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THE DEVELOPMENT OF A LEARNING MANAGEMENT SYSTEM BASED ON THE "TEACH LESS, LEARN MORE" APPROACH USING VIRTUAL CLASSROOMS INTEGRATED WITH PROJECT-BASED LEARNING

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Abstract

This research aims to develop a learning management system based on the "Less Teaching, More Learning" approach by integrating a virtual classroom with project-based learning. The objectives are to develop the system, assess its quality, and examine the durability of students' learning after engaging in the virtual classroom under this approach for two weeks. The research instruments include the virtual classroom system, tests, exercises, and evaluation forms. The study sample consists of two groups: (1) 30 students from Nakhon Pathom Rajabhat University enrolled in the Principles of Programming course during the second semester of the 2024 academic year, selected through purposive sampling, and (2) 15 experts, divided into three areas—5 experts in system design, 5 in system development, and 5 in content and activities—also selected through purposive sampling.

The research findings indicate that the developed learning management system is functional and practical. Experts evaluated the system as highly effective. Additionally, the study demonstrated good learning retention, with no statistically significant difference in students' learning durability after two weeks at the .01 level. This confirms that students learning through the virtual classroom model maintain their knowledge effectively.

Keywords: Virtual Classroom, Project-Based Learning, Less Teaching More Learning

Currently, the Thai education system is continuously evolving to respond to current technologies, including the introduction of modern learning concepts. One such concept is "Teach Less, Learn More," which aims to encourage learners to understand and explore topics in depth through self-directed research and activities, rather than merely receiving information through lectures (Hattie, 2021). This concept aligns with the principles of 21st-century education, which emphasize critical thinking, problem-solving, and collaboration skills (OECD, 2022). To support this concept, a learning management system incorporating a "virtual classroom" has been developed. This system allows learners to access educational content from anywhere at any time, effectively reducing time and location constraints. It also facilitates interaction with content through technologies such as video conferencing, online chat rooms, and interactive learning tools (Wang et al., 2020). Moreover, learning in a virtual classroom environment helps learners develop essential digital skills that are important both now and, in the future, (Nguyen et al., 2023).

Although learners engage with theoretical content, practical training is essential for sustainable learning. Therefore, the use of "Project-Based Learning" (PBL) has become a popular approach, as it allows learners to develop knowledge and skills through projects that are connected

to real-life situations. Such projects also provide opportunities to practice essential skills, including planning, teamwork, and presentation, which are critical for advancing knowledge (Thomas, 2021). Combining the concept of a virtual classroom with PBL presents an interesting option, as it enables learners to collaborate remotely and utilize digital resources to enhance their learning effectively (Barrett, 2022).

However, while the integration of virtual classrooms and PBL has significant potential to develop learners' skills, several challenges remain, including the design of appropriate activities, effective assessment methods, and sustaining learner motivation (Dabbagh & Fake, 2023). Therefore, this research focuses on developing a learning management system based on the concept of "Teach Less, Learn More," using virtual classrooms combined with PBL to examine its impact on academic achievement and analytical thinking skills among learners in the context of Thai education.

Objective of the research

1. To develop a learning management system based on the concept of "Teach Less, Learn More" using virtual classroom media in conjunction with project-based learning.
2. To evaluate the quality of the learning management system designed around the concept of "Teach Less, Learn More" using virtual classroom media alongside project-based learning.
3. To examine the learning retention of students who studied in a virtual classroom based on the "Teach Less, Learn More" concept combined with project-based learning, assessed two weeks after the conclusion of the study.

Research Conceptual Framework

The research on the development of a learning management system based on the concept of "Teach Less, Learn More" using virtual classroom media with a project-based approach has a conceptual framework that emphasizes the use of technology as a tool to promote deep learning and the development of learners' analytical thinking skills. The developed learning management system will enable learners to access educational content from anywhere at any time, while also facilitating collaboration through projects related to real-life situations.

