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Blended Learning Management Platform for Strategic Educational Management Using Activity-Based Learning Techniques and AI Technology to Enhance Educational Leadership Competencies

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Abstract

Background and Aim: The objectives of this research were: 1) to develop a blended learning management platform on strategic educational management using combined activity-based learning techniques and AI technology to enhance educational administrator competencies; 2) to evaluate the platform's efficiency against the 80/80 criterion and determine the effectiveness index and learning achievement with the platform; and 3) to study the opinions of experts and learners regarding learning with the platform.

Materials and Methods: This research employed a research and development methodology. The sample group consisted of 57 Master of Education students from Rajamangala University of Technology Rattanakosin, academic year 2024, using classrooms as the sampling unit. The target group comprised 10 educational innovation and technology experts, selected purposively. The research instruments included: 1) a learning achievement test; 2) an expert evaluation form for the platform's quality; and 3) a questionnaire on learners' opinions regarding the platform. Statistical methods used for data analysis were percentage, mean, standard deviation, and t-test.

Results: The research findings revealed that the developed blended learning management platform on strategic educational management using combined activity-based learning techniques and AI technology to enhance educational administrator competencies had an efficiency of 81.23/82.46, which met the 80/80 standard criterion, and an effectiveness index of .8328. Learners who used the platform showed significantly higher post-learning achievement compared to pre-learning achievement at the .05 statistical significance level. The expert evaluation of the platform's quality was at a high level, indicating that the platform is suitable for learners to enhance their educational administrator competencies. Learners also expressed high levels of satisfaction with the platform.

Conclusion: The research resulted in an efficient blended learning management platform on strategic education management to enhance educational administrator competencies, which is practically applicable and facilitates learners' development in strategic education management as designed.

Keywords: Blended Learning Management Platform, Strategic Educational Management, Activity-Based Learning, AI Technology

Introduction

The development of ICT systems and educational innovation has significantly contributed to the progress of nations. These systems are essential and beneficial for all organizations, particularly educational institutions. Organizations that can effectively develop and implement ICT systems, educational innovations, and artificial intelligence (AI) technologies will enhance their decision-making processes in strategic planning. This leads to timely problem-solving, competitive advantages, and efficient service delivery (Laudon & Laudon, 2019). Therefore, it is crucial to identify and implement

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appropriate ICT systems for educational organizations. The application of ICT systems, educational innovations, and AI technologies requires systematic planning and strategic management to achieve objectives, ensure continuous development, and promote sustainable growth (Sinlarat, 2020; Phangphol & Phakamach, 2021; Kang, 2023; Phakamach & Panjarattanakorn, 2024). Educational institutions must understand educational disruption and adapt their learning approaches to keep pace with both Thai and international educational technology. By applying modern management techniques and strategies, institutions can maximize their academic efficiency and effectiveness (Panjarattanakorn et al., 2023; Mudkanna Gavhane & Pagare, 2024). The Ministry of Higher Education, Science, Research, and Innovation recognizes the importance of ICT systems and has implemented policies to promote their development and application, aiming to enhance student learning and knowledge acquisition. This aligns with the government's 20-year national strategy (2017-2036), the third ICT master plan, and the Higher Education Act of 2022. Consequently, there is an increased emphasis on educational digital platforms to facilitate the sharing of educational data and knowledge globally. Educators worldwide utilize these platforms to develop new learning models and access intellectual resources. The ministry has established urgent policies and standards to support educational institutions in promoting ICT development for educational innovation. This includes enhancing the ICT skills of educators, educational personnel, and students in using applications, AI technologies, and educational platforms. Educational institutions at all levels are required to implement standardized ICT management systems to improve educational quality (Ministry of Higher Education, Science, Research and Innovation, 2019).

The era of educational disruption has introduced diverse teaching and learning models to address various educational challenges, particularly during the COVID-19 pandemic (Ismaili, 2021). Teaching and learning must adapt to new learning paradigms that equip students with life skills and the ability to acquire knowledge independently. Developing specialized learning skills and competencies remains crucial, as it enables students to meet specific needs. The evolving educational paradigms in the 21st century emphasize human potential and competency development, focusing on learning processes that foster creative skills development or the use of learning management systems (LMS) (Phakamach & Panjarattanakorn, 2024). Therefore, teaching and learning must align with new learning paradigms that emphasize active learning, enabling students to connect and create knowledge through practical activities and customized learning experiences. The application of smart learning analytics (SLA), which involves advanced data analytics, AI, and machine learning (ML), enhances the understanding and improvement of learning processes, surpassing traditional learning analytics by providing sophisticated insights and predictive capabilities (Kumar & Vivekanandan, 2018; Atasoy et al., 2020; Phakamach, 2023). This empowers graduate students to independently acquire knowledge, particularly through the use of educational innovation and technology (Adnan & Anwar, 2020; Kang, 2023). Activity-based learning (ABL) is an instructional approach that emphasizes student engagement and hands-on activities (Anwar, 2019). It focuses on developing skills and competencies through practical learning experiences, encouraging students to explore, problem-solve, analyze, synthesize, and internalize knowledge (Dzulkifli et al., 2021). This contrasts with traditional lecture-based learning, promoting long-term retention and enjoyable learning experiences (Mustapha et al., 2021). ABL encompasses various techniques, including problem-based learning, project-based learning, and service learning, all of which are active learning strategies. These approaches are increasingly integrated into digital learning platforms (Phangphol & Phakamach, 2021; Phakamach et al., 2021; Mustapha et al., 2021; Panjarattanakorn et al., 2023; Yar et al., 2023).

