (Phakamach & Panjarattanakorn, 2024).

In this era of transformative change (Education Disruption), various teaching and learning models have been employed to promote and address challenges in educational management. Therefore, teaching and learning must adapt to new learning paradigms to enable learners to acquire knowledge independently, especially by fully utilizing educational innovations and technologies (Phakamach, 2023). It is evident that practical learning process skills remain crucial and require continuous training for learners, as practical learning helps students acquire the desired skills and competencies. Furthermore, the changing paradigms and educational approaches in the 21st century emphasize educational management for human potential and capability development. Such approaches focus on learning management processes that promote the development of creative thinking and practical abilities, as well as the use of Learning Management Systems (LMS), blended and practical learning, and AI tools (Luka, 2023; Aad & Hardey, 2025). Therefore, teaching and learning must adapt to new learning paradigms that require active learning to help learners connect knowledge or construct knowledge themselves through hands-on practice via media or learning activities. Consequently, learners will be able to seek knowledge independently, especially by fully utilizing educational innovations and technologies (Martínez Casanovas et al., 2022; Dixit & Jatav, 2024).

The impact of digital education on the management of educational organizations has been continuous, affecting both operations and teaching and learning. Performing duties in this situation requires specific methods for managing educational institutions, particularly online teaching and learning, to maintain educational quality and minimize impact on student learning (Phakamach & Panjarattanakorn, 2024). The era of educational transformation has seen various management models used to promote and solve educational challenges, especially the application of the 5-step ADDIE design process: Step 1 Analysis, Step 2 Design, Step 3 Development, Step 4 Implementation, and Step 5 Evaluation (Crompton et al., 2024). Therefore, teaching and learning must adapt to new learning paradigms to enable learners to independently acquire knowledge and learning skills, especially the ability to fully utilize educational innovations and technologies (Klerk & Palmer, 2022). Thus, the teaching and learning approach according to the new learning paradigm should be learner-centered, emphasizing that knowledge is constructed by the learner. Learners must be able to use their existing knowledge and experience as a foundation for constructing new knowledge. Learning activities should be designed to encourage learners to communicate and interact with peers and the external environment, with instructors assisting learners in correctly applying their existing knowledge and reflecting on discussions with others. Instructors are therefore responsible for creating an appropriate learning environment, posing challenging problems, and helping learners construct new knowledge themselves (Phakamach, 2023).

A Concept Proposal is a document generally used for designing theses or independent studies in graduate-level programs. Writing this document clearly and correctly according to principles requires studying research methodology, which many institutions offer as a compulsory subject in graduate programs. This is because it is a subject that focuses on designing research and development projects in a chosen field to meet the academic standards of each institution. Most learning typically involves regular classroom attendance and seminars between instructors and learners in the classroom, which significantly hinders student learning if there are no supporting information sources or case studies on new research and development project writing. Therefore, the design and creation of learning media, especially Microlearning, which is an educational strategy that delivers content in small, focused units, typically lasting only a few minutes, these modules often concentrate on a single concept or skill, making learning digestible, accessible, and easily repeatable. It promotes on-demand, flexible learning,

allowing individuals to acquire knowledge or refresh skills quickly, often on mobile devices, fitting into busy schedules (Supaporn & Supattra, 2020; Leong et al., 2021). Microlearning is highly effective for skill reinforcement and just-in-time learning. Furthermore, it is a learning management system that connects learners with instructors and learners with each other by providing supplementary teaching materials and various case studies. This self-directed learning approach will effectively solve problems and obstacles encountered by students in their learning (Romero-Rodríguez et al., 2023; Phakamach & Panjarattanakorn, 2024).

Given the background and significance of the problem, it' imperative to conduct research for the development of a microlearning platform for concept proposals for graduate-level research and thesis project designers. This will transform the learning process by using a microlearning platform to support learning activities from short-term training and seminars, aiming to build understanding of concept proposals for research and thesis project designers or graduate-level learners. The design and development process of this microlearning platform applies the ADDIE design and development model, presenting digital learning media with dimensions including: 1) digital learning information on concept proposals, 2) a short-term knowledge management support system, 3) a database and academic services for graduate-level learners, 4) digital communication channels for knowledge exchange and sharing, and 5) communication tools and links with relevant agencies. Therefore, the developed prototype will be a microlearning model for concept proposals and academic services for graduate-level learners, along with quality evaluation by experts and learner satisfaction from using the developed platform. The platform's performance will be improved based on expert feedback. Thus, the microlearning platform is an appropriate model for knowledge management and providing academic services to graduate-level learners, can be practically implemented, and effectively facilitates learning and understanding of concept proposals for research and thesis project designers.

Objectives

1) To design and construct a microlearning platform concerning concept proposals for graduate-level research and thesis project designers.

2) To pilot and evaluate the use of the microlearning platform concerning concept proposals for graduate-level research and thesis project designers.

Literature review

This research study involved a review of relevant literature to serve as key information for research and development, consisting of three items:

ADDIE Model Concept

The ADDIE instructional design process is a 5-step framework that is foundational for creating effective learning experiences. It stands for Analysis, Design, Development, Implementation, and Evaluation (Mayfield, 2011).

(1) Analysis focuses on understanding learning needs, target audience characteristics, prior knowledge, skill gaps, desired learning outcomes, and various constraints. Key activities include needs assessment, learner analysis, objective setting, and identifying the learning environment. The outcome is a clear understanding of the problem, learners, and goals.

