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Development of a Collaborative Active Learning Management Platform in an English Communication Course for Education and Application with Undergraduate Students

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Abstract

Background and Aim: Thailand's declining undergraduate English communication scores and continued teacher-centered EFL practices underscore the urgent need for innovation. This Research and Development study created a Collaborative Active Learning (CAL) management platform, designed with the ADDIE model to promote interactive, student-centered learning, strengthen 21st-century skills, reduce language anxiety, and provide a scalable digital solution aligned with national policies and CEFR standards. The study aimed to: (1) develop and implement the CAL platform for the English Communication for Education course; (2) evaluate its efficiency using the 80/80 criterion; (3) determine its effectiveness index; (4) compare students' achievement before and after use; and (5) examine expert and student feedback on the platform.
Materials and Methods: This research was a research and development study. The sample consisted of 57 undergraduate students in the Faculty of Education, selected through cluster random sampling using classrooms as the sampling units. The research instruments included: 1) the developed CAL for the English Communication for Education Course; 2) a learning achievement test; 3) an expert evaluation form for the platform's quality; and 4) a student satisfaction questionnaire. Data were analyzed using percentages, means, standard deviations, and *t*-tests.
Results: The results showed that the developed platform achieved an efficiency of 81.08/83.97, exceeding the 80/80 standard, with an effectiveness index of 0.8241. Students' post-test scores were significantly higher than their pre-test scores at the .05 level. Experts rated the platform's quality as high, while students reported the highest level of satisfaction. The platform is practical for real-world implementation and effectively enhances learning for the English Communication for Education Course.
Conclusion: This research and development (R&D) study developed a Collaborative Active Learning (CAL) management platform for the undergraduate English Communication for Education course using the ADDIE model. The platform significantly improved student achievement, reduced language anxiety, and received high levels of satisfaction from both experts and students. It provides a replicable, evidence-based approach to transforming EFL instruction and fostering 21st-century skills in Thai higher education.

Keywords: Collaborative Active Learning, Learning Management System, English Communication for Education, Undergraduate Students

Introduction

The National Education Plan of Thailand (2017-2036) sets two main educational goals to achieve its vision: learner-centered goals and education management goals. The learner-centered goals aim to develop every learner with 21st-century skills and characteristics known as "3Rs8Cs," consisting of the 3Rs (Reading, Writing, and Arithmetic) and the 8Cs (Critical Thinking and Problem-Solving, Creativity and Innovation, Cross-Cultural Understanding, Collaboration, Teamwork and Leadership, Communication, Information and Media Literacy, Computing and ICT Literacy, Career and Learning Skills, as well as Compassion, Discipline, Morality, and Ethics) (Ministry of Education, 2022; Phakamach et al., 2022). Additionally, the Ministry of Education's announcement dated 25 June 2021, together with the Ministry of Higher Education, Science, Research and Innovation, outlined policies for fiscal years 2021–2022 that include: 1) modernizing curricula and learning processes to keep pace with

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21st-century changes, developing students at all levels with knowledge, skills, and attributes suitable for Thai society; 2) enhancing the quality and effectiveness of teachers and lecturers in basic, vocational, and higher education by building language and digital competencies, enabling modern, outcome-responsible instruction; and 3) transforming learning through the National Digital Learning Platform (NDLP) and everyday digital skills practice, with agencies developing a modern national platform, providing broad online access to resources, and utilizing centralized educational databases to improve management efficiency (Ministry of Higher Education, Science, Research and Innovation, 2019; Phakamach & Panjarattanakorn, 2024).

The Self-Assessment Report (SAR) for quality assurance of the Faculty of Education, Saint Theresa University, Bangkok, for the academic year 2024 revealed a declining trend in English Communication for Education test scores: an average of 37.36 in 2023, dropping to 36.88 in 2024 and further to 36.14 in 2025 (Faculty of Education, Saint Theresa University, 2025). The main causes were students' lack of analytical skills for national standardized tests due to insufficient collaborative learning environments in English classes—despite collaborative learning aligning with several 21st-century skills such as collaboration, teamwork, leadership, communication, and media literacy. Students also lacked achievement motivation, displayed anxiety and low confidence in participation (answering questions, expressing opinions, presenting work), tended to copy assignments or ignore deadlines, and experienced teacher-centered "chalk-and-talk" instruction with outdated content that had little real-world application. Thus, creating a supportive collaborative learning environment between teachers and students, and among students themselves, using up-to-date technology and team-based approaches, is essential (Phakamach, 2023).

Thailand has long adopted the English as a Foreign Language (EFL) paradigm, yet learning outcomes remain unsatisfactory. Since 2015, the Ministries of Education and Higher Education have promoted the Common European Framework of Reference for Languages (CEFR) to improve English instruction effectiveness. CEFR-based teaching emphasizes five principles: 1) teaching language for communication, 2) form-focused instruction, 3) project- and action-research-based learning, 4) cooperative learning that reflects real-life contexts, and 5) networking across classrooms and institutions to prepare students for broader communities. Collaborative learning directly supports these CEFR principles, especially communication-focused teaching, project-based learning, cooperative approaches, and networking (Office of the Higher Education Commission, Ministry of Education, 2016; Ngonkum & Deerajviset, 2024; Wudthayagorn, 2025). The research problem addressed in this study stems from Thailand's declining undergraduate English communication scores and the persistence of teacher-centered EFL practices, which fail to equip students with essential 21st-century skills. Despite national policies promoting learner-centered approaches, CEFR standards, and digital learning platforms, many students continue to struggle with low achievement, language anxiety, lack of motivation, and limited opportunities for collaborative learning. Traditional "chalk-and-talk" instruction and outdated content further exacerbate these issues, leaving students underprepared for real-world communication and professional demands. Consequently, there is an urgent need for an innovative, technology-driven solution that fosters interactive, collaborative, and student-centered learning environments to improve English communication competence and align higher education outcomes with national and international standards.