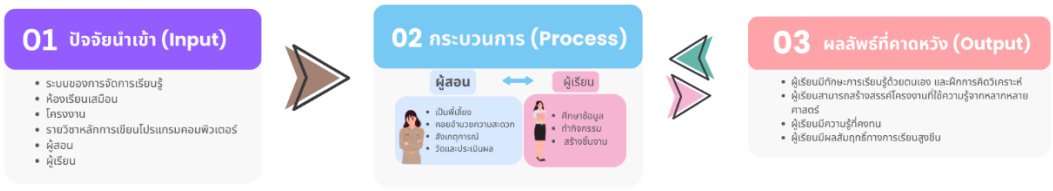


Figure 1. Framework for developing a learning management system based on the concept of teaching less and learning more.

By using virtual classroom media with project-based learning

Research Methodology

In this research, the researcher developed a learning management system based on the concept of "Teach Less, Learn More" using virtual classroom media with a project-based learning approach. The research was divided into four stages, as follows:

Phase 1: Study of Problems and Guidelines for Development

The researcher studied documents, textbooks, academic articles, and related research both domestically and internationally regarding the development of learning management systems based on the "Teach Less, Learn More" concept using virtual classroom media with a project-based approach. The goal was to analyze and design a learning management system based on this concept. An assessment form was created to evaluate the developed system, which was reviewed by five experts to determine the appropriateness of the learning management system model. The results of the evaluation from all five experts were analyzed to further develop the system.

Phase 2: Development of the Virtual Classroom System

The researcher analyzed the technology to be used in developing the virtual classroom as designed in Phase 1. The System Development Life Cycle (SDLC) consisted of: 1) studying guidelines for system development, 2) analyzing and designing the system, 3) developing the system using Visual Basic .NET (VB.NET) and MySQL to manage the database, 4) testing the system, and 5) monitoring and evaluating it. Five experts were also selected to assess the efficiency of the developed system.

Phase 3: Development of Content and Activity Design

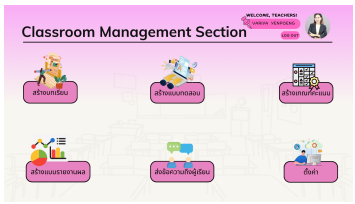
The researcher analyzed the content of the programming principles course to create instructional materials and design activities for students. This included developing an achievement test consisting of ten lessons, each featuring exercises, pre- and post-tests, and assessments. Five content experts were selected to review the accuracy and appropriateness of the materials and to make corrections based on their suggestions. The researcher tested the content and achievement test with non-sample groups, including individual students and groups, as well as through field experiments.

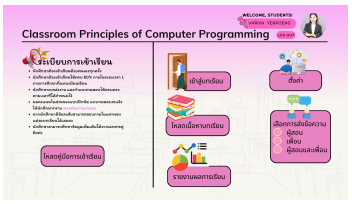
Phase 4: Measurement and Evaluation

The researcher explained the use of the system, teaching methods, and activity formats to ensure students understood how to register for classes, including recording student IDs, names, and class groups. The obtained data were analyzed to evaluate learning achievements and assess the durability of learning two weeks after the study.

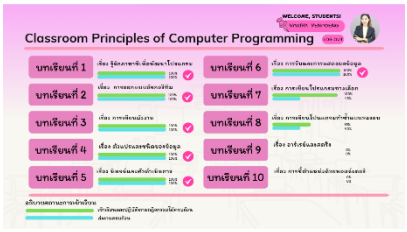
Research results

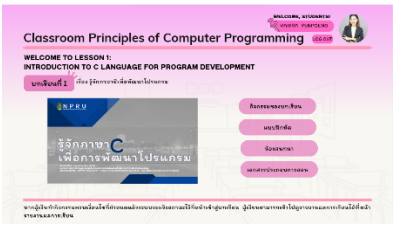
1. The results of the development of the learning management system based on the concept of "Teach Less, Learn More," utilizing virtual classroom media with project-based learning, are divided into four main components: the system access section, the learning activity section, the measurement and evaluation section, and the reporting section, as shown in Figure 2.