Strategic educational management is a mandatory seminar course in education programs at the graduate level, focusing on educational policies, strategies, and the development of modern management processes. Traditional classroom-based instruction poses significant challenges for students without systematic digital platforms and resources. Implementing learning management systems that connect students, instructors, and curriculum, along with digital learning materials and coaching-based instruction (Adele et al., 2023), can address these challenges. Designing proactive learning experiences that align with course content (Huang & Lai, 2020; Aad & Hardey, 2025) and supporting self-directed learning can enhance knowledge management and create meaningful learning

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experiences. Developing effective blended learning platforms requires rigorous testing to ensure quality and suitability (Phakamach et al., 2022; Phakamach & Panjarattanakorn, 2024). Based on these concepts, the researchers aimed to develop a blended learning management platform for strategic educational management using combined activity-based learning and AI technologies to enhance educational administrator competencies. This research employed a research and development (R&D) methodology to create and evaluate the platform, incorporating educational innovations such as: 1) electronic learning materials, 2) active knowledge management support (knowledge repositories, knowledge recording, retrieval, and assessment), 3) faculty and student databases, and academic services, 4) online discussion boards, 5) AI educational tools, and 6) university integration (e-MIS). The platform's development involved educational software, Gen AI, LMS Tool Box, and expert evaluation, along with student satisfaction surveys and platform refinement based on expert feedback. This research resulted in a blended learning management platform that is suitable for graduate-level education, practically applicable, responsive to student needs, and effective in facilitating strategic educational management learning for digital-age administrators.

Objectives

1) To develop a blended learning management platform on strategic educational management using activity-based learning techniques and AI technology to enhance educational administrator competencies.

2) To evaluate the efficiency of the blended learning management platform against the 80/80 criterion and determine the effectiveness index and learning achievement with the blended learning management platform.

3) To study the opinions of experts and learners regarding learning with the blended learning management platform on strategic educational management.

Literature review

Activity-Based Learning (ABL) is defined as an instructional strategy centered on engaging students in active learning experiences through hands-on activities and practical application. This approach fosters skill development and competence acquisition by encouraging students to actively participate in the learning process, promoting exploration, problem-solving, analysis, and synthesis of knowledge. ABL contrasts with traditional lecture-based methods, emphasizing active engagement to facilitate deeper, more meaningful, and enjoyable learning experiences. Key ABL strategies include problem-based learning, project-based learning, and service learning, all of which underscore the importance of active participation in the learning process (Dzulkifli et al., 2021).

The integration of Artificial Intelligence in education (AIED) has spurred significant interest in academic and research circles. AIED is seen as a way to personalize learning, automate administrative tasks, and provide valuable insights through data analytics. AIED applications include adaptive learning platforms, intelligent tutoring systems, and AI-driven assessment tools. One of the primary benefits of AI in education is its capacity to personalize the learning experience. AI algorithms can assess individual students' learning styles, paces, and preferences to deliver customized content and support. This personalized approach has the potential to increase student engagement, motivation, and learning outcomes. AI can automate administrative tasks, freeing up educators' time to focus more on teaching. AI-driven systems can assist with grading, scheduling, and providing feedback, streamlining tasks, and improving efficiency. Another key benefit of AI in education is the use of data analytics to derive insights into student performance and learning patterns. AI algorithms can analyze large datasets to identify at-risk students, evaluate the effectiveness of teaching strategies, and inform decision-making. While there are many benefits of AI in education, there are also challenges and considerations. Ethical considerations, data privacy concerns, and the need for human oversight are important factors to address for the responsible and effective implementation of AI in educational settings (Kang, 2023; Mudkanna Gavhane & Pagare, 2024; Aad & Hardey, 2025).

