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Development of Creative-Based Learning Management Platform on Transformational Leadership Educational Management in Digital Education for Graduate Learner

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Abstract. The objectives of this research were to 1) design and create, test, use and evaluate a prototype of creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner; and 2) propose a creative-based learning management platform developed. This research is research and development. The sample group consisted of 38 graduate students in the master and doctoral of education program at the Rajamangala University of Technology Rattanakosin in the academic year 2024**.** The target group is fifteen experts in ICT systems and educational innovations. The research method consisted of four steps: 1) analysis of user requirement, 2) system design and development, 3) usability testing and evaluation, and 4) improving system performance. Quantitative data analysis by using statistical packages to show mean and standard deviation. The qualitative data analysis was used content analysis. The research results were as follows: 1) the prototype of a platform developed uses a DBLC development process. Experimenting with the operational system for graduate learning involves learning alongside technology with a simple implementation. Students have the highest level of satisfaction with the platform prototype that is evolving, and 2) this platform has a structure that consists of a website, lecturer and student database, knowledge record, knowledge assessment, discussion board, download documents, related case studies, and pictures of various activities. In addition, the prototype platform will provide students with practical skills in learning Transformational Leadership Educational Management in Digital Education, including better developing skills in the use of ICT systems in education.

Keywords: Creative-Based Learning, Transformational Leadership, Educational Management, Digital Education, Graduate Learner

INTRODUCTION

Information and Communication Technology: ICT is a critical and valuable system for the nation's development to progress. It is also very relevant to people's way of life in modern society. All societies have changed and adapted to becoming an electronic society (e-Society) completely. Hence, ICT has become a system that is necessary for every operation in various departments. Organizations developing and implementing appropriate ICT systems will help executives and operators receive accurate and timely information. As a result, the decision-making in planning the organization's operations is more efficient. Solving problems is possible on time. This is the ability to compete for advantage and efficiently develop services to customers (Laudon & Laudon, 2019). Therefore, studying how to apply the appropriate ICT system for the organization is essential. The practical application of ICT to make timely decisions requires concrete management planning (Phakamach, 2023). This includes various strategies in systematic management so that the organization achieves its objectives and has continuous development and sustainable growth (Sinlarat, 2020). The role of universities is to understand the changes and learn new ways to keep up with modern Thai and international technology in education management (Demir et al., 2021) with the introduction of modern management and management techniques. These are applied to educational administration in institutions for maximum academic efficiency and effectiveness (Garbin, Ten Caten, & Jesus Pacheco, 2022).

The Ministry of Higher Education, Science, Research and Innovation saw the importance of ICT by encouraging the use of ICT to develop and apply in order to enable learners to learn and develop to a higher level of knowledge. This is in line with the government's policy according to the 20-year national strategy 2017-2036, and under the ICT Master Plan 3 (ICT Master Plan 3) Higher Education Act B.E. and more educational platforms due to the global connection of information, it is a new avenue for education. People use this main road as a path to intellectual treasures and to develop new learning styles (Buasuwan, 2018: Lyapina et al., 2019; Phakamach, Senarith, & Wachirawongpaisarn, 2022). Therefore, the Ministry has established policies and standards to encourage educational institutions and agencies to implement the policy to promote the development of ICT for education by providing teachers. Educational personnel and learners have developed the ability to use educational platforms to benefit teaching and learning. Educational institutions at all levels need to have an ICT management system for educational innovation development as a standard system for improving the quality of education at all levels (Panjarattanakorn & Phakamach, 2020).

Teaching in the era of transformational change (Education Disruption) has a variety of teaching and learning management models that are used to promote and solve educational management problems in various fields, especially in the situation of the epidemic of Coronavirus (Ismaili, 2021). Teaching and learning management must align with the new learning paradigm. This enables learners to be able to seek knowledge on their own. This is specially true of the ability to fully use innovation and educational technology in pursuing knowledge. The principles under the Higher Education Act B.E. 2562 show that thinking process skills are still essential and must be encouraged for learners because thinking is an intrinsic factor influencing a person's actions and expressions. People with high thinking abilities will be able to solve problems. They are accomplished and develop their own lives. Therefore, the development of thinking ability is an integral part of the development of learners to live happily in a changing society (Gioiosa & Kinkela, 2022). Creative-Base Learning (CBL) is based on the aim of developing students' intellectual abilities by providing them with research skills, thinking skills, and group work skills. New knowledge can be linked to previous knowledge, with instructors encouraging students to use their creativity to present ideas that can be applied for effective teaching and learning (Gabaree et al., 2020; Asad et al., 2021; Xiao & Wang, 2023). The CBL

