

DEVELOPING A LARGE-SCALE LEARNING MANAGEMENT SYSTEM FOR THE OFFICE OF GENERAL EDUCATION AND INNOVATIVE ELECTRONIC LEARNING

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ABSTRACT

This research focuses on the development and management of an online teaching support system for various subjects, including exam systems and academic service tasks, through electronic systems. The study utilizes a multiple-case study approach and aims to create a large-scale learning management system for the Office of General Education and Innovative Electronic Learning. This system incorporates virtual computer technology to efficiently manage course websites, exam system websites, website monitoring systems, study results, and various academic service websites. The results highlight the strategic adaptation of reducing the number of host computers by introducing virtual computing technology, resulting in cost savings and improved system support.

In the study titled “Analysis and Development of Large-Scale Learning Management System to Enhance the Efficiency of General Education Office,” 1,600 university students from Rajabhat University Suan Sunandha and 25 staff members of the General Education Office participated in the satisfaction assessment questionnaire. The results show high levels of satisfaction with the cloud-based question and answer repository technology across various aspects, with an overall satisfaction score of 4.52.

The implementation of research findings has enhanced the efficiency of managing the Large-Scale Learning Management System, enabling users to conveniently retrieve required information. This has streamlined the information retrieval process for students and improved work efficiency within the General Education Office. Challenges encountered during the implementation included ensuring data accuracy and approval processes, as reliance on data from the Educational Services department required careful consideration and approval from departmental heads and deputy directors to ensure accuracy and completeness.

Keywords: Development, General Education, Technology, Large-Scale learning

INTRODUCTION

The development of learning systems is crucial in today's era due to the rapid advancements in information technology and communication. This technology adaptation across various organizational units has been a driving force in continuous education and system development. It aims to solve issues and maximize benefits, both in terms of investment and utilization.

The curriculum was designed to provide graduate students with broad areas of knowledge in the teaching profession in mathematics education, including the application of new technologies appropriate to teaching and learning in the mathematics classroom (Kaewsaiha, C., & Kaewsaiha, P., 2020).

At present, the General Education and E-Learning Innovation Office has been tasked with supporting the management of general education courses for undergraduate students, totaling over 20,000 registrants. The focus lies in developing an all-encompassing online teaching

system that covers every subject, including exam management, monitoring academic performance, and providing various academic services through an integrated online platform. This motivation has led to the integration of virtual computer technology to efficiently manage the computing resources of the network to align with the courses registered by students each semester and to track usage for effective service delivery to students and university staff.

The researcher has experience in maintaining server computer systems and supporting the General Education and E-Learning Innovation systems to meet standards. Collaborative efforts with relevant units have ensured that the server computer systems operate round the clock, leveraging expertise in computer network maintenance and corrective actions for optimal functionality.

RESEARCH OBJECTIVES

This research study was aimed to

1) To reduce the number of networked computers within the organization: Due to the continuous increase in demand for new systems to manage teaching through Learning Management Systems (LMS), there has been a constant need to purchase additional networked computers. However, with the introduction of virtual computer technology, it's possible to reduce the cost of purchasing additional networked computers. This is achievable because a single networked computer (node) can support multiple operating systems, such as Windows and Linux.

2) To decrease maintenance expenses: Previously, the higher number of networked computers led to increased costs in repairing and upgrading each machine's components like hard disks, RAM, or increasing CPU and RAM. This incurred substantial budgetary expenditure. investigate the satisfaction levels of students, faculty, and staff towards the question-answering repository within the General Education Department.

3) To optimize the utilization of existing networked computer resources: Presently, the majority of networked computers within the organization utilize only 10%-20% of their capacity. With the integration of virtual computer technology, administrators can analyze the usage of resources on each virtual machine. If the actual resource consumption is lower than planned, administrators can reallocate these resources to other virtual machines to prevent wastage.