(2) Design involves detailed learning planning, including defining behavioral objectives, selecting instructional strategies, content delivery methods, content sequencing, activity design, and evaluation planning. The outcome is a detailed blueprint of the instructional program.

(3) Development is the stage of creating and compiling learning materials according to design specifications. This includes content creation, multimedia assets, online lesson programming, and piloting the materials. The outcome is learning materials ready for implementation.

(4) Implementation is the actual delivery of the instructional program to learners. This includes instructor training, managing the learning environment, and providing learner support. The outcome is learners engaging with the learning materials and activities.

(5) Evaluation is the final stage of assessing the efficiency and effectiveness of the instructional program. Data and feedback are collected to verify whether learning objectives have been achieved and

to identify areas for improvement. Evaluation includes both formative (during implementation) and summative (after completion) assessments. The outcome is insights for continuous improvement.

In addition, ADDIE is a systematic, flexible, and widely accepted model in the field of instructional design. Although sometimes criticized for being too linear, the basic principles of ADDIE remain crucial for creating quality learning experiences (Dick, Carey, & Carey, 2015; Crompton et al., 2024).

Microlearning Concept

Microlearning can be defined as modern learning media divided into small units based on learning topics, with defined learning activities. Its objective is to provide a just-in-time learning management format (Insaard, 2021; Chen, 2022). Therefore, microlearning is a learning strategy that uses a set of content characterized as small learning units or short courses with a systematically planned learning pathway (Osborne & Hogarth, 2021). Microlearning is designed to suit the limitations of the human brain in terms of attention span and to avoid cognitive overload. Microlearning consists of short lessons (Size Lessons) or small lessons with specific learning objectives to support long-term learning and comprehension goals. In another sense, it is self-directed and informal learning, as well as an effective tool to support and reinforce specific learning and knowledge management. This helps facilitate easier understanding and good long-term memory (Mohammed et al., 2018; Leong et al., 2021; Kossen & Ooi, 2021; Phakamach, 2023; Choudhary & Pandita, 2024).

Microlearning Platforms and Their Application

Microlearning platforms are categorized as digital media technology for learning that can be applied in education. They can promote and develop learning in conjunction with interactive learning, which allows instructors and learners to access modern knowledge innovations and interact more conveniently and quickly online. Research reports related to the application of educational platforms often choose platforms with characteristics such as user-friendliness, comprehensive tools, flexibility of use, accessibility, security in use, and no additional costs (Phakamach & Panjarattanakorn, 2024). The process of developing and implementing microlearning to build learning competencies includes: (1) lesson content must align with learning objectives, (2) clearly state objectives and problems to learners, (3) design a good structure and plan for accessing learning, (4) have a system to verify that learners achieve learning outcomes and solve problems, (5) require learners to learn using a Non-Linear Approach and Active Learning, (6) progress towards analytical and critical learning, (7) provide regular practical exercises with immediate feedback, and (8) record access data, knowledge processing results, and usage in a standard format (Dos Santos et al., 2022; Sharma et al., 2024).

In summary, the ADDIE instructional design model is a five-step framework—Analysis, Design, Development, Implementation, and Evaluation—used to create effective learning experiences. Microlearning, on the other hand, is a learning strategy that delivers content in small, easily digestible units to prevent cognitive overload and enhance long-term memory. It is a just-in-time learning method that can be applied through various user-friendly digital platforms. Effective microlearning design requires content aligned with clear objectives, a well-structured learning path, and opportunities for non-linear, active learning with regular feedback. By combining the systematic approach of the ADDIE model with the focused delivery of microlearning, educators can create a powerful and modern learning experience tailored to today's learners. The results from the review of relevant literature can be used as key information for the research and development of a microlearning platform and will be discussed in the next section.