learning process consists of 5 steps as follows: 1) stimulating interest, which is a positive stimulus that results in learners wanting to learn. Curious, eager to find answers and alert in search of self-knowledge; 2) problem setting and segmentation, such as what is the benefit of the content taught or how it will be used. What stories are relevant to real life?; 3) the search and thinking stage is the voluntary, interest, and cooperation of learners; 4) presentation stage, after researching and coming to a conclusion, the students will come out and present their work one by one. Group members also develop collaboration skills, research skills, and thinking skills. Instructors promote skills by supporting and providing opportunities to demonstrate their abilities according to their aptitude; and 5) evaluation stage Assessment needs to cover all three areas: knowledge, skills, and attributes, and should be displayed separately and not combined so that learners can use the assessment results to improve themselves. Therefore, if the challenge-based learning management process is considered for graduate students' teaching and learning, it will also affect the quality of education appropriately.

Transformational Leadership Educational Management in Digital Education is a core course in the Master of Education program at the Rajamangala University of Technology Rattanakosin; many institutes provide teaching and learning at the graduate level and are compulsory courses for modern educational administrators. This is because it is a course learned for effective leadership development for education administration in the digital era (Phakamach, Wachirawongpaisarn, & Panjarattanakorn, 2021). Most of the learning takes place in a regular classroom, creating severe obstacles to student learning if there is no good source of support for the use of modern management techniques and operating systems to build an educational platform. It is worthwhile considering using learning materials on web applications, a teaching and learning process management system that connects learners with teachers and learners with learners. It provides digital learning materials and teaching materials with instructors acting as trainers (Adele, Ellinger, McWhorter, & Egan, 2023) and are inspirers by designing experiential proactivity activities that correspond to the course content (Huang & Lai, 2020), which is a self-paced learning model that supports knowledge management in a given course, helping to solve problems and obstacles that arise in students' learning. In particular, graduate teaching and learning focus on creating learning challenges in order to create new knowledge to appear with quality.

Based on this idea, the researcher is interested in developing a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner. This system will change the learning process by using the learning management system platform to support teaching and learning activities. To be a complete learning organization, this design and development present educational innovations with specific dimensions: 1) electronic learning media; 2) a knowledge management support system, i.e., knowledge repository, knowledge record, chat board, and a knowledge assessment form; 3) a database of teachers and students as well as academic services; 4) online electronic bulletin boards to exchange learning; and 5) linkage with universities (e-MIS). The prototype will be a model of a learning management system using software and services. as well as assessing the efficiency and satisfaction of the learners. Performance improvements are based on expert feedback The model system is suitable for serving graduate students. It can be used to respond to the needs of students and contribute to learning about the effective management of Transformational Leadership Educational Management in Digital Education.

RESEARCH OBJECTIVES

1. To design, create, test, use and evaluate a prototype of a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner.

2. To propose a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner.

RESEARCH CONCEPTUAL FRAMEWORK

Research concepts can be formulated from the literature review and related research process design. The goal is to create a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner, as shown in Figure 1.