The integration of AI technology into education is transforming traditional learning environments and enhancing Activity-Based Learning. AI offers tools and platforms that can personalize learning,

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provide adaptive feedback, and create interactive simulations, thereby enriching active learning experiences. Research in this area focuses on leveraging AI to develop innovative blended learning platforms that combine the benefits of ABL with AI-driven technologies to foster critical skills and competencies. Studies indicate that AI-enhanced ABL platforms can lead to improved learning outcomes, increased student engagement, and positive perceptions from both educators and learners (Kumar & Vivekanandan, 2018; Atasoy et al., 2020).

A review of the literature indicates that the landscape of higher education is undergoing a significant transformation, driven by digital advancements and the need for more effective andragogical approaches. Blended learning, which combines traditional face-to-face instruction with online learning experiences, has emerged as a prominent strategy to address these challenges. The integration of technology into educational settings is not merely about adopting new tools but also about reimagining how knowledge is disseminated, accessed, and applied, particularly in the context of strategic educational management (Mustapha et al., 2021; Panjarattanakorn et al., 2023; Phakamach & Panjarattanakorn, 2024; Yar et al., 2023).

The development of blended learning management platforms, incorporating activity-based learning and AI, is a multifaceted endeavor. It requires a deep understanding of educational theories, technological capabilities, and the specific needs of educational leaders. Activity-based learning, with its emphasis on student engagement and active participation, aligns well with the goals of developing strategic thinking and problem-solving skills, which are crucial for effective educational leadership. Furthermore, the integration of AI into these platforms offers opportunities to personalize learning experiences, automate administrative tasks, and provide data-driven insights to both learners and instructors. This approach not only enhances the learning process but also equips educational leaders with the tools and knowledge necessary to navigate the complexities of modern educational institutions (Kang, 2023; Mudkanna Gavhane & Pagare, 2024; Phakamach & Panjarattanakorn, 2024; Aad & Hardey, 2025).

Conceptual Framework

Based on the review of relevant literature, documents, and research reports, the research team designed a research and development process by establishing a research framework for the research and development of a blended learning management platform on strategic educational management using activity-based learning techniques and AI technology to enhance educational administrator competencies, as shown in Figure 1.

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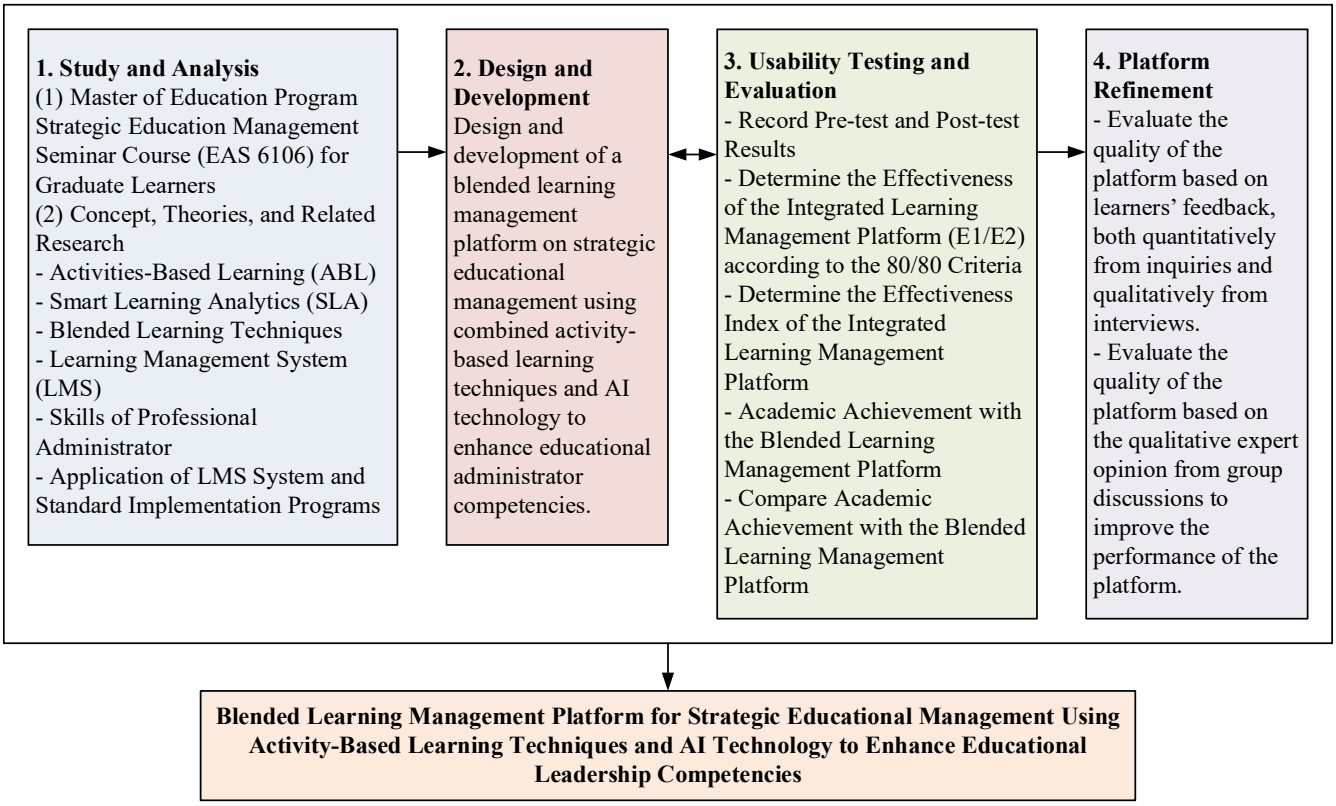