Collaborative Active Learning (CAL) allows students to work in groups, exchange ideas, analyze critically, interact intensively, discuss, critique, share resources, and take collective responsibility for group success. It effectively develops teamwork and problem-solving skills and can be implemented via mobile devices, wireless communication, cloud technology, and online social media. Instructors must design modern digital lessons and materials that match students' devices and platforms to facilitate guidance and interaction (Kant et al., 2021; Klerk & Palmer, 2022; Martínez Casanovas et al., 2022). Modern Learning Management Systems (LMS) with online multimedia content, animations, videos, immediate feedback, and interactive elements significantly increase motivation and enable self-paced learning (Maslov et al., 2021; Jang et al., 2022; Luka, 2023). Success in collaborative learning requires appropriate teaching techniques, student readiness, active participation, and shared responsibility, with

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group success achieved only when all members reach the common learning goals (Fidalgo-Blanco et al., 2022; Boren & LaLonde, 2022; Tam, 2022).

Based on the aforementioned problems and theoretical foundations, the research team is interested in developing a Collaborative Active Learning Management Platform for the English Communication course for Education and applying it with undergraduate students. This study adopts a Research and Development (R&D) methodology to create and implement a learning management platform for the English Communication for Education course that employs collaborative learning techniques centered on undergraduate students. The platform is designed and developed following the ADDIE instructional design model. It integrates educational innovations and technology as supplementary tools to enhance teaching and learning, while creating activities aligned with 21st-century skills (3Rs8Cs) within the course. This approach enables students to independently seek knowledge from diverse sources, fostering the ingrained behavior of "learning how to learn." Furthermore, it transforms learning processes and instructional activities to establish a digital-for-learning environment in classrooms and institutions. The developed platform is expected to facilitate proactive collaborative learning in class, build competencies in collaborative proactive learning, effectively address students' needs in English language skills in line with current contexts, and serve as a model for further developing the knowledge and capabilities of faculty members and educational personnel in higher education institutions that utilize ICT systems and educational innovations in teaching and learning.

Objectives

1) To develop and implement a collaborative active learning management platform for the English Communication Course for Education and application with undergraduate students.

2) To evaluate the efficiency of the collaborative active learning management platform for the English Communication Course for Education and application with undergraduate students, according to the 80/80 criterion.

3) To determine the effectiveness index (E.I.) of the collaborative active learning management platform for the English Communication Course for Education when applied with undergraduate students.

4) To compare learning achievement before and after using the collaborative active learning management platform for the English Communication for Education Course with undergraduate students.

5) To examine the opinions of experts and undergraduate students regarding the collaborative active learning management platform for the English Communication Course for Education.

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; Molenda, 2015; Chang et al., 2024).

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

2) Design (D) involves detailed instructional planning. This stage includes defining measurable behavioral objectives, selecting appropriate instructional strategies and content delivery methods, sequencing the content, designing activities, and planning the evaluation process. The outcome is a detailed blueprint of the instructional program.

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3) Development (D) is the stage where learning materials are created and compiled according to the design specifications. This encompasses content creation, the development of multimedia assets, programming the online lessons, and piloting the materials. The outcome is a set of learning materials ready for implementation.

4) Implementation (I) is the stage of actual delivery of the instructional program to the students. Key activities include training instructors, managing the learning environment, and providing comprehensive learner support. The primary outcome is students actively engaging with the provided learning materials and activities.

5) Evaluation € is the final stage, dedicated to assessing the efficiency and effectiveness of the instructional program. Data and feedback are systematically collected to verify the achievement of learning objectives and to identify areas for subsequent improvement. Evaluation includes both formative (conducted during implementation) and summative (conducted after completion) assessments. The outcome provides actionable insights for continuous program 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 et al., 2015; Spatioti et al., 2022; Crompton et al., 2024).

Collaborative Active Learning Concept

Collaborative Active Learning (CAL) is an instructional approach that integrates active learning with collaborative learning. Students actively engage in meaningful tasks (doing, discussing, problem-solving, and reflecting) while working interdependently in structured groups. It emphasizes positive interdependence, individual accountability, promotive interaction, explicit development of social skills, and group reflection. Grounded in Vygotsky's sociocultural theory and the ICAP framework, CAL demonstrates that the interactive mode—where students co-construct knowledge through peer interaction—yields the highest learning outcomes (Andrews-Todd & Rapp, 2021; Boren & LaLonde, 2022).

CAL is particularly well-suited for developing English communication skills at the undergraduate level, as it reduces language anxiety, minimizes rote memorization, and effectively fosters the 4Cs (Critical thinking, Communication, Collaboration, and Creativity), aligning closely with 21st-century skills and CEFR descriptors. It can be applied both in traditional classrooms (e.g., jigsaw, think-pair-share, problem-based learning) and online environments using LMS platforms, Google Workspace, breakout rooms, or other contemporary collaborative tools. Extensive research confirms that CAL significantly enhances academic achievement, knowledge retention, student motivation, and teamwork abilities. Consequently, it serves as an ideal foundation for developing a collaborative proactive learning management platform for the English Communication for Education course at the tertiary level.

Collaborative Active Learning Platforms and Their Application

Collaborative Active Learning (CAL) platforms are digital environments specifically designed to support interactive, group-based active learning by integrating real-time collaboration tools, peer feedback, shared workspaces, gamification, and analytics into a single ecosystem. Popular examples include 360Learning, NovoEd, EducateMe, Miro, Lumio, SC Training (EdApp), and Google Workspace/Microsoft Teams. These platforms transform traditional LMS into dynamic spaces that promote positive interdependence, individual accountability, and high cognitive engagement, making them especially effective for developing English communication skills at the undergraduate level through role-plays, collaborative writing, debates, peer reviews, and project-based tasks. Research consistently shows that CAL platforms significantly improve academic achievement, knowledge retention, motivation, and 21st-century competencies (critical thinking, communication, collaboration, creativity) while reducing language-learning anxiety, making them an ideal foundation for a proactive, collaborative learning management platform in English Communication for Education courses and beyond (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. CAL, on the other hand, is a learning strategy that delivers content in small, easily digestible units to prevent

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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 CAL 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 CAL, educators can create a powerful and modern learning experience tailored to today's students. The results from the review of relevant literature can be used as key information for research and development of CAL platform and will be discussed in the next section.