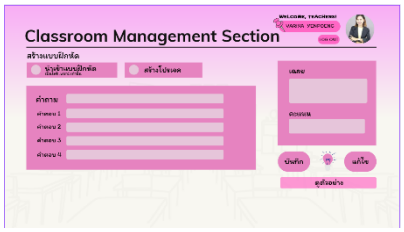


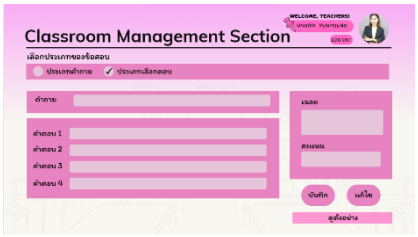
(a) The login section, where users must register to determine their status.



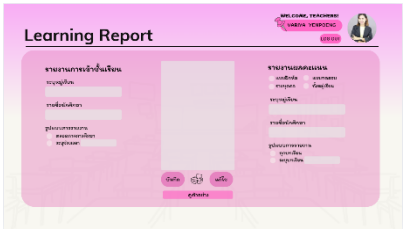


(b) The learning activities section consists of ten lessons on the subject of Computer Programming Principles. Each lesson features different activities tailored to the specific content of that lesson.





(c) Measurement and Evaluation Section: In this section, the teacher will design tests or exercises for the students and determine scores for each student activity.



(d) The Reporting Section: This is where students and teachers can view the scores for each exercise and test. Students will only see the information that the teacher has granted them permission to access.

2. The results of evaluating the quality of the learning management system based on the "Teach Less, Learn More" concept using virtual classroom media with project-based learning are

divided into four parts: system management, content and learning activities, measurement and evaluation, and reporting. This information can be summarized in Table 1.

Table 1 Results of the quality assessment of the learning management system based on the "Teach Less, Learn More" concept using virtual classroom media in conjunction with project-based learning.

Topic	$\bar{x}$	SD
System management section		
1. The system can support the access of students and teachers efficiently.	4.10	0.50
2. The system is stable and can be accessed anywhere and anytime.	4.18	0.66
3. Technical support and assistance from administrators are efficient.	3.85	0.75
4. The system can allocate resources and tools necessary for learning appropriately.	3.50	1.13
5. Users can use the system conveniently and it is user-friendly.	3.85	0.90
Average	**3.90**	**0.24**
Part of Content and Learning Activities		
1. The content of the lesson is accurate, complete and up-to-date.	4.10	0.71
2. Learning activities used in the system can promote analytical thinking and problem solving.	3.75	0.65
3. The system can effectively promote project-based learning.	3.95	0.87
4. There is a learning management that promotes student participation and interaction.	3.70	1.19
5. The learning media in the system are interesting and help stimulate the learners' learning.	3.93	0.48
Average	**3.89**	**0.27**
Measurement and evaluation section		
1. The system has appropriate tools for measuring student achievement.	4.00	0.51
2. The evaluation method can reflect the learner's true abilities.	3.90	0.71
3. A variety of assessment tools are used, such as tests, exercises, presentations, and projects.	3.83	1.02
4. Rating and feedback are fair and systematic.	3.98	0.79

Topic	$\bar{x}$	SD
5. The system can record the learning outcomes of the students accurately and efficiently.	3.80	0.93
Average	**3.90**	**0.20**
Reporting section		
1. The system can clearly summarize the learning outcomes of the students.	3.88	1.04
2. Learning outcome reports can help learners and teachers improve learning.	3.60	1.07
3. The system can display learning results in an easy-to-understand format, such as graphs or charts.	4.00	0.51
4. Learners can access their own learning outcomes information easily and quickly.	3.75	0.65
5. The system can export learning outcome report data for use in research or further development.	3.85	0.75
Average	**3.82**	**0.24**
All Average	**3.88**	**0.03**

the results of the quality assessment of the learning management system based on the "Teach Less, Learn More" concept, as evaluated by experts, indicated that all sections were rated at a high level ($\bar{x}$ = 3.88, SD = 0.03). Specifically, the system management section received a score of ($\bar{x}$ = 3.90, SD = 0.24), the content and learning activities section scored ($\bar{x}$ = 3.89, SD = 0.27), the measurement and evaluation section was rated at ($\bar{x}$ = 3.90, SD = 0.20), and the results reporting section was rated at ($\bar{x}$ = 3.82, SD = 0.24). The study also examined learning retention among students who participated in the virtual classroom based on the "Teach Less, Learn More" concept combined with project-based learning. After two weeks of study, it was found that learning retention did not differ significantly at the statistical level of .01. This indicates that students who engaged with the learning management system designed around the "Teach Less" concept demonstrated substantial learning persistence when using the virtual classroom media and project-based learning developed by the researcher, as shown in Table 2.