Conceptual Framework

From a review of relevant literature, documents, academic articles, and research reports, the research team designed a research and development methodology and established a conceptual framework for developing a microlearning platform on concept proposals for graduate-level research and thesis project designers, as shown in Figure 1.
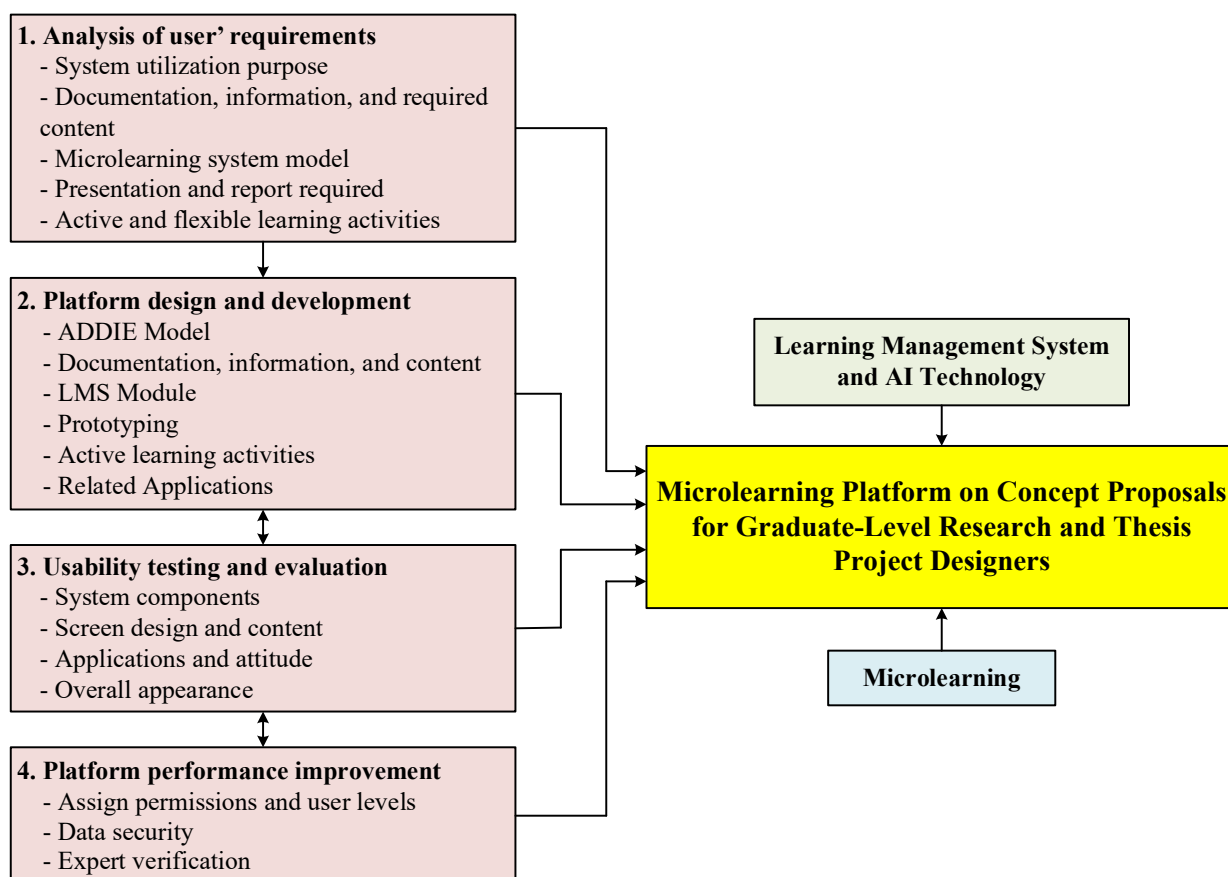
1. Analysis of user' requirements
- System utilization purpose
- Documentation, information, and required content
- Microlearning system model
- Presentation and report required
- Active and flexible learning activities

2. Platform design and development
- ADDIE Model
- Documentation, information, and content
- LMS Module
- Prototyping
- Active learning activities
- Related Applications

3. Usability testing and evaluation
- System components
- Screen design and content
- Applications and attitude
- Overall appearance

4. Platform performance improvement
- Assign permissions and user levels
- Data security
- Expert verification

Learning Management System and AI Technology

Microlearning Platform on Concept Proposals for Graduate-Level Research and Thesis Project Designers

Microlearning

Figure 1: Research Conceptual Framework

Methodology

This research used a research and development (R&D) methodology with related details as follows:

Population and Samples

The study population consisted of students enrolled in Thesis courses (EAS 7401) and (PES 9401) in the Master of Education and Doctor of Education programs at Rattanakosin International College of Creative Entrepreneurship, Rajamangala University of Technology Rattanakosin, during the first semester of academic year 2025. This included 2 classrooms, totaling 78 students. Sample group 1 comprised 10 experts in ICT systems and educational innovation, selected by purposive sampling based on specified qualifications: 1) holding a doctoral degree in educational innovation and technology or related fields, 2) having knowledge and experience in developing ICT systems and educational innovation for more than 5 years, and 3) having demonstrable achievements in designing and developing modern educational media or innovations. Sample group 2 consisted of 50 Master's degree students and 28 Doctoral degree students, obtained through cluster random sampling, using classrooms as the sampling unit, totaling 78 individuals.

Research Instruments

The research and development instruments included: a microlearning platform concerning concept proposals for graduate-level research and thesis project designers. The research instruments used for data collection included: 1) a Semi-structured Interview Form for studying and analyzing the needs of platform users, covering both instructors and students; 2) a Platform Quality Evaluation Form for experts in ICT systems and educational innovation, using a 5-point Rating Scale; 3) a Student Satisfaction Evaluation Form, using a 5-point Rating Scale, assessing the suitability of the platform in terms of its components, design and content, and usability; and 4) a Structured Interview Form for interviewing participants about their platform usage, covering issues such as (1) knowledge and

application, (2) behavior and response, (3) participation, (4) usage results and attitudes, and (5) problems and suggestions.

Research Procedures

As this research is a Research and Development (R&D) study, the research team defined the research procedures into 4 steps, as shown in Figure 2, to cover the research issues sequentially, with details as follows:

1) Analysis of User Requirements

This involved studying and analyzing the needs of both instructors and learners for the microlearning platform, to identify necessary requirements for designing and constructing the platform.

2) Platform Design and Development

This involved designing and developing the platform using Learning Management System (LMS) software, programs related to digital media development, AI tools for research development, and designing case studies related to concept proposal content, including initial usability testing.

3) Usability Testing and Evaluation

This stage involved piloting the platform for 1 month, comprising 10 practical learning units, testing the quality of use by experts, and testing user satisfaction with the platform by students. The experiment and data collection were structured as follows:

3.1) Experimental Preparation:

(1) Obtaining permission to collect data and pilot the developed platform for 3 months,

(2) preparing the developed prototype for upload to the website, uploading data to the server, and testing functionality, and

(3) preparing the location, computers, and setting the duration of the experiment, by conducting practical testing on the content of the comprehensive concept proposal writing.