The literature review highlights three key foundations for the study. First, the ADDIE instructional design model provides a systematic five-step process for creating effective learning experiences, ensuring instructional quality and continuous improvement. Second, the concept of CAL integrates active engagement with structured group collaboration, grounded in Vygotsky's sociocultural theory and the ICAP framework, showing that interactive peer learning yields the highest outcomes. CAL is particularly effective for English communication, as it reduces language anxiety, fosters critical thinking, communication, collaboration, and creativity, and aligns with CEFR principles. Third, research on CAL platforms demonstrates that digital environments combining real-time collaboration, peer feedback, gamification, and analytics significantly enhance achievement, motivation, retention, and 21st-century competencies while lowering anxiety. Together, these strands of literature establish the theoretical and practical basis for developing a CAL management platform tailored to undergraduate English communication courses.

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 collaborative active learning management platform in an English Communication Course for Education and application with undergraduate students, as shown in Figure 1.

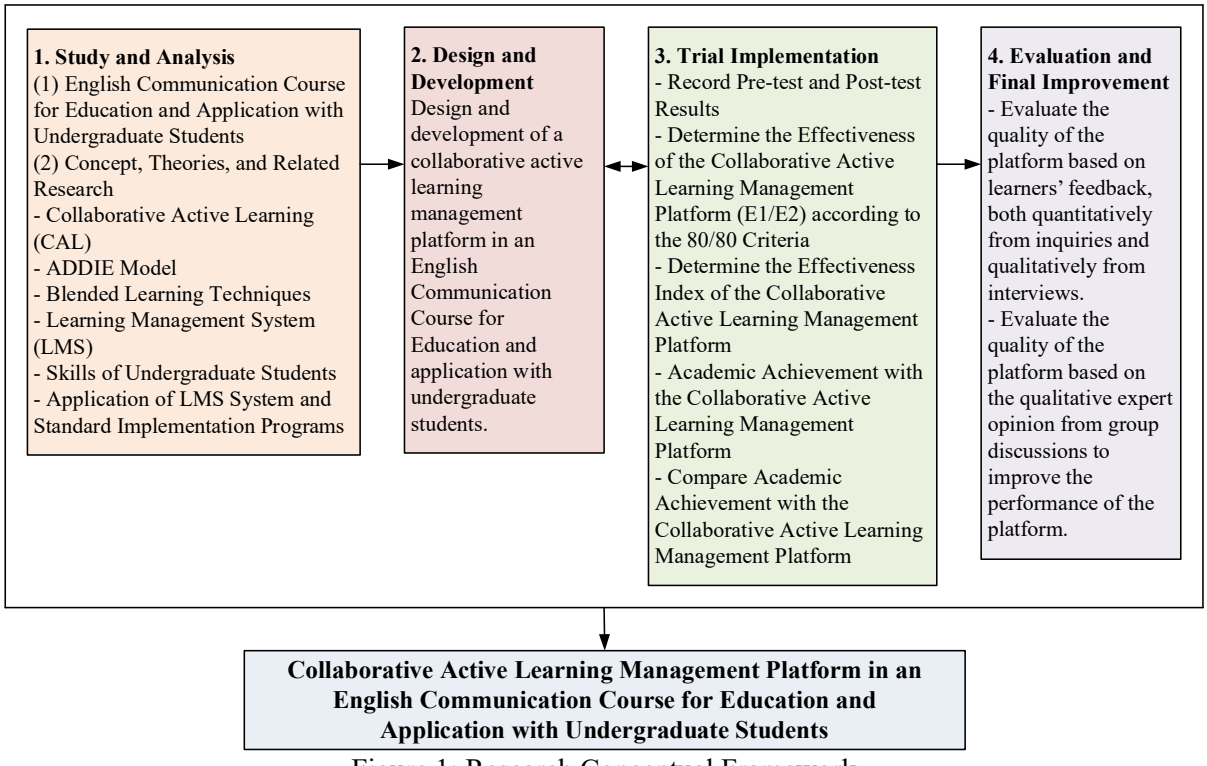

Figure 1: Research Conceptual Framework

Methodology

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This study employed a Research and Development (R&D) approach with the primary aim of designing, developing, implementing, and evaluating a Collaborative Active Learning Management Platform specifically tailored for an English Communication for Education Course and its practical application with undergraduate students.

Population and Sample

The study population consisted of students enrolled in English Communication course for Education during the first semester of the academic year 2025, Faculty of Education, Saint Theresa University, Bangkok, Thailand. Sample 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 2 comprised 57 undergraduate students Participants were selected through cluster random sampling, in which entire classrooms were randomly chosen as the sampling units to ensure natural group representation and ecological validity.

Research Instruments

The following instruments were developed and validated:

1) The Collaborative Active Learning Management Platform itself, designed for the English Communication course for Education.

2) A 40-item pre- and post-learning achievement test aligned with course objectives.

3) An expert quality evaluation form for assessing platform content, design, usability, and pedagogical effectiveness.

4) A student satisfaction questionnaire measuring perceived usefulness, ease of use, engagement, and overall satisfaction.

All questionnaires underwent content validity checking by five qualified experts. After pilot testing, internal consistency was confirmed using Cronbach's alpha, yielding a reliability coefficient of $\alpha = .928$. Item discrimination was analyzed via item-total correlation, ensuring only high-quality items were retained.

Research Procedures

The research was systematically conducted in four major phases:

Phase 1: Study and Analysis

Conducted a comprehensive review of relevant literature, existing platforms, and institutional needs. In-depth and unstructured interviews were held with 10 purposively selected experts (5 in tertiary-level English for communication and 5 in educational technology and innovation) to identify essential content, appropriate collaborative features, and technical requirements. All data were synthesized to form the conceptual framework and specifications for the desired platform.

Phase 2: Design and Development

The platform was designed and developed following the ADDIE instructional design model. It was built as a fully functional, database-driven web application using: Moodle as the core LMS, MySQL/PHP/JavaScript for backend and interactivity, Google Workspace integration for real-time collaboration, Canva and multimedia tools for engaging content.