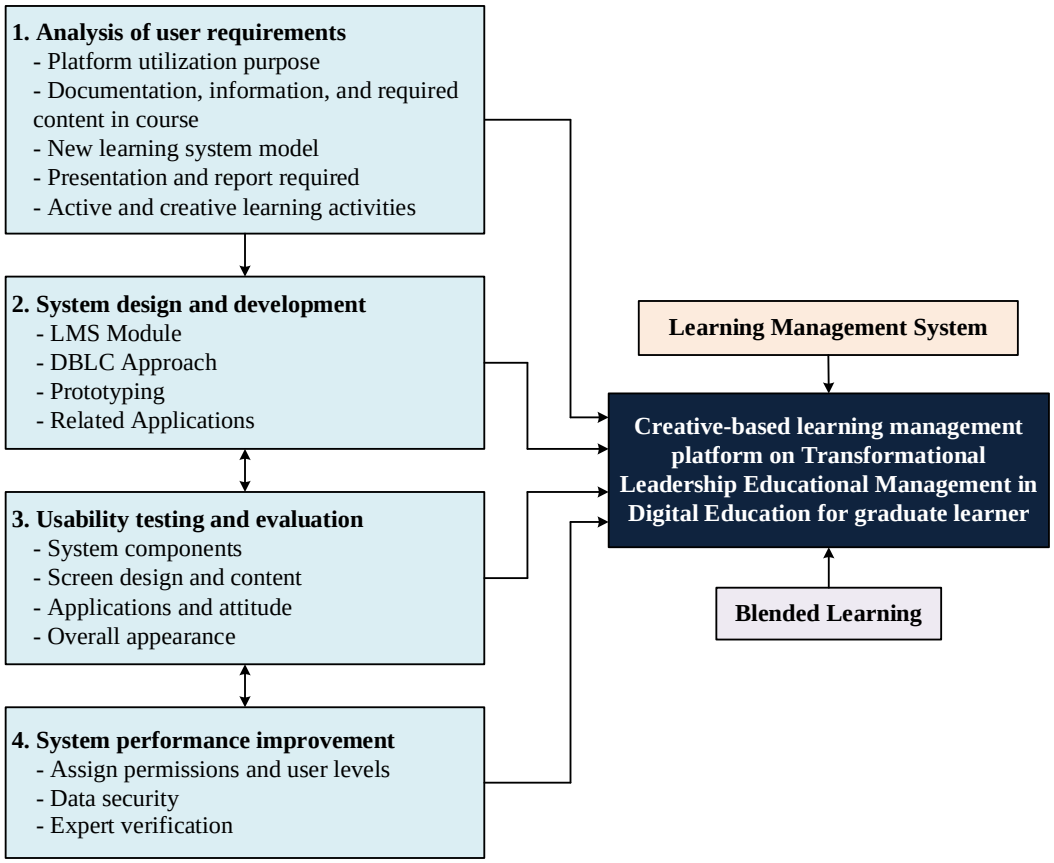

Figure 1: Research Conceptual Framework

METHODOLOGY

This research includes research and development with related details as follows:

Population and Sample

The population used in this research were graduate learners of the Master and Doctoral of Education program at Rattanakosin International College of Creative Entrepreneurship, Rajamangala University of Technology Rattanakosin, Enrolled in Transformational Leadership Educational Management in Digital Education in the first semester of the academic year 2024, there are 38 students because the total study population is small and requires data based on the opinions of all learners. Therefore, the panel used a method of selecting the entire population by defining it as a sample. The target group would be 10 experts in ICT systems and educational innovation.

Research Instruments

The research tools consisted of (1) a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner and (2) the tools used for data collection were:

(1) Quality assessment form (for experts) in ICT systems and educational innovations is a 5-level rating scale that assesses the efficiency of the system in terms of system components, design and development, as well as usability.

(2) The student satisfaction assessment form is a 5-level rating scale that assesses the suitability of the system in terms of system components, screen design and content, as well as usability and attitude.

(3) Structured interview form for interviewing students' use of the system on issues of (1) knowledge and implementation, (2) behavior and response, (3) participation, (4) results of use, and (5) problems and suggestions.

Procedures for Conducting Research

This research is research and development. The research method consisted of four steps:

(1) Analysis of user requirements, which is the study and analysis of user needs for both faculty and students. This establishes the necessary requirements for building a learning management system promotes solving current challenges through a five-step learning process. Starting from 1) Stimulate creativity and imagination, 2) Consider issues creatively, 3) Seek findings, 4) Exchange learning creatively, and 5) Evaluate and expand to dissemination, etc.

(2) System design and development, by using learning management system and programs related to the development of both offline and online teaching materials. This entails designing a case study related to the course, including a preliminary test.

(3) Usability testing and evaluation, platform quality and suitability checks by ICT and educational innovation by 10 experts. This is a 3-month trial phase, and satisfaction is tested by students enrolled in course.

(4) Improving system performance, by taking the test and evaluation results obtained from Step 3 for confirmation and improving the performance of the creative-based learning management platform on Transformational Leadership Educational Management in Digital Education to be effective for graduate learner.

The process of creating tools used in teaching and learning management includes: 1) Studying the curriculum/course and analyzing the content of the Transformational Leadership Educational Management in Digital Education course at the graduate level; 2) Defining the learning objectives to determine the scope of content in each unit including creating and challenging learning activities accordingly; 3) Determine the format for presenting content by collaborating academic seminars in accordance with the learning management approach that promotes the solution of challenging problems in 5 steps. Start with (i) Stimulate creativity and imagination, (ii) Consider issues creatively, (iii) Seek findings, (iv) Exchange learning creatively, and (v) Evaluate and expand to dissemination, etc.; 4) Write a flowchart of the learning management platform to define internal communication channels for convenience; 5) Design the storyboard according to a hierarchical structure based on proactive knowledge management techniques; 6) Develop the platform layout using LMS tool box and related computer programs; 7) Conduct trial to revise the platform; and 8) Evaluate the quality and satisfaction of the platform.