Figure 1: Research Conceptual Framework

Methodology

This research is a research and development (R&D) study aimed at designing and developing a blended learning management platform on strategic educational management using activity-based learning techniques and AI technology to enhance educational administrator competencies. The details of the research methodology are as follows:

Population and Sample

The study population consisted of students enrolled in the Strategic Educational Management Seminar (EAS 6106) course within the Master of Education program at Rajamangala University of Technology Rattanakosin, academic year 2024.

The sample group, comprising 57 students, was obtained through cluster random sampling from classrooms 1 and 2, with classrooms as the sampling unit.

The target group consisted of 10 educational innovation and technology experts, selected purposively based on specified criteria.

Research Instruments

The research instruments included: 1) A learning achievement test; 2) An expert evaluation form for the platform's quality; 3) A questionnaire on learners' opinions regarding the platform; 4) A structured interview form to assess the usage and attitudes regarding: (1) knowledge and application, (2) behavior and response, (3) participation and knowledge exchange, (4) usage results and attitudes, and (5) problems and suggestions; and 5) A focus group interview guide for educational innovation and technology experts.

The questionnaires were reviewed by experts for content validity, language appropriateness, and clarity, resulting in an Index of Item-Objective Congruence (IOC) of .945. The questionnaires were tested for reliability using Cronbach's Alpha Coefficient, yielding a reliability score of .926. Item total correlation was tested to find the discrimination power of each question.

Research Procedure

This research followed a research and development (R&D) approach, consisting of four phases:

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Step 1: Study and Analysis: Involving the analysis of course content based on graduate-level qualification standards for the Master of Education program, utilizing relevant documents and research reports.

Step 2: Design and Development: Utilizing the Smart Learning Analytics (SLA) framework, employing learning management system (LMS) software, digital learning development tools, and AI tools, based on the course syllabus, including preliminary testing during online class sessions.

Step 3: Usability Testing and Evaluation: Conducting a 3-month operational trial of the developed platform (block course), followed by efficiency testing, effectiveness index calculation, and learning achievement assessment.

Step 4: Platform Refinement*:* Analyzing the evaluation results from phase 3 through a focus group discussion with 10 experts and refining the blended learning management platform for graduate-level students.

Development of Instructional Tools

The development of instructional tools included:

1) Analyzing the curriculum/course and content of the Strategic Educational Management Seminar, along with educational administrator competency activities based on the Teachers' Council professional standards of Thailand.

2) Defining learning objectives to determine the scope of content and activities for each learning unit.

3) Determining the presentation format for content and modern educational administrator skill development activities.

4) Creating a flowchart of the blended learning management platform to establish classroom communication channels.

5) Designing a storyboard based on a hierarchical structure, incorporating activity-based learning techniques and AI technology.

6) Developing the platform using LMS Tool Box, Gen AI, and computer programs.

7) Conducting a pilot test and making necessary adjustments to the platform.

8) Evaluating the quality and efficiency of the blended learning management platform.

Experiment/Data Collection Site

1) The experiment and data collection took place at Rajamangala University of Technology Rattanakosin, Nakhon Pathom Province.

2) The experiment preparation included: (1) obtaining permission for data collection and platform testing, (2) uploading the developed platform to the PP-LMS website and conducting preliminary tests, and (3) preparing the venue, computers, connection equipment, and scheduling the experiment in regular classrooms.

3) The experiment was conducted by implementing the platform, which had been evaluated by experts, to assess its effectiveness through the following experimental designs (Fernández Cruz et al., 2016):

(1) One-to-One Testing: The experiment involved three graduate students who had previously taken the course (EAS 6106), selected through simple random sampling. The platform's efficiency (E_1/E_2) was evaluated, and any identified shortcomings were addressed. The resulting E_1/E_2 value was 60.45/61.97.