The system supported forums, group workspaces, peer assessment, gamified quizzes, and progress tracking.

Phase 3: Trial Implementation

The platform was progressively tested and refined through one-to-one, small-group, and field trials (detailed in 2.5) to ensure usability, functionality, and pedagogical effectiveness before full deployment.

Phase 4: Evaluation and Final Improvement

After field implementation, efficiency (E_1/E_2), effectiveness index, and learning gains were calculated. Ten experts participated in focused interviews to provide in-depth feedback on content accuracy, technical performance, and collaborative features. Final revisions were made based on both

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quantitative results and qualitative expert input, culminating in the finalized platform and complete research report.

Steps in Developing the Instructional Platform

The platform was developed through the following ten systematic steps:

Step 1: Curriculum and content analysis of the English Communication Course for Education based on the Ministry of Higher Education, Science, Research and Innovation standards, emphasizing competencies and learning outcomes, to understand course objectives, content scope, teaching methods, assessment procedures, and to compile supporting instructional materials.

Step 2: Specification of learning objectives to define the scope of content for each learning unit.

Step 3: Content presentation design by dividing the course into learning units, designing instructional activities, and submitting lessons to five content experts (university instructors experienced in English Communication for Education) for validation of instructional processes and alignment between objectives and content, and to measurement/assessment experts for validation of achievement test items. The acceptable Index of Item-Objective Congruence (IOC) was 0.50–1.00.

Step 4: Creation of a platform flowchart based on the ADDIE model to map internal communication pathways, followed by review for accuracy and suitability by educational technology and innovation experts.

Step 5: Design of hierarchical storyboards incorporating CAL techniques, followed by review for accuracy and appropriateness by educational technology and innovation experts.

Step 6: Technical development of the collaborative platform using LMS Tool Box and related software, with initial functionality testing to ensure all required features were operational.

Step 7: Second-round expert validation of the fully developed platform by specialists in tertiary-level English for Communication teaching and educational technology/innovation experts.

Step 8: Revision and improvement of the platform according to expert recommendations.

Step 9: Cross-browser testing and debugging to identify and correct errors before uploading the final version to the server for live internet deployment.

Step 10: Final quality evaluation by ten educational technology and innovation experts using a standardized quality assessment form. Only the version passing expert approval proceeded to full efficiency trials with the target learner group.

Experimental Implementation and Data Collection Procedures

The Collaborative Active Learning Platform was developed and implemented following the ADDIE model through the following sequential steps:

Preparation for the Experiment

1) Obtained official permission for data collection and platform trial use.

2) Uploaded the finalized platform to the online LMS website, deployed it to the server, and conducted full functionality testing.

3) Prepared the physical venue, computers, internet connectivity, and scheduled the trial sessions.

Execution of the Experiment

The expert-validated platform was trialed in three progressive stages to determine efficiency (E_1/E_2):

1) One-to-One Testing: Conducted with 3 students (simple random sampling) who had previously taken the course. Efficiency was $E_1/E_2 = 61.44/62.78$. Defects were identified and corrected.

2) Small Group Testing: Conducted with 9 students (simple random sampling) who had previously enrolled in the course. Efficiency improved to $E_1/E_2 = 71.98/73.05$. Further refinements were made.

3) Field Testing: Implemented with the sample of 57 undergraduate students, following this sequence: (1) Pretest using a 40-item achievement test (10 items per each of the 4 learning units), (2) Students studied via the Collaborative Active Learning Platform and instructional materials on Moodle. (3) Students completed in-platform exercises (10 items), (4) Posttest using the same 40-item achievement test, and (5) Overall platform efficiency was calculated from the scores obtained, yielding $E_1/E_2 = 81.08/83.97$.

Data Analysis

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Data were analyzed using statistical software:

1) Platform quality and student satisfaction: Mean, standard deviation, and interpretation using a 5-level rating scale (4.21–5.00 = highest, etc.). The mean values from the rating scale questionnaire 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.

2) Statistics used for assessing the quality of the achievement test: (1) Item discrimination index, calculated using Brennan's criterion-referenced method; (2) Item difficulty index; (3) Content validity of each item, using the Index of Item-Objective Congruence (IOC) formula; (4) Test reliability, calculated using the Kuder-Richardson Formula 20 (KR-20).

3) Effectiveness Index (E.I.), calculated using the Goodman-Fletcher-Schneider method.

4) Instructional efficiency, determined according to the standard 80/80 criterion using the conventional E_1/E_2 formula.

5) Comparison of pretest and posttest scores, performed using a dependent-samples *t*-test (paired *t*-test) with the standard *t*-test formula.

This rigorous, multi-phase R&D methodology—covering systematic analysis, careful design, iterative development, trial implementation, and comprehensive evaluation—ensured that the resulting CAL platform was not only grounded in strong theoretical foundations but also technically reliable and pedagogically impactful. By integrating validated instructional design principles with modern digital tools, the platform demonstrated structural soundness, functional stability, and instructional effectiveness, ultimately enhancing undergraduate students' English communication competence, reducing language anxiety, and fostering essential 21st-century skills.

Results

The findings from the study titled "Development of a Collaborative Active Learning Management Platform in an English Communication Course for Education and Application with Undergraduate Students" are presented below according to the research objectives:

1. Results of Platform Development

The CAL management platform for the English Communication Course for Education was successfully developed using the LMS Tool Box as the foundation, enhanced with CAL techniques. The resulting platform fully aligns with the Foreign Language Learning Area (English) standards for higher education. The systematic design and development process—following the ADDIE model and incorporating multiple rounds of expert validation—ensures that the platform possesses sufficient quality for real-world implementation among undergraduate students in the Faculty of Education, Saint Theresa University. Moreover, it serves as a replicable model for other higher education institutions in the future.