Experiment and Data Collection

The experimental model and the data collection were set as follows.

The preparation of the experiment includes: (1) ask for permission for the data collection and test the system by collecting data and testing the system in the first semester

of the academic year 2024; (2) prepare the developed prototype and put it on the Dr.Darunee Learning Center, send the data to the server, and test its use; and (3) prepare the location and the computer, and schedule the experiment by testing the operating system in the content of educational platform development.

Take a system prototype that has been evaluated by an expert and test it for performance evaluation according to the following format.

One to One Testing: an experiment with three students who have taken this course before selected on the basis of high, medium and low grades based on their average grades in the past semester. Using a simple random sampling method, test the system to find defects and then use it to improve and fix it with the value E_1/E_2 = 61.75/62.86

Small Group: Testing Experiment with nine students who have taken this course before by selecting students with high, medium and low grades based on the average of the course scores in the past semester as criteria. Using a simple random sampling method, test the system to find bugs and use them to improve E_1/E_2 = 71.84/72.93

Field testing, including:

(1) Bring the system to students for a one-month workshop experiment by selecting a sample group of 38 students and organizing a pretesting knowledge meeting. The meeting is carried out in the following order: (1) Pretest by having students test from the achievement test of 40 items, (2) let learners study by using a challenge-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner, (3) allow learners to do exercises from the system ten items per learning unit, and (4) then post-test by having learners test from the achievement test of 40 items and evaluate the overall efficiency of E_1/E_2 with a value of E_1/E_2 = 81.95/ 83.22

(2) Interview a sample group of students, who use it regularly it, about their use.

(3) Analyze the results of the interview summarized in an essay manner and improve the system to be suitable and complete.

Data Analysis

The data obtained in the research process were analyzed in the following order:

1) Analysis of user requirements: summarized in an essay to illustrate the details that consist of (a) the purpose of using the system, (b) the required documents, information and content, (c) new learning system model, (d) presentation and report required (e) Active and CBL activities, and (f) practical activities.

2) System design and development: by ten experts in ICT systems and innovations for education administration, summarized in an essay format to illustrate the details, which consist of (a) LMS Module, (b) DBLC Approach, (c) Prototyping, and (d) related applications.

3) Usability testing and evaluation: Assessment of the efficiency of the prototype system by experts and based on the satisfaction by 38 students using a 5-level rating scale.

The research at this stage will apply the process in steps 1 and 2 by assessing the effectiveness and satisfaction of use. The information in step 2 can adjust the process as appropriate. There is a practical test. as well as study according to the prescribed format in order to obtain a system that is suitable for creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner.

The study population at this stage can be divided into two groups as follows: Group 1: the target group is 10 ICT experts and educational innovations and Group 2: the sample group consisted of 38 students in Transformational Leadership Educational Management in Digital Education course at Rajamangala University of Technology Rattanakosin.

The tool used to collect the data is an unstructured interview form to test its effectiveness. Problems and obstacles, as well as corrective guidelines. Data collection can

be divided according to the study population as follows: Group 1: workshops and interviews and Group 2: was a workshop facilitation and participant observation. The questionnaire consisted of checklist questions. Text form and a 5-level estimation scale, with the questionnaire having three parts with details as follows:

Part 1: Information about the respondents.

Part 2: Opinions on using a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner. Will be an analysis to determine the efficiency and satisfaction of the system's users.

The criteria for using the score measurement are as follows: Strongly Agree; the weight was scored as 5, Agree; the weight was scored as 4, Neutral; the weight was scored as 3, Disagree; the weight was scored as 2, and Strongly Disagree; the weight was scored as 1.

Part 3: Suggestions and guidelines for developing a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner.

Creation and verification of the questionnaire tools draft will be submitted to experts to verify content validity and the appropriateness of language and wording. Then the next step is to test the reliability of the questionnaire using Cronbach's Alpha Coefficient formula. The reliability of the whole questionnaire was .942.