(2) Small Group Testing: The experiment involved nine graduate students who had previously taken the course (EAS 6106), selected through simple random sampling. The platform's efficiency (E_1/E_2) was evaluated, and any identified shortcomings were addressed. The resulting E_1/E_2 value was 70.67/71.88.

(3) Field Testing: The experiment involved 57 graduate students from the sample group, following these steps: (1) administering a pretest using a learning achievement test with 10 learning units, each containing 10 questions; (2) providing instruction using the blended learning format and educational administrator competency enhancement activities; (3) assigning 10 practice exercises using the blended learning format and educational administrator competency enhancement activities; and (4)

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administering a posttest using a learning achievement test with 40 questions. The overall E_1/E_2 efficiency was evaluated, resulting in a value of 81.23/82.46.

Data Analysis

The research team analyzed the data obtained from each research phase using statistical software, as follows:

1. Development of a Blended Learning Management Platform on Strategic Education Management Using Activity-Based Learning Techniques and AI Technology to Enhance Educational Administrator Competencies:

(1) Platform Quality Evaluation by Experts: The platform's quality was evaluated by 10 experts using a 5-point rating scale. The interval width was calculated using the formula (5-1)/5 = 0.8, with the following interpretation:

4.21 – 5.00: Quality is at the highest level.
3.41 – 4.20: Quality is at a high level.
2.61 – 3.40: Quality is at a moderate level.
1.81 – 2.60: Quality is at a low level.
1.00 – 1.80: Quality is at the lowest level.

The quality analysis involves finding basic statistics, including percentage, average score, and standard deviation (S.D.), derived from the tests of each learning unit and post-learning achievement scores. (2) Finding efficiency according to the 80/80 criteria. (3) Finding the effectiveness index. (4) Analyzing and comparing learning achievement before and after learning using t-test statistics. And (5) analyzing the opinions of learners regarding learning with the blended learning management platform by finding the average () and standard deviation (S.D.) and comparing the average with the established criteria, using a 5-level rating scale.

2. The learning achievement test was analyzed for discrimination, difficulty, content validity (IOC), and reliability (KR20).

3. The effectiveness index of the blended learning management platform was calculated using Goodman, Fretcher, and Schneider's method.

4. The efficiency of the platform was determined using the 80/80 criterion.

5. The difference between pre-test and post-test scores was analyzed using a dependent samples t-test.

Results

Based on the research study titled "Blended Learning Management Platform on Strategic Educational Management Using Activity-Based Learning Techniques and AI Technology to Enhance Educational Administrator Competencies," the research results and data analysis, aligned with the research objectives, are presented in the following sequence:

1. Research and Development Methodology

The platform's research and development process consisted of four phases: 1) study and analysis, 2) design and development, 3) usability testing and evaluation, and 4) platform refinement. Phase 1 involved deriving structural conclusions for the design and construction of the platform. Phase 2 focused on selecting appropriate tools for designing content and instructional media in an Online-Merge-Offline (OMO) course format. Phase 3 included usability testing and evaluation through efficiency assessment, effectiveness index calculation, and learning outcome evaluation. Phase 4 was a qualitative research phase aimed at utilizing the research findings to refine the platform's capabilities. The design and development resulted in a platform with key features, including practical applicability for course instruction, comprehensive support for learning management processes, activity modules aligned with course content, and integrated case studies. The platform can be applied for thesis or independent study projects in subsequent academic terms. Additionally, the platform is designed to operate according to the scheduled timetable and should incorporate a Content Management System (CMS) and Gen AI to achieve a complete blended learning management platform.

2. Platform Efficiency Evaluation

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2.1 The efficiency evaluation of the developed platform, based on the 80/80 criterion, revealed an efficiency rating of 81.23/82.46. This indicates that the platform facilitated an 81.23% learning process among students and demonstrated an 82.46% effectiveness in learning and behavioral change, meeting the established 80/80 criterion as per the research objectives.

2.2 Effectiveness Index and Learning Achievement: The effectiveness index of the developed platform was calculated to be 0.8328 or 83.28%. The learning achievement assessment showed that the average pre-learning score was 25.28 out of 40 (63.20%), while the average post-learning score was 34.89 out of 40 (87.23%). The *t*-test analysis (t=-19.418) demonstrated a statistically significant difference (p<.05), with post-learning scores being significantly higher than pre-learning scores, as shown in Table 1.

Table 1: Compares learners' academic achievement between pretest and posttest learning with the platform.

Learning Achievement	***n***	$\bar{x}$	**S.D.**	***t***	***p*-value**
Pretest	57	25.28	0.667	-19.418	.001
Posttest	57	34.89	0.632		

* Statistically significant at the level of .05.