2. Efficiency of the Platform (80/80 Criterion)

The efficiency of the developed CAL management platform was 81.08/83.97, exceeding the established 80/80 standard. This indicates that the platform facilitated a learning process score of 81.08% (E_1) and an overall learning outcome and behavioral change score of 83.97% (E_2). Therefore, the platform meets and surpasses the predetermined efficiency criterion of 80/80.

3. Effectiveness Index (E.I.)

The Effectiveness Index of the developed platform was 0.8241 (or 82.41%). This high value confirms that the platform significantly and positively impacted students' learning, enabling them to achieve the intended learning outcomes effectively.

4. Comparison of Learning Achievement

Students' pre-test mean score was 23.81 out of 40 (59.53%), while the post-test mean score increased to 34.91 out of 40 (87.28%). A dependent-samples *t*-test revealed a statistically significant

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improvement (t = -28.939, p < .05), indicating that post-test scores were substantially higher than pre-test scores. These results are summarized in Table 1.

Table 1: Comparison of Learning Achievement Using the CAL Management Platform for the English Communication Course for Education with Undergraduate Students

Learning Achievement	*n*	$\bar{x}$	S.D.	**t*	*p*-value
Pretest	57	23.81	0.63	-28.939	.001
Posttest	57	59.53	0.64		

*Statistically significant at .05

5. Opinions of Experts and Students Toward the Platform

1) Results of the quality evaluation of the CAL Management Platform for the English Communication Course for Education, as assessed by 10 experts in educational technology and innovation, are presented in Table 2 below.

Table 2: Results of the Expert Assessment of the Platform's Quality

Topics and Assessment Items		M	S.D.	Interpret
Learning Components and Activities	1. Course Website	4.32	0.65	Highest
	2. Active Learning Activities	4.17	0.50	High
	3. Measuring and Evaluating Knowledge	4.11	0.55	High
	4. Discussion Boards and Knowledge-Exchange Features	4.35	0.50	Highest
	5. Record and Knowledge Library	4.26	0.55	High
	6. Downloading Documents	4.08	0.65	High
	7. Photos of Various Activities	3.93	0.55	High
Design and Development	8. Content Alignment	4.42	0.55	Highest
	9. Font Style and Size	4.12	0.55	High
	10. Font color with background	4.05	0.55	High
	11. Visual and Sound Effects	4.07	0.55	High
	12. Multimedia System	3.97	0.65	High
	13. Instruction and Manuals	3.88	0.55	High
	14. Content Alignment and Screen Design	4.38	0.50	Highest
	15. Overall Design and Development Process	4.50	0.55	Highest
Practical Application and Implementation	16. Membership and Back End	4.07	0.45	High
	17. Links and Interactions	4.21	0.55	High
	18. Search/Performance-Tracking Functions	4.30	0.55	Highest
	19. Learning Management Support Systems	4.35	0.65	Highest
	20. How to apply it according to the course objectives	4.01	0.55	High
	21. Achievement of Learning Outcomes	4.41	0.55	Highest
Total		**4.17**	**0.55**	**High**

According to Table 2, the quality evaluation of the CAL management platform by 10 experts across three dimensions—Learning Components and Activities (7 items, M = 4.16), Design and Development (8 items, M = 4.17), and Practical Application and Implementation (6 items, M = 4.22)—yielded an overall high rating of M = 4.17. The highest-rated aspects included discussion boards and knowledge-exchange features, the overall design and development process, content alignment and screen design, achievement of learning outcomes, learning management support systems, and search/performance-tracking functions, confirming the platform's strong pedagogical design, technical robustness, and practical effectiveness for real-world implementation in undergraduate English Communication for Education courses.

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2) Results of learner satisfaction with using the CAL management platform for the English Communication Course for Education, as reported by 57 undergraduate students, are presented in Table 3 below.

Table 3: Results of Learner Satisfaction Assessment

Topics and Assessment Items		M	S.D.	Interpret
Platform Components and Learning Activities	1. Course Website	4.49	0.47	Highest
	2. Learning Activities and Case Studies	4.40	0.72	Highest
	3. Measuring and evaluating knowledge	4.08	0.57	High
	4. Discussion Board	4.39	0.56	Highest
	5. Record and Knowledge Library	4.26	0.63	Highest
	6. Downloading Documents	4.28	0.73	Highest
	7. Photos of Various Activities	4.38	0.65	Highest
Interface and Content Design	8. Content Accuracy and Relevance	4.36	0.64	Highest
	9. Font Style and Size	4.22	0.75	Highest
	10. Font Color with Background	4.28	0.60	Highest
	11. Illustration	4.25	0.55	Highest
	12. Sound Effects	4.12	0.64	High
	13. Multimedia System	4.21	0.51	Highest
	14. Instruction and User Guides	4.30	0.60	Highest
	15. Overall Content and Screen	4.35	0.70	Highest
Usability and Attitudes	16. Membership System	4.26	0.67	Highest
	17. Results Search and Verification System	4.12	0.71	High
	18. Lessons and Exercises Navigation System	4.42	0.57	Highest
	19. Links and Interactions	4.15	0.50	High
	20. Effectiveness in Achieving Learning Objectives	4.38	0.67	Highest
	21. Knowledge and Experience Gained	4.51	0.51	Highest
Total		**4.30**	**0.63**	Highest

The learner satisfaction evaluation (n = 57) across three dimensions—Platform Components, Interface and Content Design, and Usability and Attitudes—revealed an overall satisfaction level at the highest rating (M = 4.30). Specifically, Platform Components and Learning Activities (7 items) scored M = 4.30, with the top three aspects being (1) course website, (2) learning activities and case studies, and (3) discussion board; Interface and Content Design (8 items) scored M = 4.29, with the highest-rated items being (1) content accuracy and relevance, (2) instructions and user guides, and (3) overall content and screen; while Usability and Attitudes (6 items) achieved the highest dimension score of M = 4.32, led by (1) knowledge and experience gained, (2) lesson and exercise navigation system, and (3) effectiveness in achieving learning objectives, respectively.