3.2) Experiment Implementation: The platform prototype, having been evaluated by experts, was then piloted for quality assessment through field testing:

(1) The developed platform was provided to training participants for practical use for 3 months (1 week per learning unit). 78 student samples were selected, and data were collected between January and March 2025. A briefing session was held before the experiment, and the overall quality was evaluated after the experiment.

(2) Interviews were conducted with consistently active student participants, and

(3) interview results were analyzed, summarized in narrative form, and the platform was revised to be appropriate and complete according to the research objectives.

4) Platform Performance Improvement

This involved analyzing and confirming the results from step 3 and enhancing the performance of the microlearning platform for concept proposals for graduate-level research and thesis project designers to be effective according to the defined objectives.
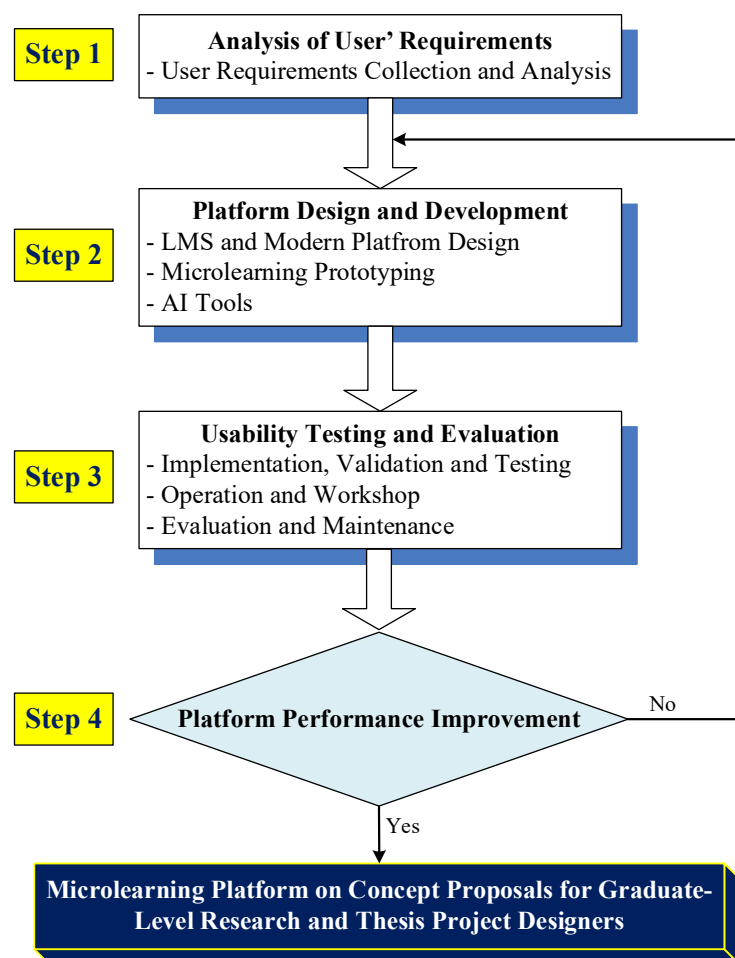
Step 1

Analysis of User' Requirements
- User Requirements Collection and Analysis

Step 2

Platform Design and Development
- LMS and Modern Platfrom Design
- Microlearning Prototyping
- AI Tools

Step 3

Usability Testing and Evaluation
- Implementation, Validation and Testing
- Operation and Workshop
- Evaluation and Maintenance

Step 4

Platform Performance Improvement   No

Yes

Microlearning Platform on Concept Proposals for Graduate-Level Research and Thesis Project Designers

Figure 2: Research Procedure

Data Analysis

The data obtained from the 4 steps of the research procedure were analyzed sequentially as follows:

1) Analysis of User Requirements

Summarized in narrative form to present necessary details for platform design and development, including: (1) purpose of use, (2) desired documents, data, and content, (3) microlearning platform format, (4) desired presentation and reports, (5) active learning activities, and (6) practical activities.

2) Evaluation of Platform Design and Development by Experts

10 experts in ICT systems and educational innovation provided evaluations, summarized in narrative form to present details including: (1) LMS Module, (2) ADDIE Process, (3) Microlearning Prototyping, (4) programs related to Social Media development, and (5) AI tools.

3) Usability Testing and Evaluation

This involved evaluating the quality of the developed platform using a 5-point rating scale.

Data analysis at this stage involved a preliminary assessment of data from steps 1 and 2 before proceeding with the quality and satisfaction evaluations. The processes in step 2 could be modified as appropriate to the given timeframe. Actual usage tests were conducted, and studies followed the defined format to ensure a suitable microlearning platform. The sample group was divided into two groups: Group 1 consisted of 10 experts in ICT systems and educational innovation, and Group 2 consisted of 78 graduate-level learners in total. This stage aimed to test the usability quality of the microlearning platform, identify problems and obstacles, and determine solutions. Data collection tools were categorized by study population as follows:

[31]

Group 1 involved a Workshop and Interviews.

Group 2 involved Workshop Facilitation and Participant Observation, using a questionnaire comprising checklist items, fill-in-the-blank questions, and a 5-point rating scale. The questionnaire had three parts:

Part 1: Information about the respondents.

Part 2: Opinions on the use of the microlearning platform concerning concept proposals for graduate-level research and thesis project designers, which were analyzed for user quality and satisfaction. The scoring criteria were: Highest = 5, High = 4, Moderate = 3, Low = 2, and Lowest = 1.