3. Findings on Expert and Learner Opinions Regarding the Developed Platform

The study to evaluate the opinions of experts and learners regarding the developed platform revealed the following: The overall quality of the platform, as perceived by experts, was rated at a high level ($\bar{x}$=4.18, S.D.=0.581), with all individual aspects also rated at a high level, including content and learning activities ($\bar{x}$=4.20, S.D.=0.565), design and development ($\bar{x}$=4.18, S.D.=0.605), and usability ($\bar{x}$=4.17, S.D.=0.575). The evaluation of learner opinions regarding the developed platform showed that the overall average opinion of learners was at the highest level ($\bar{x}$=4.23, S.D.=0.604), with individual aspects also rated at the highest level, including attitude ($\bar{x}$=4.28, S.D.=0.617) and content and learning activities ($\bar{x}$=4.23, S.D.=0.557), while design and development was rated at a high level ($\bar{x}$=4.19, S.D.=0.638).

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 innovation and technology for platform refinement, are as follows:

1) Knowledge and Application: The teaching team and students found the blended learning management platform on strategic education management using activity-based learning techniques and AI technology to enhance educational administrator competencies to be responsive to the course's requirements and the implementation of practical learning activities. The teaching team could apply the experience gained to future course management, while students could utilize the knowledge and experience to develop educational strategies for their potential roles as educational administrators and for their thesis or independent study projects.

2) Behavior and Response: The teaching team used the platform to design formats and active learning activities to enhance educational administrator competencies. Students used the platform for learning, knowledge retrieval and recording from practical activities, question formulation, practice in developing educational management strategies, participation in discussion forums, knowledge sharing, engagement in active learning activities, and knowledge assessment, all aligned with knowledge management processes, which effectively supported their self-development and enhanced their educational administrator competencies.

3) Participation and Knowledge Exchange: The teaching team and students actively participated in using the platform for teaching and learning management, utilizing OMO learning materials, formulating creative questions and seeking answers, engaging in knowledge exchange and sharing, and creatively participating in assigned learning activities. The platform successfully motivated students to engage and fostered a collaborative learning environment conducive to knowledge exchange in modern educational settings.

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4) Usability and Attitude: The teaching team and students expressed satisfaction with the platform's usability, with some students adapting knowledge and experiences from their peers' strategic educational management approaches. The collaborative activities, including problem identification and solution discovery, enhanced learning skills and competencies in educational administration.

5) Problems and Recommendations: The teaching team and students suggested adding a feature to display developmental knowledge assessment results in a graphical format, potentially without public access, to allow users to track their current competencies and learning outcomes. This feature could be used to improve future classroom learning effectiveness. Additionally, they recommended expanding the knowledge recording section to include standardized report formats for educational quality assurance and to support future knowledge development.

Examples of the blended learning management platform on strategic educational management using activity-based learning techniques and AI technology to enhance educational administrator competencies are shown in Figures 2-4, respectively, comprising: (2) the main page of the blended learning management platform using activity-based learning techniques; (3) learning management supporting documents; and (4) examples of learning activities and assignments, in that order.

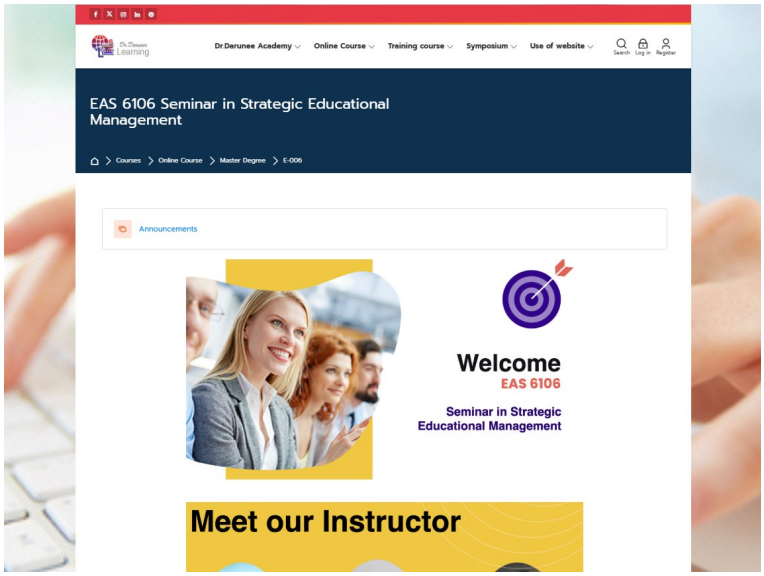

Figure 2: The Main Page of the Blended Learning Management Platform Using Activity-Based Learning Techniques and AI Technology