The results of interviews with the teaching team, educational academics, and students regarding the developed platform, categorized into five key areas, and the results of a focus group discussion with 10 experts in educational technology and innovation for platform improvement, are as follows:

1) Knowledge and Application

Instructors and students agreed that the CAL management platform for the English Communication for Education effectively met course requirements and supported practical learning activities. Instructors can apply gained experience to future teaching, while students can utilize the knowledge and skills to enhance their English communication competencies at undergraduate level and beyond, including for higher-level studies.

2) Behavior and Response

Instructors used the platform to design CAL formats and activities for classroom management. Students engaged in language skill practice, knowledge retrieval and recording from practical activities, question formulation, participation in discussion forums, knowledge exchange, active learning tasks,

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and self-assessment—all aligned with knowledge management processes—effectively promoting self-development and improving English communication skills.

3) Participation and Knowledge Exchange

Both instructors and students actively participated in teaching and learning via the platform, using comprehensive learning materials, posing creative questions and seeking answers, exchanging and sharing knowledge, and creatively engaging in assigned activities. The platform successfully motivated student involvement and fostered a collaborative learning atmosphere conducive to knowledge exchange in modern educational contexts.

4) Usability and Attitude

Instructors and students expressed high satisfaction with the platform's usability. Some students adapted knowledge and experience from peers' English communication practices. Collaborative activities (e.g., problem identification and solution-seeking) enhanced learning skills and competencies in Academic English Communication.

5) Problems and Recommendations

Instructors and students recommended adding a feature to display developmental assessment results graphically (optionally private) so users can track their own competencies and learning outcomes for continuous improvement. They also suggested expanding the knowledge-recording section to include standardized report templates for educational quality assurance and future knowledge development.

Examples of the developed CAL management platform for the English Communication Course for Education, as applied with undergraduate students, are illustrated in Figures 2–5 as follows: (1) Overall platform interface, (2) Content, supplementary documents, and instructional media, (3) Instructional video clips, and (4) End-of-lesson quizzes.