4) To streamline networked computer management: Virtual computer technology will facilitate efficient resource management. System administrators will have the flexibility to instantly adjust resources like CPU, RAM, and HDD on each virtual machine in real-time, enhancing overall convenience and management efficiency.

CONCEPTUAL FRAMEWORK

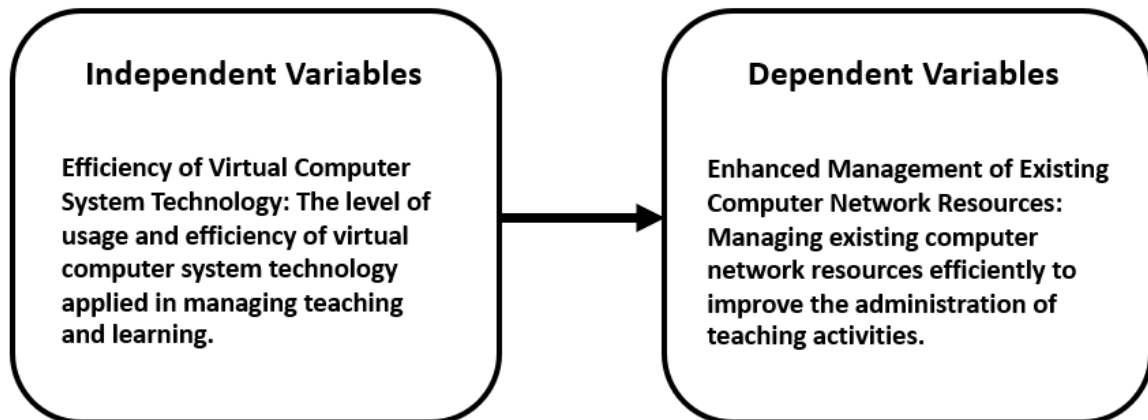


Figure 1. Conceptual Framework of the Study

From Figure 1. Illustrates the relationship between the efficiency of virtual computer system technology (VCST) and the enhanced management of existing computer network resources. The framework assumes that VCST can improve the efficiency of teaching and learning activities by providing a more flexible and scalable platform for educational resources. This, in turn, can lead to improved management of existing computer network resources, as these resources can be more efficiently allocated to meet the needs of teaching and learning activities.

METHODOLOGY

The research methodology employed in this study encompasses various stages and methods aimed at improving the Large-Scale Learning Management System of the General Education Department. The population under investigation includes personnel from The Office of General Education and Innovative Electronic Learning, as well as students enrolled in General Education courses during the first semester of the academic year 2023. The sample group consists of education service personnel, research and development personnel, general administrative personnel, budget planning and quality assurance personnel, and 1,600 students. The study involves several key methods and activities:

- 1) Brainstorming Meetings for Data Exploration: Initial meetings are conducted to gather and explore information relevant to the research objectives.
- 2) Collection and Analysis of User Needs: User problems and requirements related to the Large-Scale Learning Management System are gathered and analyzed to identify areas for improvement.
- 3) Designing Repository Management with Large-Scale Learning Management System: Strategies for managing the Large-Scale Learning Management System, particularly the question-answering repository, are designed based on the identified needs.
- 4) Pilot Testing the Enhanced Repository: The enhanced repository is implemented with a sample group to identify flaws and make necessary adjustments based on user feedback.

- 5) Brainstorming Meetings for System Enhancement: Subsequent meetings are conducted to enhance the question-answering repository further, considering feedback from the initial usage.
- 6) Real-world Implementation and Data Collection: The enhanced repository is implemented with the actual user population for three months. Data is collected, processed, and user satisfaction is measured during this phase.
- 7) Presentation of Research Findings: Research findings are presented to the management for dissemination and wider adoption, both internally and externally.

Statistical analysis involves testing research hypotheses using null (H₀) and alternative (H₁) hypotheses, focusing on the satisfaction level of users with the question-answering system. Specifically, the null hypothesis states that user satisfaction is less than or equal to 3.51, while the alternative hypothesis posits that user satisfaction is greater than 3.51.