The data were then analyzed by statistical methods using statistic computer program. to find the efficiency and satisfaction of using a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner and present a statistical model for assessing efficiency and user satisfaction as follows:

Data analysis of group 1: Bring the data to analyze and synthesize in order to find ways to improve and develop the system. Also, recommend the correct usage according to the prescribed format so that users can use it effectively.

Data analysis of group 2: Part 1: Information that is the status of the respondents analyzed by frequency distribution and percentage.

Part 2: Information about opinions on using a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner. It is approximate scale data and is analyzed by calculating the mean and standard deviation.

Part 3: Information on recommendations and guidelines for developing a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner, which is text-based information. Use content analysis to obtain recommendations and development guidelines.

The mean was obtained from the estimation scale questionnaire data from the data analysis in group 2 and was compared with the criteria. The criteria for interpreting the mean, in summary, are as follows: 4.21-5.00 means efficiency and satisfaction are at the highest level; 3.41-4.20 means efficiency and satisfaction are at a high level; 2.61-3.40 mean efficiency and satisfaction are moderate; 1.81-2.60 means that efficiency and satisfaction are at a low level; and 1.00-1.80 means that efficiency and satisfaction are at the lowest level. where the spectral range is determined by the formula = (5-1)/5 = 0.8

4) Improving system performance:

The research at this stage will apply the results of the 3rd step to improve a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner. Next, conduct interviews with five experts in ICT systems and educational innovations using a non-structured interview, focused interview method verification for opinions and suggestions. Then apply the examination results to improve the system's performance and complete the learning requirements according to the teacher's council's compulsory course criteria.

RESULTS

An example of a prototype system is shown in Figures 2-5, respectively. Developing a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner.