Part 3: Suggestions and guidelines for the microlearning platform concerning concept proposals for graduate-level research and thesis project designers.

The questionnaire instrument was created and validated by presenting a draft to 3 experts to check for content validity, language appropriateness, and wording. It was then trialed, and its reliability was tested using Cronbach's Alpha Coefficient, resulting in an overall questionnaire reliability of .926.

Subsequently, the data were analyzed using statistical software to determine the Quality and Satisfaction of using the microlearning platform for concept proposals for graduate-level research and thesis project designers. The evaluation format for user quality and satisfaction was presented statistically according to data analysis principles as follows:

Data analysis for Group 1:

Data were analyzed and synthesized to identify approaches for improving and developing the platform's performance, as well as providing correct usage recommendations according to the defined format to enable users to effectively utilize this microlearning platform.

Data analysis for Group 2:

Part 1: Data on respondent demographics were analyzed using frequency distribution and percentages.

Part 2: Data on opinions regarding the use of the microlearning platform concerning concept proposals for graduate-level research and thesis project designers, which was rating scale data, were analyzed by calculating the mean and standard deviation.

Part 3: Data on suggestions and guidelines for developing the microlearning platform concerning concept proposals for graduate-level research and thesis project designers, which was fill-in-the-blank data, were analyzed by summarizing to identify suggestions and development guidelines. The mean values from the rating scale questionnaire in Group 2 were compared against the interpretation criteria for mean values as follows: 4.21–5.00 means quality and satisfaction are at the highest level; 3.41–4.20 means quality and satisfaction are at a high level; 2.61–3.40 means quality and satisfaction are at a moderate level; 1.81–2.60 means quality and satisfaction are at a low level; and 1.00–1.80 means quality and satisfaction are at the lowest level. The class interval width was determined by the formula = (5-1)/5 = 0.8.

4) Platform Performance Improvement

This research stage involved analyzing the research results from step 3 and performing quality improvements. Unstructured interviews using a Focused Interview method were conducted with 10 experts in ICT systems and educational innovation to solicit their opinions on usage and obtain suggestions for confirmation. The results of this review were then used to refine the performance of the microlearning platform to meet the requirements of modern learning management.

Results

The research findings for developing a microlearning platform concerning concept proposals for graduate-level research and thesis project designers can be summarized under the four key steps of the research process as follows:

1. Analysis of User Requirements

The research found that both instructors and learners required a platform that could be used for training on concept proposals, covering essential topics such as Research Title, Name of Researcher/Advisor, Introduction, Research Question/Research Hypothesis, Research Objectives, Expected Benefits from Research, Literature Reviews, Definition of Specific Terms, Research

Methodology, Research Procedure, Duration of Research, Scope of Research, Value and Possibility of Research, Stakeholders of Future Research/Development, Original Contribution to Scientific Knowledge, Brief Structure of Study, References, and Author's Profile. The platform also needed to be accessible to users via the internet. The suitable research and development method for the microlearning platform on concept proposals for graduate-level research and thesis project designers comprised 4 steps: 1) Analysis of User Requirements, 2) Platform Design and Development, 3) Usability Testing and Evaluation, and 4) Platform Performance Improvement.

2. Platform Design and Development

The study found that a standardized short-form learning media development process should be used for developing the learning management system. Clear procedures and methods for knowledge exchange and sharing should be defined to ensure the platform can fully support learning for the specified content.

3. Usability Testing and Evaluation

The study found that after implementing and evaluating the platform, the analysis of its quality by experts and user satisfaction with the microlearning platform for concept proposals for graduate-level research and thesis project designers can be summarized as follows:

3.1 The overall quality of the platform, based on expert opinions, was at a high level ($\bar{x}$=4.20, S.D.=0.55), as shown in Table 1. This indicates that the developed platform is highly functional as a tool for managing learning related to concept proposal writing for both instructors and learners, in line with the objectives. It effectively supports learning about concept proposals for graduate-level research and thesis project designers, making it an efficient tool for learning and practical application on the specified topics.

Table 1: Platform Quality Evaluation Results from Experts

Topics and Assessment Items		$\bar{x}$	S.D.	Interpret
System components and learning activities	1. Microlearning platform	4.35	0.55	Highest
	2. Active learning activities	4.32	0.65	Highest
	3. Measuring and evaluating knowledge	4.17	0.50	High
	4. Discussion board and share	4.07	0.55	High
	5. Knowledge repository	4.11	0.55	High
	6. Document download	4.26	0.65	Highest
	7. Pictures of various activities	4.08	0.65	High
Design and development	8. Content and consistency	4.41	0.45	Highest
	9. Formats and font sizes	4.23	0.65	Highest
	10. Font colors and background	4.08	0.65	High
	11. Visual and sound effects	4.04	0.50	High
	12. Multimedia system	3.98	0.55	High
	13. Instructions and Manuals	4.08	0.55	High
	14. Overall content and screen	4.31	0.50	Highest
	15. Design process	4.47	0.55	Highest
Usability	16. Membership system	4.21	0.55	Highest
	17. Back-end system	4.09	0.45	High
	18. Link and search section	4.28	0.45	Highest
	19. Interaction and assignment section	4.32	0.65	Highest
	20. Educational management applications	4.08	0.45	High
	21. Purposeful implementation	4.10	0.55	High
	22. Practice in the course	4.36	0.65	Highest
Total		**4.20**	**0.55**	**High**

3.2 The overall satisfaction from the learners' opinions regarding the use of the microlearning platform was at the highest level ($\bar{x}$=4.28, S.D.=0.65), as shown in Table 2. This indicates that learners, as users of this platform, had a satisfactory level of usage satisfaction. This is because the platform

effectively met the learning management needs related to concept proposals for graduate-level research and thesis project designers, enabling learners to develop concept proposals in preparation for their theses according to the prescribed learning management program.