RESULT

The study, titled “Analysis and Development of Large-Scale Learning Management System to Enhance the Efficiency of General Education Office,” yielded several noteworthy results: The research involved a diverse group of respondents who completed a satisfaction assessment questionnaire regarding the Large-Scale Learning Management System. This group included 1,600 university students from Rajabhat University Suan Sunandha during the first semester of the academic year 2023, along with 25 staff members from the General Education Office. Most participants were students, constituting 98.46% of the total respondents, while staff members comprised 1.54%. Satisfaction Assessment: The study assessed user satisfaction with various aspects of the cloud-based question and answer repository technology. The evaluation criteria covered essential factors related to system performance, usability, and service provision. The results, as presented in Table 2, demonstrated consistently high levels of satisfaction across all evaluated criteria. The average scores ranged from 4.44 to 4.68, with standard deviations of 0.47 to 0.50. Overall, the users expressed "Very Satisfied" levels of satisfaction, with an impressive overall satisfaction score of 4.52.

These findings highlight the success and effectiveness of the Large-Scale Learning Management System, emphasizing its efficiency, reliability, user-friendliness, and the high level of service provided by both the system and staff members. The research outcomes have been actively utilized to improve and enhance the efficiency of managing the Large-Scale Learning Management System for the General Education Office. These improvements aim to facilitate convenient and efficient information retrieval for users. Impact of Workflow Changes: The research has brought about notable changes in workflow processes. Students have gained the ability to independently search for information, streamlining the information retrieval process. Additionally, it has provided clear and unified directions for General Education Office staff, leading to a reduction in errors related to information responses and an overall enhancement in work efficiency. Challenges encountered during the research implementation, such as data accuracy and the approval process, were acknowledged and addressed. The reliance on data from the Educational Services department necessitated careful consideration and approval from departmental heads and deputy directors to ensure the accuracy and completeness of information, ultimately facilitating swift and efficient use by students.

Table 1 General Information of Satisfaction Assessment Respondents for the Large-Scale Learning Management System of the General Education Office

Category	Number	Percentage
Student	1,600	98.46
Staff	25	1.54
Total	1,625	100

Table 2 Satisfaction Percentage, Average Score, and Standard Deviation of User Satisfaction with the Cloud-Based Question and Answer Repository Technology of the General Education Office

Evaluation Criteria	Satisfaction Level	Average Score	Standard Deviation
1. System efficiency, modernity, and reliability	4.57	0.50	Very Satisfied
2. Stability, security, and accessibility of the system	4.49	0.50	Very Satisfied
3. Currency of data in the system	4.52	0.50	Very Satisfied
4. User-friendliness of the system	4.52	0.50	Very Satisfied
5. Benefits derived from the system	4.44	0.50	Very Satisfied
6. Accuracy and speed of service provision	4.51	0.50	Very Satisfied
7. Clarity and promptness of guidance for system use	4.48	0.50	Very Satisfied
8. Convenience of system use	4.46	0.50	Very Satisfied
9. Accuracy and speed of service provision by staff	4.56	0.50	Very Satisfied
10. Knowledge and ability of staff to provide system services	4.68	0.47	Very Satisfied
Overall Satisfaction	4.52	0.50	(Very Satisfied)

CONCLUSION

In conclusion, the study focused on the analysis and development of a Large-Scale Learning Management System to enhance the operational efficiency of the General Education Department. The researchers successfully implemented and tested the system among 1,600 students and 25 staff members during the first semester of the academic year 2023.

The results indicated a high level of satisfaction among both students and staff, with an overall satisfaction score of 4.52. This suggests that the Large-Scale Learning Management System significantly contributed to the improvement of operational efficiency within the General Education Department.

The implementation of the system led to streamlined question management for students and facilitated convenient use for both students and staff. The collaboration and knowledge exchange fostered by the system resulted in a sense of unity among different departments, promoting a cooperative learning environment.

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