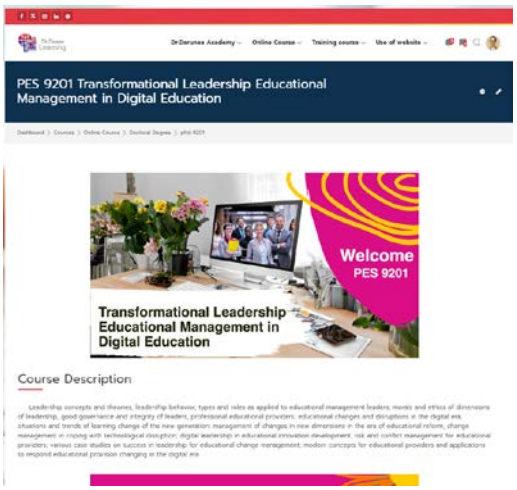

Figure 2: Creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner

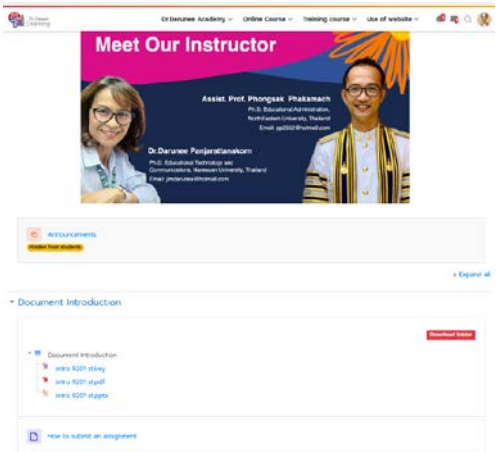

Figure 3: Example of teaching materials

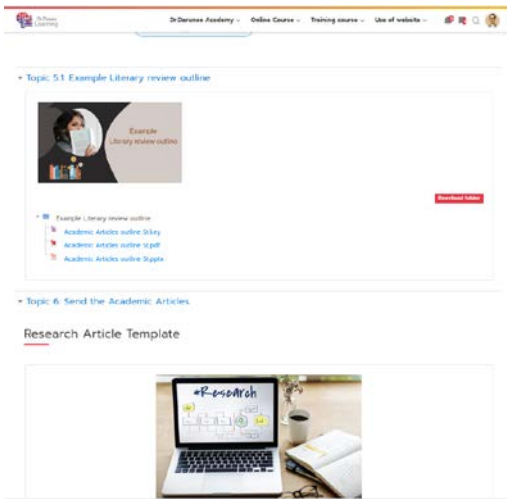

Figure 4: Example of active learning and assignments

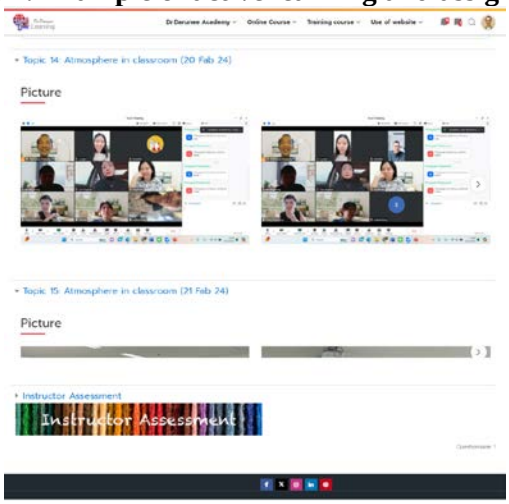

Figure 5: Example of class and student activities

The results of the research were as follows:

Research results according to objective 1

Design and create, test, use and evaluate a prototype of a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner. The findings can be listed as follows:

Analysis user requirements results

1) The results of analysis of user requirements in order to use data to design and build a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learners. Users have commented on their needs in critical areas, including: (a) It must be a platform that can be used to support teaching and learning in a given course; (b) The platform must support the process of teaching and learn with complete support functions; (c) the platform should provide operating parts that are consistent with the course content; (d) the platform should have relevant practical learning and case studies to enhance knowledge and understanding; and (e) the platform designed and built must be able to operate according to the schedule. designated classes

2) Guidelines for developing a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner and recommendations. One should study the information related to academic Transformational Leadership Educational Management in Digital Education before teaching management. Then, the system development method should be chosen according to the standard model. DBLC has the proper research and development process to achieve an operational learning system combined with case study learning on Transformational Leadership Educational Management in Digital Education. That responds to the complete knowledge management model in the course.

System design and development results

System design and development will use the DBLC standard method to make the system efficient. The key steps are (1) System Analysis, (2) System Design, (3) System Implementation, (4) System Installation, (5) System Operation and Evaluation, and (6) System Maintenance and Evolution, resulting in a learning management system for the course.

Usability testing and evaluation

The results of the test and trial of a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner with students enrolled in course in the first semester of the academic year 2024 by

quality assessment by experts and the satisfaction assessment by students showed the following:

1) The results of evaluating the effectiveness of a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner based on the opinions of 10 experts, as shown in Table 1.

Table 1: Results of efficacy assessment by experts

Topics and Assessment Items		$\bar{x}$	S.D.	Interpreting
System components	1. Website	4.25	0.55	Highest
	2. Record knowledge	4.19	0.65	High
	3. Measuring and evaluating knowledge	3.95	0.50	High
	4. Discussion board	4.25	0.55	Highest
	5. Knowledge repository	4.07	0.65	High
	6. Learning activities	4.29	0.65	Highest
	7. Pictures of various activities	4.02	0.55	High
Design and development	8. Content and Consistency	4.40	0.55	Highest
	9. Format and font size	4.12	0.45	High
	10. Font color and background	4.08	0.65	High
	11. Visual and sound effects	4.18	0.50	High
	12. Multimedia system	3.76	0.55	High
	13. Instructions and Manuals	3.72	0.50	High
	14. Overall screen	4.45	0.65	Highest
	15. Design process	4.38	0.55	Highest
Usability	16. Membership system	4.18	0.45	Highest
	17. Back-end system	4.18	0.65	High
	18. Link section	4.23	0.65	Highest
	19. Interaction section	4.40	0.45	Highest
	20. Search system	4.02	0.55	High
	21. How to use it for the purpose	4.46	0.55	Highest
	22. Practice in the course	4.33	0.45	High
Total		4.18	0.55	High

From Table 1, shows system performance evaluation by experts in three areas: system components, screen design and content, and usability. It was found that the system's overall quality was at a high level in all aspects ($\bar{x}$=4.18, S.D.=0.55). When considering each aspect, it was found that as for the components of the system, 7 items, the overall picture was at a high level ($\bar{x}$=4.15), arranged in order of averages from highest to lowest in 3 sequences: 1) learning activities, 2) website, and 3) discussion board respectively, with the highest level, is the website. In terms of design and development, 8 items were overall at a high ($\bar{x}$=4.13), arranged in order of averages from highest to lowest in 3 sequences: 1) overall screen, 2) content and consistency, and 3) design process accordingly sequence, with the highest level on the overall screen as a whole. As for the usability aspect of the 7 items, the overall picture was high ($\bar{x}$=4.27). The mean was sorted from highest to lowest in 3 orders, namely 1) how to use it for the purpose, 2) interaction section, and 3) practice in the course. Respectively, with the highest level in terms of how to use it for the purpose.