Table. 2 The results of the study on the learning durability of students who engaged with the learning management system based on the "Teach Less, Learn More" concept, utilizing virtual classroom media in conjunction with project-based learning.

Trial List	$\bar{x}$	SD	Average difference	t	p
Test immediately after learning	35.85	1.44	0.33	2.171	0.016
Test after 2 weeks of study	35.51	1.33			

The results of the analysis indicated that learning persistence did not differ significantly at the .01 level, as shown in Table 2. This suggests that students who studied with the learning management system based on the "Teach Less, Learn More" concept, utilizing virtual classroom media in conjunction with project-based learning developed by the researcher, exhibited durable learning.

Summary of research results

1. The development of the learning management system based on the "Teach Less, Learn More" concept using virtual classroom media with a project-based approach is divided into four main parts: the system access section, the learning activity section, the measurement and evaluation section, and the reporting section. The results from ten system trials indicated that it functioned effectively all ten times, achieving a success rate of 100 percent.
2. The quality assessment of the learning management system, based on the "Teach Less, Learn More" concept as evaluated by experts, revealed that all sections were rated at a high level ($\bar{x}$ = 3.88, SD = 0.03). Specifically, the system management section received a score of ($\bar{x}$ = 3.90, SD = 0.24), the content and learning activities section was rated at ($\bar{x}$ = 3.89, SD = 0.27), the measurement and evaluation section scored ($\bar{x}$ = 3.90, SD = 0.20), and the reporting section was rated ($\bar{x}$ = 3.82, SD = 0.24). These results indicate that the developed system is of high quality and can be used effectively.
3. The analysis of learning durability showed no significant differences at the .01 level. This suggests that students who engaged with the virtual classroom learning model demonstrated learning persistence.

Conclusion

The development of the learning management system based on the "Teach Less, Learn More" concept, utilizing virtual classroom media with a project-based approach, is divided into four main parts: the system access section, the learning activity section, the measurement and evaluation section, and the reporting section. All components can be integrated effectively. This aligns with the findings of Sakdang Man (2024), who studied the development of an active teaching system aimed at enhancing learning in the 26th Buddhist century for teachers of social studies, religion, and culture in the secondary education area of Nakhon Ratchasima Province. The study revealed that the active teaching system significantly improved the learning efficiency of teachers in the social studies, religion, and culture group, enabling them to apply new techniques in the classroom and enhancing students' understanding of the lessons. Furthermore, Ukrit Donbantao and Ekkarat Khositphimanwet (2024) studied the development of a learning management system in the digital age. Their findings indicated that a learning management system designed for this era allows learners to engage more conveniently, without limitations of location or time. Additionally, technology was shown to stimulate learning and encourage student participation. However, the research results also indicated that learners using the system developed by the researcher showed no statistically significant differences in knowledge durability at the .01

level. This is consistent with Kanchana Saengchan's (2022) study on the durability of learning in the subject of living things through brain-based learning combined with game and song techniques. This research aimed to assess academic achievement, learning durability, and students' attitudes towards biology among Mathayom 3 students. The results showed an increase in academic achievement and learning durability. Similarly, Sukanlaya Saengduean (2023) investigated the enhancement of academic achievement and learning durability in mathematics through deductive teaching methods combined with STAD techniques for Mathayom 1 students at Chirasart Wittaya School. This study aimed to create and evaluate the quality of a learning management plan using these teaching methods and to compare the outcomes with conventional teaching approaches. The results indicated that the innovative teaching methods led to an increase in students' academic achievement and learning durability.

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