Table 2: Learner Satisfaction Evaluation Results from Platform Usage

Topics and Assessment Items		$\bar{x}$	S.D.	Interpret
System components and learning activities	1. Website	4.33	0.59	Highest
	2. Knowledge record	4.36	0.53	Highest
	3. Measuring and evaluating knowledge	4.35	0.62	Highest
	4. Discussion board	4.08	0.52	High
	5. Knowledge repository	4.28	0.52	Highest
	6. Active learning activities	4.30	0.64	Highest
	7. Pictures of various activities	4.26	0.65	Highest
Screen design and content	8. Content and consistency	4.38	0.65	Highest
	9. Formats and font sizes	4.25	0.56	Highest
	10. Font colors and background	4.28	0.57	Highest
	11. Visual and sound effects	4.25	0.60	Highest
	12. Multimedia system	4.14	0.66	High
	13. Instructions and Manuals	4.23	0.65	Highest
	14. Overall screen	4.39	0.61	Highest
	15. Design process and collaboration	4.36	0.57	Highest
Usability and attitude	16. Membership system	4.27	0.62	Highest
	17. Back-end system	4.15	0.60	High
	18. Link and search section	4.35	0.70	Highest
	19. Interaction section	4.22	0.65	Highest
	20. Enhance cognitive skills	4.26	0.71	Highest
	21. Purposeful implementation	4.34	0.66	Highest
	22. Practice in the course	4.40	0.67	Highest
Total		4.28	0.65	Highest

The interview results regarding learners' opinions on the use of the microlearning platform for concept proposals for graduate-level research and thesis project designers, across 5 key areas, are as follows:

1) Knowledge and Application: Learners found the microlearning platform for concept proposals for research and thesis project designers suitable for graduate-level teaching and learning. They could apply the knowledge to design concept proposals for their theses and independent studies, as well as to design future research projects.

2) Behavior and Response: Learners utilized the interaction sections with instructors and among themselves. They engaged in course activities such as group discussions, individual discussions, brainstorming, exercises, self-problem-solving, and presenting assigned work. They also used the search system and links for course-related information, and recorded knowledge for exchange and sharing, as well as knowledge assessment, which yielded results according to classroom knowledge management processes. This enabled self-development and enhanced experience in developing modern concept proposals.

3. Participation: The platform successfully motivated students to use it, creating an atmosphere for knowledge exchange and transfer within the online community. Furthermore, participatory activities and concise content helped students practice skills in developing concept proposals for research design.

4) Usage Results and Attitudes: Learners expressed satisfaction with the system and partially adapted the knowledge and skills related to concept proposal design from other members. This contributed to enhanced learning competency in graduate-level research design.

5) Problems and Suggestions: Learners requested more support for relevant academic documents or case studies. Regarding practical exercises, the time allocated for both theoretical learning and practical components within the course should be appropriately aligned.

4. Platform Performance Improvement

The research findings indicate that experts believe the developed platform could genuinely be used for practical training. The platform features learning steps with comprehensive supporting functions. It provides practical sections aligned with the content, including hands-on learning and relevant case studies to enhance understanding. Furthermore, the platform can operate according to the defined schedule and should utilize a Content Management System (CMS) and supplementary AI technology to become an even more complete learning management system. Examples of the platform as shown in Figures 3 and 7, respectively.

Figure 3: Microlearning platform on concept proposals for graduate-level research and thesis project designers
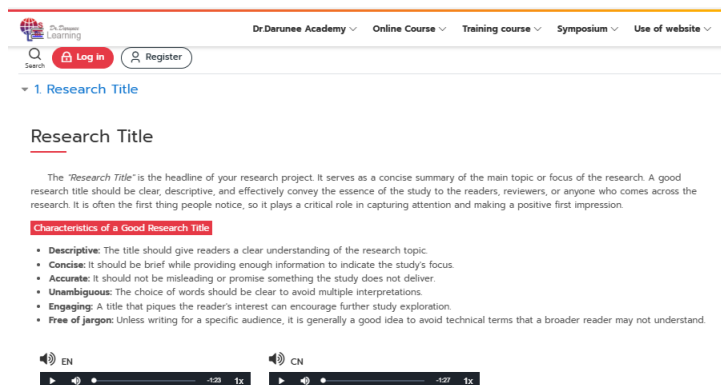