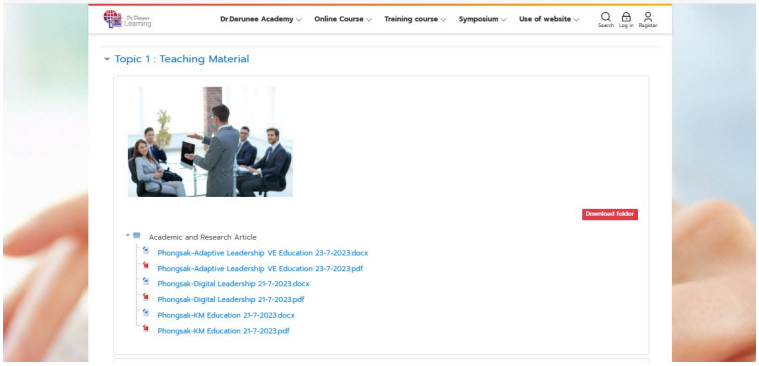

Figure 3: Learning Management Supporting Documents

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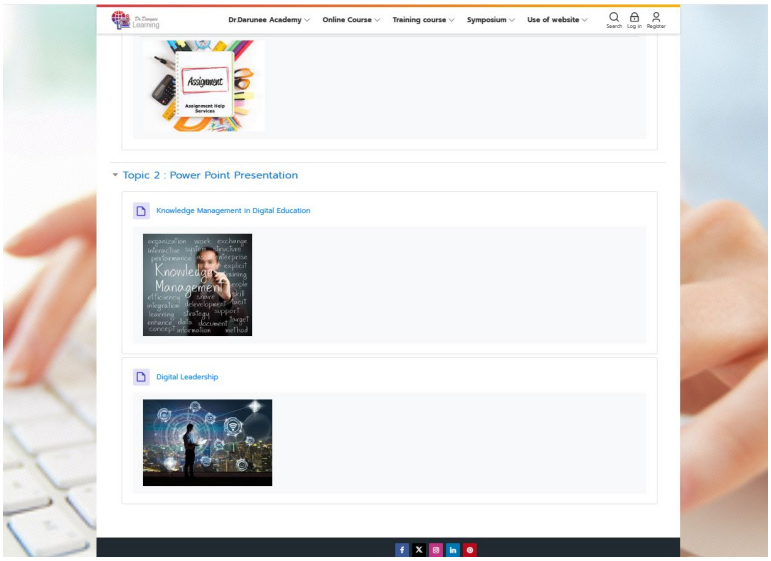

Figure 4: Examples of Learning Activities and Assignments

Discussion

Based on the research study to develop a blended learning management platform on strategic education management using activity-based learning techniques and AI technology to enhance educational administrator competencies, the following discussions can be drawn, aligned with the research objectives and research steps:

1. Results of Platform Design and Development

The research and development methodology employed, following the defined steps, resulted in an effective blended learning management platform for the course. The design and development outcome, based on the presented methodology, ensures sufficient quality for the practical application of the blended learning platform in teaching the Strategic Educational Management Seminar in an OMO (Online-Merge-Offline) format and other related courses for graduate-level students.

2. Platform Efficiency Assessment

The efficiency of the developed platform was found to be 81.23/82.46. This indicates that the developed blended learning management platform facilitated an 81.23% learning process among students and demonstrated an 82.46% effectiveness in learning or behavioral change. This meets the 80/80 criterion, effectively aiding students in their learning progress in the Strategic Educational Management Seminar and enhancing their educational administrator competencies. This finding aligns with the research of Sankaranarayanan et al. (2020), Phakamach et al. (2021), Freyn et al. (2021), and Yar et al. (2023). The reasons for this include:

2.1 The researchers systematically developed the platform, starting with data study and analysis, applying the SLA process through AI applications, designing strategic educational management content using activity-based learning through the LMS, which was reviewed by content experts and revised after flowcharting, and subsequently reviewed by computer program design and production experts. The platform was then piloted with the sample group to evaluate efficiency and further refined based on the findings. This approach to media production and learning management aligns with the research and development (R&D) process, incorporating active learning activities in each learning unit and utilizing the LMS Tool Box for content and interaction design, which is consistent with the research of Nkhoma et al. (2017), Sankaranarayanan et al. (2020), Phakamach et al. (2021), Dzulkifli et al. (2021), and Yar et al. (2023). This approach enhances students' understanding of strategic educational management to foster quality educational administration.

2.2 The platform development was based on the conceptual framework derived from Dzulkifli et al. (2021), Yar et al. (2023), and Kang (2023), employing a standardized LMS and AI application design process, including: 1) content analysis, 2) instructional design based on activity-based learning

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principles, 3) collaborative activities and knowledge synthesis, 4) instruction using designed formats and media, and 5) efficiency testing based on learning achievement and practice exercise scores.