2) The results of the satisfaction assessment of the use of the model of a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner according to the opinions of 38 students are shown as follows: Table 2.

Table 2: Results of the satisfaction assessment by students

Topics and Assessment Items		$\bar{x}$	S.D.	Interpreting
System components	1. Website	4.44	0.68	Highest
	2. Record knowledge	4.23	0.46	Highest
	3. Measuring and evaluating knowledge	4.19	0.75	High
	4. Discussion board	4.25	0.59	Highest
	5. Knowledge repository	4.08	0.51	High
	6. Learning activities	4.37	0.67	Highest
	7. Pictures of various activities	4.30	0.62	Highest
Screen design and content	8. Content and Consistency	4.41	0.58	Highest
	9. Format and font size	4.25	0.59	Highest
	10. Font color and background	4.22	0.60	High
	11. Visual and sound effects	4.12	0.73	High
	12. Multimedia system	4.18	0.69	High
	13. Instructions and Manuals	4.33	0.64	High
	14. Overall screen	4.37	0.68	Highest
	15. Screen design process	4.27	0.54	Highest
Usability and attitude	16. Membership system	4.01	0.75	High
	17. Back-end and search system	3.93	0.73	High
	18. Link and interaction section	4.28	0.61	Highest
	19. How to use it for the purpose	4.19	0.68	High
	20. Practice in the course	4.42	0.75	Highest
	21. Cognition of learning activities	4.45	0.69	Highest
	22. Implementation for Education Administrators	4.38	0.71	Highest
Total		4.27	0.67	Highest

Table 2 showed student satisfaction with using the system in three areas: system components, screen design and content, and usability. It was found that the overall system satisfaction was at a highest level in all aspects ($\bar{x}$=4.27, S.D.=0.67). When considering three aspects, it was found that for 7 items of the system, the overall picture was at a high level ($\bar{x}$=4.25). The averages were sorted from least to most significant in 3 orders: 1) website, 2) learning activities, and 3) pictures of various activities, respectively, with the highest level on the website. In terms of screen design and content, 8 items, the overall picture was at a high level ($\bar{x}$=4.22), arranged in 3 descending orders of average values: 1) content and consistency, 2) overall screen, and 3) instructions and manuals, respectively, with the highest level of content and consistency. As for the usage aspect, 7 items, the overall picture was also high ($\bar{x}$=4.34). The mean was sorted from highest to lowest in 3 orders, namely 1) cognition of learning activities, 2) practice in the course, and 3) implementation for Education Administrators. respectively, with the highest level in terms of cognition of learning activities.

3) The results of the interviews about student' opinions towards the model of a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner included 5 issues, as follows:

3.1 Knowledge and implementation found that students have a learning management system suitable for teaching and learning styles at the graduate level for issues related to Transformational Leadership Educational Management in Digital Education. As well as the ability to apply knowledge to become an educational administrator in the digital era, including future research design.

3.2 Behavior and response were found that students use the interaction section with the instructor and between learners together; that they practice this in the course (as

group discussion, One-on-one discussion, brainstorming, doing exercises and presentation of assignments); they can use a search system and link sections related to the course, and record knowledge for exchanging and sharing knowledge. The students can also develop themselves. Moreover, Learners can enhance their competencies and potential as digital transformation administrators to prepare them to become future education administrators.

3.3 Participation found that the system can motivate students to use it to create an atmosphere of exchange and transfer knowledge in social media, participatory operations, and creative-based learning. It also helps students to update leadership skills and strategies for building a modern educational platform.

3.4 The utilization results showed that students were satisfied with the system by applying their knowledge and skills of creative leadership. It also helped build learning skills in effective transformation leadership educational management in digital education.

3.5 Problems and suggestions found students want a system to customize the screen by themselves to be more beautiful, as well as more attractive. When accessing this course, as with other social networks, practice sessions should be timed appropriately for both learning theory and practice in the course.

System performance improvement results

The research team synthesized the results of testing and trials of the system from the expert quality assessment and student satisfaction assessment to improve the system's efficiency. Then, five experts in ICT systems and education innovation were interviewed for a definitive review. An experts continue to provide feedback and suggestions for further improvements in system performance by developing interactive digital content. Online interactions include other techniques and methods for further improvement of academic achievement.