Figure 4: Concept proposals content

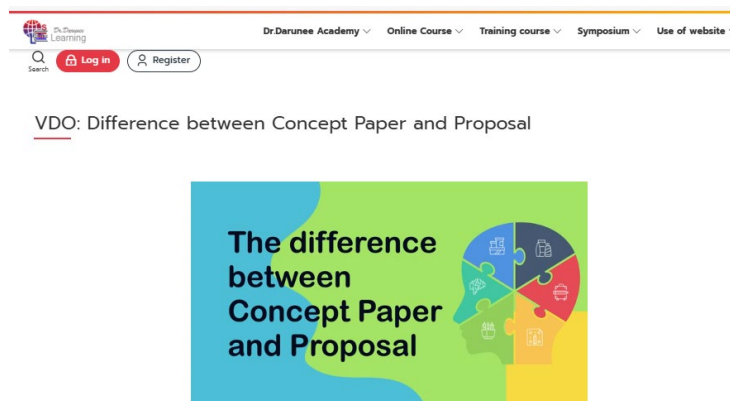Figure 5: Example of research title part

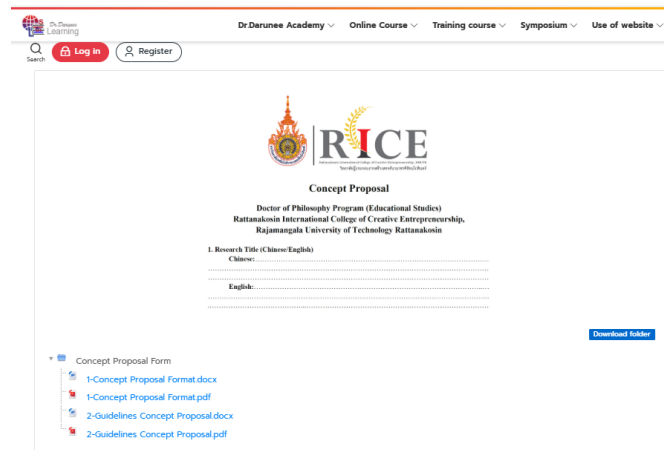Figure 6: Example of a multimedia system

Figure 7: Example of **a** document and concept proposals template

In summary, from the design, construction, testing, piloting, and evaluation of the microlearning platform prototype concerning concept proposals for graduate-level research and thesis project designers, it was found that the platform developed using the presented research and development methodology is sufficiently high in quality to be confidently used for teaching and learning in courses related to graduate-level seminars, for the preparation of graduate-level theses, independent studies, and dissertation in specified courses, and for general researchers who need to write concept proposals for effective research implementation.

Conclusion

Based on the research's findings, the following conclusions could be drawn about the two primary objectives of this study.

1) Design and Construction of the Microlearning Platform

The first objective of this research, which was to design and construct a microlearning platform for graduate-level research and thesis project designers, was successfully achieved. The study systematically followed a research and development methodology, which began with a thorough analysis of user needs among graduate students and a review of established instructional design principles. By adopting the ADDIE model as its core framework, the research was able to meticulously plan and develop a platform that is not only robust in its technical design but also pedagogically sound. The design process focused on creating a user-friendly, flexible, and accessible tool that could deliver learning content in a "bite-sized" format, which is particularly effective for complex topics like research proposal writing. The platform was structured to provide a logical learning path while also allowing for a non-linear approach, catering to the diverse learning styles and schedules of graduate students. The output of this stage was a functional, ready-to-use microlearning platform that served as the prototype for the subsequent evaluation phase. The successful construction of this platform demonstrates that a systematic and well-planned approach can yield a high-quality educational tool that directly addresses a specific academic need.

2) Pilot and Evaluation of the Microlearning Platform

The second objective, to pilot and evaluate the use of the microlearning platform, was also met with highly positive results. The evaluation process involved a pilot test with a sample group of graduate students and an assessment by experts in educational technology and innovation. The findings indicate that the platform is both effective and well-received. Experts gave the platform an outstanding overall quality rating, affirming its suitability for practical learning and its alignment with modern instructional design standards. Most importantly, the student evaluation revealed a very high level of satisfaction and a strong belief that the platform was instrumental in helping them develop practical skills in research design. The data collected confirmed that the microlearning approach successfully motivates students, facilitates knowledge exchange, and provides a clear pathway for them to overcome the common hurdles of writing thesis concept proposals. This hands-on, self-directed learning environment proved to be a valuable alternative to traditional seminar-based instruction, which often lacks the supporting information and case studies necessary for deep understanding. The successful evaluation validates the platform's utility as a modern, effective educational media that can be integrated into graduate-level curricula to improve student outcomes and foster a more dynamic learning experience.

Discussion

Based on the research and development of a microlearning platform concerning concept proposals for graduate-level research and thesis project designers, the issues and findings could be discussed in order, according to the objectives and research procedures:

1) To design and construct a microlearning platform concerning concept proposals for graduate-level research and thesis project designers.

The discussion points are as follows:

1.1 The developed platform prototype: The research team applied a research and development framework based on the concepts of Kant et al. (2021), Murphy and Kelliher (2022), and Phakamach (2023) to design the research. The steps included: (1) content analysis, (2) platform design by sequencing content, classifying topics according to microlearning principles, defining learning activities, identifying relevant research sources, creating virtual learning environments, knowledge processing, and knowledge exchange, (3) platform development adhering to the 4Is standards (Information, Interactive, Individual, and Immediate Feedback), (4) platform usage for training through designated communication channels, and (5) testing for quality and satisfaction based primarily on expert and participant feedback.

1.2 Results of quality evaluation by experts: The developed platform was found to be highly suitable, indicating its satisfactory quality and practical applicability. This is attributed to the research

team's systematic approach, applying the 5-step ADDIE process, which underwent expert review. Subsequently, it was piloted with the sample group to evaluate quality, and the results were used for revisions. This method of producing digital media, following the R&D process, aimed for maximal completeness, aligning with the research findings of Osborne and Hogarth (2021), Maslov et al. (2021), Almoslamani (2022), Klerk and Palmer (2022), Crompton et al. (2024), and Phakamach and Panjarattanakorn (2024). However, to achieve an even better learning management prototype and greater usability for participants, improvements should focus on adding research sections, relevant and reliable case studies, some related multimedia and graphics for increased appeal, and supplementary AI technology for critical learning. This is to ensure the platform's completeness and its enhanced role as a learning resource supporting thesis or independent study.