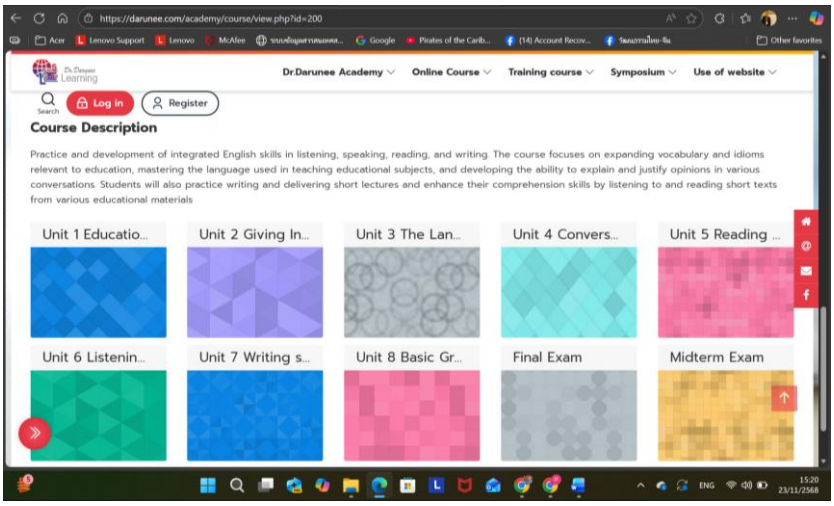

Figure 2: Overall Platform Interface

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Article ID: e2683

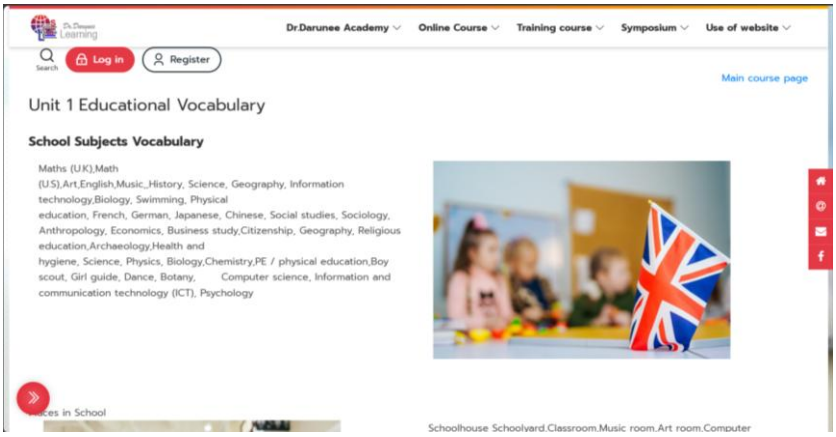

Figure 3: Content, Supplementary Documents, and Iinstructional Media

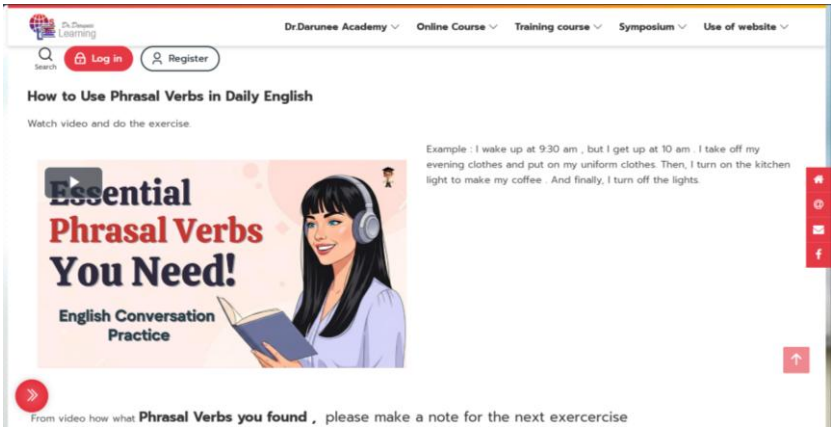

Figure 4: Instructional Video Clips

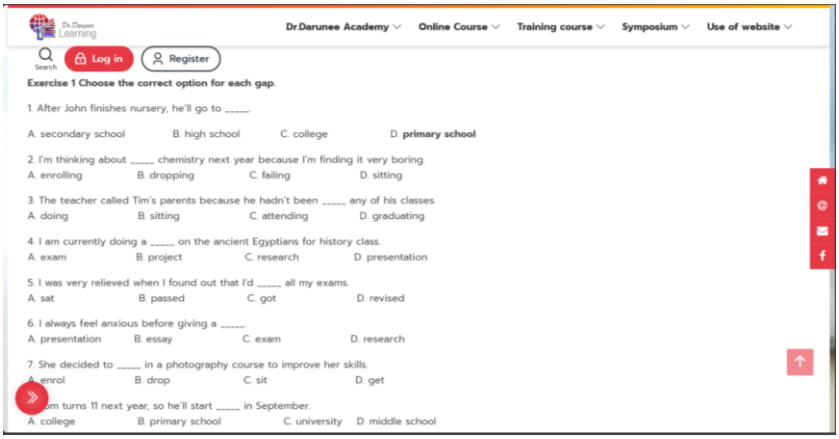

Figure 5: End-of-Lesson Quizzes

In summary, this R&D study successfully designed and implemented a CAL management platform for the undergraduate English Communication Course for Education, guided by the ADDIE instructional design model. The platform not only enhanced students' academic achievement but also created a more interactive and supportive learning environment that encouraged active participation and meaningful engagement between students and instructors. By reducing language anxiety and fostering confidence in communication, it addressed key barriers to effective English learning. Both experts and

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students reported high levels of satisfaction with the platform's quality, usability, and pedagogical impact. Overall, the CAL platform represents a replicable, evidence-based innovation that can transform traditional EFL instruction into dynamic, student-centered learning, while simultaneously cultivating essential 21st-century skills within Thai higher education.

Conclusion

The research and development of the Collaborative Active Learning Management Platform in an English Communication Course for Education and application with undergraduate students yielded the following results corresponding to the five research objectives:

1) Platform Development: The systematic development process following the ADDIE model produced a high-quality CAL management platform that fully meets real-world implementation standards for undergraduate students, particularly in the Faculty of Education.

2) Efficiency (80/80 Criterion): The platform achieved an efficiency of 81.08/83.97, exceeding the required 80/80 standard. This indicates that students acquired knowledge through the learning process at 81.08% and demonstrated overall learning outcomes and behavioral change at 83.97%, thereby fulfilling the predetermined efficiency goal.

3) Effectiveness Index: The platform's Effectiveness Index (E.I.) was 0.8241, confirming its strong positive impact on student learning and successful attainment of intended outcomes.

4) Learning Achievement: Pretest mean score was 23.81/40 (59.53%), while the posttest mean score rose to 34.91/40 (87.28%). A dependent t-test revealed a highly significant improvement ($t = -28.39$, $p < .05$), proving that the platform significantly enhanced students' academic performance in English Communication for Education Course.

5) Expert and Student Opinions: Experts (n=10) rated the platform's overall quality as high across all dimensions: Learning Components and Activities, Design and Development, and Practical Application and Implementation. students (n=57) reported highest-level satisfaction in all three dimensions: Platform Components and Learning Activities, Interface and Content Design, and Usability and Attitudes.

These results collectively demonstrate that the developed platform is pedagogically sound, technically robust, and highly effective for real-world application in undergraduate English Communication Courses for Education.

Discussion

The results of the study on the development of a CAL platform in an English Communication Course for Education and application with undergraduate students are discussed below in alignment with the five research objectives:

1) Objective 1 (Platform Development): The platform was successfully developed following the ADDIE model and drawing on the work of Spatioti et al. (2022), Glogger-Frey & Renkl (2023), Crompton et al. (2024), Phakamach and Panjarattanakorn (2024), and Chang et al. (2024). The resulting system fully complies with the Foreign Language (English) learning area standards for higher education and possesses sufficient quality—confirmed through systematic design, expert validation, and iterative refinement—for practical, real-world implementation with undergraduate students in the Faculty of Education.

2) Objective 2 (Efficiency): The platform achieved an efficiency score of 81.08/83.97, surpassing the 80/80 criterion. This indicates a learning process efficiency of 81.08% and an overall instructional effectiveness (including behavioral change) of 83.97%, consistent with findings by Jahnke (2023), Phakamach and Panjarattanakorn (2024), and Chang et al. (2024). The high scores can be attributed to (a) rigorous ADDIE-based development with expert-validated collaborative content and LMS Tool Box integration (Kant et al., 2021; Spatioti et al., 2022; Glogger-Frey & Renkl, 2023), and (b) robust LMS features supporting content management, interaction, and outcome tracking (Klerk & Palmer, 2022; Phakamach, 2023), enabling effective self-directed and collaborative learning even in remote settings.

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3) Objective 3 (Effectiveness Index): The Effectiveness Index was 0.8241 (82.41%), indicating substantial learning gains. This aligns with Maslov et al. (2021), Wang & Zhang (2021), Dos Santos et al. (2022), Boren and LaLonde (2022), and Chang et al. (2024). The high index likely stems from engaging, teacher-like presentation using text, graphics, animation, and multimedia, combined with collaborative activities that reduce EFL anxiety, foster peer interaction, promote all four language skills, and cultivate 21st-century competencies (Wudthayagorn, 2025).

4) Objective 4 (Learning Achievement): Pre-test mean was 23.81/40 (59.53%); post-test mean rose to 34.91/40 (87.28%), with a highly significant improvement ($t = -28.39$, $p < .05$). This corroborates Jahnke (2023), Phakamach and Panjarattanakorn (2024), and Chang et al. (2024). attributable to learner-centered design, technology-enhanced collaborative activities, and LMS-supported interaction that significantly boosted academic performance.

5) Objective 5 (Expert and Student Opinions): Experts rated overall quality as high across all dimensions, while students reported highest-level satisfaction. These results mirror Maslov et al. (2021), Wang and Zhang (2021), Dos Santos et al. (2022), Boren and LaLonde (2022), and Chang et al. (2024). The positive evaluations reflect systematic R&D processes, expert validation, and iterative refinement using the ADDIE model. Experts suggested further integration of modern multimedia and AI, challenging problem-based scenarios, globally relevant case studies, and enhanced outcome-based assessment to increase sophistication for higher education contexts.