Research results according to objective 2

Designing and creating, testing, using and evaluating a prototype of the creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner found that the system developed according to the methods presented here can be assured of sufficient quality for effective implementation of this system in teaching and learning at the graduate level.

CONCLUSION AND DISCUSSION

The research results can be summarized and discussed in crucial issues according to the objectives and research process as follows:

Conclusion

1) Research and development methods for a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner consisted of 4 steps: 1) Analysis of user requirements, 2) System design and development, 3) Usability testing and evaluation, and 4) System performance improvement. Design and development result in a system with important characteristics, such as a system that can actually be used for teaching and learning in the course. The system must support the teaching and learning process with complete support functions, provide operating sections consistent with the course content, and have practical learning and relevant case studies to enhance knowledge and understanding. In addition, the system must be able to operate according to the specified schedule and should use a Content Management System to make the system perfect.

2) Design and development of a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner. A standard ICT development process should be used to develop a learning system.

It determines clear procedures and practices to obtain a system that can fully respond to learning management in a given course or content.

3) An analysis of the study analyzing the efficiency and satisfaction of using a creative-based learning management platform on Transformational Leadership Educational Management in Digital Education for graduate learner yield this results:

3.1 The efficiency of using the system from experts' opinions was a high level ($\bar{X}$=4.18, S.D.=0.55), indicating that the developed system could be used as a tool for teaching in the course. This system can be used as effective learning and implementation tool in course. It can also support learning about Transformational Leadership Educational Management in Digital Education.

3.2 Overall satisfaction from the students' opinions of using the system was a highest level ($\bar{X}$=4.27, S.D.=0.67), indicating that the students who used this system had a satisfactory level of satisfaction because this system can respond well to the management of learning about Transformational Leadership Educational Management in Digital Education.

Discussion

Discussion of this research includes, related parts under these headings:

1) Developed system prototype the researcher has applied the conceptual framework for research and development from the ideas of Murai & Muramatsu (2020), Kant, Prasad, and Anjali (2021), and Kim, Beyerlein, Wang, and Han (2023). to design the following steps: (1) course content analysis; (2) system design by ordering content, classify subject subjects according to learning principles, assign learning activities, determine the relevant research resources, creating a virtual learning room, and knowledge processing; (3) the development of the system based on the principles of 4Is: Information, Interactive, Individual and Immediate Feedback; (4) the use of the system for teaching and learning based on the communication channels provided; and (5) testing for the efficiency of the system is mainly based on the opinions of students.

2) The evaluation results by experts found that the developed system is suitable for a high level. It shows that the developed prototype system has this quality and that it can be used in practice because the researcher develops the lessons systematically from the study and analysis of the data using the ADDIE process, which experts have reviewed. After that, the data are tested with the sample to evaluate the efficacy and to apply the results for improvement. It is a method of conducting media production according to research and development (R&D) and relying on trials and modifications to be as complete as possible. That is consistent with the research work of Phakamach, Wachirawongpaisarn, and Panjarattanakorn (2021), Demir, Maroof, Sabbah Khan, and Ali (2021), Trivedi, Patra, and Singh (2022), Ma, Lu, and Tang, (2023), and Xiao & Wang (2023). However, to get a good model and make students understand the subject matter more, some aspects of multimedia and graphics system design should be improved related to the operation. This is required to make the system more complete and provide more educational options.

3) The satisfaction assessment results by students found that the developed system showed highest satisfaction. It shows that students can learn about Transformational Leadership Educational Management in Digital Education. The system can support learning management very well. That is consistent with the research by Raymundo (2020), Wang et al. (2021), Singh, Sharma, and Paliwal (2021), Hamdan et al. (2022) and Xiao & Wang (2023) that found that developing a sound model system requires at least four elements: i. data source and content, ii, support resources; iii, discussion boards; iv, online learning activities; and that case studies help learners understand, which can be used to create a virtual learning model. (Parramore, 2019). Therefore, the prototype system has all the elements that can be used as a system to support learning management in this course.

4) The results of confirmation of the system used by experts from group interviews found that the challenge-based learning management platform can be a support system for teaching and learning at the graduate level. It can enable students to gain theoretical knowledge and practice learning experiences in the study. Therefore, it can be confirmed that the system's efficiency was developed from the international elements and procedures for developing a quality learning management system (Presicce et al., 2020; Kant, Prasad, & Anjali, 2021; Tam, 2022; Gioiosa & Kinkela, 2022).

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