2) To pilot and evaluate the use of a microlearning platform concerning concept proposals for graduate-level research and thesis project designers.

The discussion points are as follows:

2.1 Results of satisfaction evaluation by learners: The developed platform garnered the highest level of satisfaction, demonstrating that learners could effectively learn and understand how to write concept proposals for graduate-level research and thesis project designers. The microlearning platform effectively supported learning, consistent with research by Kossen and Ooi (2021), Chen (2022), Jang et al. (2022), Romero-Rodríguez et al. (2023), and Phakamach and Panjarattanakorn (2024), which found that a well-developed platform should have at least four components: data and content sources, support resources, discussion forums, and active learning activities. Additionally, including case studies on relevant issues would help learners understand and enable the creation of virtual learning models if all dimensions promoting active learning models are developed (Phakamach et al., 2022; Jahnke, 2023; Sung et al., 2023; Dixit & Jatav, 2024). Therefore, the developed platform possesses comprehensive components suitable for use as a tool supporting learning management related to concept proposals for graduate-level research and thesis project designers.

2.2 Results of platform usage confirmation by experts from group interviews: The microlearning platform concerning concept proposals can be utilized as a modern classroom for developing practical knowledge in the form of graduate-level research and thesis projects. This enables learners to acquire both theoretical knowledge, practical experience, and hands-on learning for designing quality research and thesis projects according to standards. Therefore, the research findings qualitatively confirm the developed platform's quality, stemming from its components and development steps that meet international quality standards (Kant et al., 2021; Tam, 2022; Fidalgo-Blanco et al., 2022; Phakamach & Panjarattanakorn, 2024).

Knowledge Contribution

The study makes a significant knowledge contribution by providing a validated and effective model for developing a microlearning platform specifically tailored for graduate-level research and thesis project designers. The research demonstrates that this platform, built using the ADDIE instructional design process, is highly suitable for practical learning. The findings confirm that such a platform not only meets the needs of graduate students but also enhances their practical skills in designing research concept proposals. This is particularly important given the challenges students face in this area, which are often compounded by traditional learning methods that lack supporting information sources and case studies. The developed prototype serves as a concrete example of how modern educational technology can be applied to solve a specific academic problem, offering a blueprint for other institutions and researchers.

Furthermore, the research provides a comprehensive methodology for the design, construction, and evaluation of such a platform. It outlines a four-step research and development process—user needs analysis, platform design and development, usability testing and evaluation, and performance improvement. The study's detailed findings on expert quality evaluations and student satisfaction provide empirical evidence of the platform's effectiveness and usability. The inclusion of a detailed literature review on the ADDIE model and microlearning concepts grounds the research in established educational theory. The platform's success in motivating student participation and facilitating

knowledge exchange within an online community highlights its potential to transform traditional seminar-based learning into a more interactive and self-directed experience. The findings ultimately provide a model for creating standardized, modern learning media that can be used for teaching and learning in graduate-level courses, and for general researchers seeking to write effective concept proposals.

Recommendations

The researchers put forward two kinds of feedback as follows:

Recommendations for applying the research results

The implementation and quality enhancement of this microlearning platform involve the following:

1) Based on the research findings that the microlearning development process should utilize standard methods and programs for designing and developing the learning management system, the development of a microlearning platform necessitates a multidisciplinary development team. This team should include instructors, subject matter experts, educators, educational psychologists, programmers, and educational innovation and technology designers, among others. This ensures the platform is truly suitable for learners and performs effectively, achieving the specified practical learning outcomes.

2) Given the research findings that users' platform usage skills are crucial and necessary for fast and cost-effective microlearning within limited timeframes, training in browser or application literacy should always be provided before actual training sessions. This ensures learners or trainees understand the correct methods and can independently solve problems encountered during learning and practical exercises.

3) Considering the research findings that microlearning usage requires consistent practical application, details of activities appropriate for the content should be added. Examples include learning resources and case studies related to writing concept proposals at the graduate level, the application of AI technology for in-depth research, specialized problem-solving, and active, interactive components. This aims to provide in-depth practical training for learners on topics of interest and to broaden their learning.

4) For the development of a standardized microlearning platform that can serve as a model for modern learning media, appropriate and consistent use of text, graphics, audio, multimedia, and AI technology should be selected in conjunction with learning activities and within specified timeframes. This is to engage learners in situational learning, achieve desired learning outcomes through practical exercises, and ensure efficient information processing within the given time.

Recommendations for further research

To enhance the quality and performance of this research, the research and development model should be improved in the future for the following issues.

1) This microlearning platform should be further developed to include components that make it a more standardized modern learning medium. This will yield in-depth data to improve the comprehensive practical learning model for increased efficiency.

2) Digital platforms should be researched and developed using blended learning or HyFlex learning models that can create a more positive feeling and imagination for online learners by enhancing multimedia and communication channels to be more engaging.

3) Research and development of microlearning systems or learning management models for other content should be increased to augment modern learning resources for Thailand's educational development.

4) Microlearning research and development should focus on content related to modern life skills in the digital education era for the development of other professions for Thais, and for applying this knowledge towards national development.

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