Overall summary, this R&D study successfully produced a high-quality, effective CAL management platform that can be confidently deployed for real-world teaching of the English Communication for Education at the undergraduate level. It serves as a replicable blended-learning model (offline + online) and lays a strong foundation for future enhancements to further improve English language proficiency among Thai students.

Knowledge Contribution

This research makes a significant contribution to the field of educational technology and English language instruction in Thai higher education by providing a fully developed, empirically validated CAL management platform specifically tailored for the English Communication Course for Education. Unlike many previous studies that focused on general LMS adoption or short-term interventions, this R&D project delivers a complete, ready-to-deploy digital ecosystem built on the ADDIE model and grounded in CAL principles. The resulting platform integrates Moodle-based infrastructure with real-time collaborative tools (discussion forums, peer assessment, group workspaces, gamified quizzes, and multimedia content) that directly address persistent challenges in Thai EFL contexts: low learner engagement, language anxiety, teacher-centered pedagogy, and weak 21st-century skill development. By achieving an efficiency of 81.08/83.97, an Effectiveness Index of 0.8241, and statistically significant learning gains (pretest 59.53% → posttest 87.28%, $p < .05$), the platform offers concrete evidence that structured, technology-enhanced collaborative learning can substantially improve both cognitive outcomes and behavioral change in undergraduate English Communication Courses for Education.

The study further contributes a replicable methodological framework for developing similar platforms in other content areas and institutions. It demonstrates how the systematic application of ADDIE, combined with multiple rounds of expert validation, one-to-one, small-group, and field trials, produces a high-quality learning environment that earns both expert approval and exceptional learner satisfaction. These findings extend existing literature (e.g., Glogger-Frey & Renkl, 2023; Jahnke, 2023; Phakamach & Panjarattanakorn, 2024) by moving beyond theoretical discussions or small-scale pilots to a full-scale, institution-specific implementation that simultaneously satisfies national policy requirements (National Education Plan 2017–2036, CEFR alignment, and NDLP initiatives) and local quality assurance demands. The open-source-friendly architecture and detailed development documentation make the platform adaptable for other Thai universities facing similar declines in English proficiency scores.

Finally, this study establishes a practical link between global best practices in CAL and the realities of Thai higher education, delivering a culturally responsive and scalable solution that supports both blended and fully online instruction. The developed platform offers faculty developers,

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instructional designers, and policymakers a validated model for transforming traditional "chalk-and-talk" English classrooms into dynamic, student-centered digital environments that cultivate the 4Cs—critical thinking, communication, collaboration, and creativity—while simultaneously reducing EFL anxiety and promoting lifelong learning skills. As one of the few Thai-led R&D initiatives to surpass the rigorous 80/80 efficiency benchmark in large-scale undergraduate implementation, this work sets a new standard for evidence-based educational innovation and provides a pathway for the wider adoption of collaborative digital platforms across Thai higher education institutions.

Recommendations

The researchers put forward two kinds of feedback as follows:

Recommendations for Practical Application of the Research Findings

The research findings suggest that the developed CAL management platform can be practically applied in Thai higher education by integrating it into English Communication courses to shift instruction from teacher-centered to student-centered approaches, training faculty to effectively use CAL strategies and digital tools, and implementing the platform in both blended and fully online formats to expand accessibility and flexibility. Aligning with CEFR standards and national education policies, the platform helps reduce language anxiety, build student confidence, and foster active participation, while offering a replicable model that can be scaled across institutions to promote evidence-based innovation, enhance learning outcomes, and strengthen 21st-century skills among undergraduate students. Additionally, to maximize the efficiency and effectiveness of the CAL management platform for the English Communication for Education Course with undergraduate students, the following implementation and enhancement strategies are recommended:

(1) Ensure lesson content strictly aligns with curriculum learning objectives and incorporates appropriate collaborative learning techniques tailored to the subject matter.

(2) Clearly communicate learning objectives and the collaborative learning process to students from the outset.

(3) Design a well-structured learning pathway with regular formative assessments to monitor achievement of objectives.

(4) Implement a robust system for tracking whether students meet intended learning outcomes, including periodic reminders and notifications.

(5) Adopt non-linear, active, and blended learning approaches that integrate multiple methods to promote deep understanding.

(6) Provide frequent practice exercises with immediate, constructive feedback.

(7) Ensure the platform is fully responsive and standardized across various devices and current technological contexts.

(8) Select and integrate software and tools that enhance content delivery and meet international educational standards.

Recommendations for Further Research

Future research should expand on this study by testing the CAL management platform across diverse courses, institutions, and student populations to examine its adaptability and scalability beyond English communication. Longitudinal studies could explore the sustained impact of CAL on language proficiency, confidence, and 21st-century skills development over time. Comparative research between traditional LMS and CAL platforms would provide deeper insights into pedagogical effectiveness, while qualitative investigations could capture students' and instructors' lived experiences of collaborative learning. Additionally, studies focusing on integration with emerging technologies such as AI-driven feedback, mobile learning, and virtual classrooms would help refine and extend the platform's relevance in evolving higher education contexts. Nevertheless, to enhance the quality and performance of this research, the R&D model should be improved in the future for the following issues.

(1) The platform should be trialed with undergraduate students from other higher education institutions at the same academic level to gather richer quantitative and qualitative data for further refinement and standardization of learning components.

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(2) Further research and development should focus on elevating the platform's components to higher standards, yielding deeper insights to improve overall learning management and significantly raise student achievement in the course.

(3) Future studies should develop the digital platform using blended collaborative active learning approaches enriched with highly engaging multimedia and positive imaginative elements, particularly targeting enhanced online learning experiences.

(4) Additional platforms should be researched and developed for other courses to expand the pool of modern proactive learning resources and serve as effective tools for both offline and online instruction, ultimately contributing to improved educational outcomes across Thai higher education.

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