2.3 The developed platform includes a blended learning management support system and mechanisms to verify student achievement in educational administrator competencies, covering content, AI-driven research, knowledge synthesis, discussion, critical thinking, supplementary activities, and collaborative experiential learning.

2.4 Effectiveness Index and Learning Achievement: The effectiveness index of the developed platform was 0.8328, indicating an 83.28% increase in scores post-learning, aligning with the research of Ranjbarfard & Sureshjani (2018), Anwar (2019), Dzulkifli et al. (2021), Sandanayake et al. (2022), and Yar et al. (2023). This is attributed to the platform's direct instructor-like presentation, enhanced understanding through collaborative learning and AI application, educational administration practice, appropriate use of text, graphics, images, and multimedia, challenging activities and scenarios, and novel presentation that sustains student interest. The average pre-learning score was 25.28 (63.20%), and the average post-learning score was 34.89 (87.23%). The *t*-test analysis (t=-19.418) showed a significant difference ($p<.05$), indicating that the platform significantly improved student learning achievement.

3. Expert and Learner Opinions

Both quantitative and qualitative assessments of expert and learner opinions showed high satisfaction with the platform. Experts rated the overall platform quality as high ($\bar{x}$=4.18, S.D.=0.581), with high ratings across content and activities ($\bar{x}$=4.20, S.D.=0.565), design and development ($\bar{x}$=4.18, S.D.=0.605), and usability ($\bar{x}$=4.17, S.D.=0.575), consistent with the research of Anwar (2019), Dzulkifli et al. (2021), Manoharan et al. (2022), and Yar et al. (2023). Learners rated content and activities at the highest level ($\bar{x}$=4.23, S.D.=0.557), indicating high satisfaction, aligning with Phakamach et al. (2021) and Patra et al. (2021). Design and development were rated high ($\bar{x}$=4.19, S.D.=0.638), indicating effective design. Attitude was rated at the highest level ($\bar{x}$=4.28, S.D.=0.617), showing positive learner attitudes, consistent with the research of Anwar (2019), Dhawan (2020), Mustapha et al. (2021), Dzulkifli et al. (2021), Sandanayake et al. (2022), Yar et al. (2023), and Thottoli and Thomas (2024), which emphasize the importance of attitude in instructional design.

Knowledge Contribution

This research involves the development of a blended learning management platform for strategic education management, employing activity-based learning techniques and AI technology to enhance the competency of education administrators. The research and development (R&D) methodology was used to create and pilot the blended learning platform. The design and development introduced educational innovations comprising the following dimensions: 1) electronic learning media; 2) a proactive knowledge management system, including a knowledge repository, knowledge logs, knowledge retrieval, and knowledge assessment; 3) a database of faculty and students, along with academic services; 4) an online electronic bulletin board for knowledge exchange; 5) AI tools for education; and 6) a link to the university's e-MIS. The blended learning management system was modeled using educational software, including GenAI, and student services were provided through the LMS Tool Box. The platform's quality was evaluated by experts, with the evaluation results being at a high level. The evaluation of user satisfaction with the platform, conducted by learners, was at the highest level. Additionally, the platform's performance was improved based on feedback from experts in the final stage to demonstrate the platform's competency for use in graduate-level teaching and learning. Consequently, the research yielded a blended learning management platform with a model suitable for teaching, learning, and providing services to graduate students in educational administration. The platform is practical, meets the needs of learners, and effectively fosters learning about strategic education management for education administrators in the digital education era.

In conclusion, the research on the blended learning management platform for strategic educational management, using activity-based learning and AI to enhance educational administrator competencies, demonstrates sufficient quality and efficiency for practical application in graduate-level education, effectively promoting educational administration competencies.

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Recommendations

Recommendations for implementation and development

1) The platform's content must align with the learning objectives of the course according to the specified curriculum.

2) Clearly state the objectives to learners in each learning unit sequentially.

3) Design a well-structured and planned learning access and practical training pathway.

4) Have a system to verify that learners achieve the learning outcomes in each learning unit as specified.

5) Require learners to engage in a blended approach of a non-linear approach and proactive learning.

6) Develop towards analytical and critical learning, including the creation of new knowledge from research.

7) Provide regular practice exercises, incorporate creative activities, and offer immediate feedback.

8) Record access data, knowledge processing results, and learner services in a standard format.

Recommendations for future research

1) The blended learning management platform should be developed to include more components that can be used as learning media according to qualification standards. This will provide in-depth data for improving the effectiveness and efficiency of the learning management model.

2) Further research and development of blended learning management models should be conducted in other courses to increase educational resources that meet international standards.

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