Integrated Approaches to Enhance Information Technology Competencies Mahachulalongkornrajavidyalaya University

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Abstract

The research study on the integration of teaching methods for enhancing information technology competency at Mahachulalongkornrajavidyalaya University. The objectives were: 1) To study the knowledge of blended teaching among lecturers at Mahachulalongkornrajavidyalaya University. 2) To examine the technological competency in blended teaching of students and lecturers at Mahachulalongkornrajavidyalaya University. 3) To develop a blended teaching system to enhance the IT competency of lecturers at Mahachulalongkornrajavidyalaya University. 4) To evaluate the effectiveness of the blended teaching system in enhancing the IT competency of lecturers at Mahachulalongkornrajavidyalaya University.

This research employed a Research and Development (R&D) approach, integrating both quantitative and qualitative methods. The population and sample consisted of 244 university personnel and students. Research instruments included interviews, questionnaires, and achievement tests, with data analyzed using mean, standard deviation, and t-test.

The results of this research were found that: 1) Lecturers possessed knowledge of blended learning, emphasizing the integration of traditional and online learning to enhance educational efficiency. 2) Both students and lecturers demonstrated competency in using information technology and digital platforms for teaching and learning, making the learning process more flexible and responsive to learners' needs. 3) The blended learning system was developed to enhance technological competency through the use of digital tools and online platforms. 4) The prototype system was rated highly 4.01, system efficiency was also rated high 3.96, student learning achievement significantly improved, and overall satisfaction of students and lecturers was rated high 3.88.

Keywords: Blended Teaching; IT Proficiency; Educational Technology; Teaching Effectiveness

Introduction

In the present era, education has been changing, the focus on learning outcomes for students is not measured solely by grades but also requires students to be able to create knowledge, develop innovations on their own, and connect with global society effectively. Therefore, teachers and students in the 4.0 education era must adapt to teaching that aligns with the changes of the times.

In the past, education focused on enabling learners to create knowledge by themselves, but it still lacked the ability to convey and apply that knowledge in daily life effectively. Therefore, it is necessary to continuously develop various skills, especially information technology skills, which play a crucial role in the education sector both now and in the future. This development aims to guide and encourage learners to learn independently at all times. Besides supporting educational technology for teaching and learning, future educators also need to have deep knowledge of the subjects they teach and be proficient in teaching techniques and methods that help learners create knowledge from experience. They should also organize activities that connect knowledge from external learning sources, promote teamwork, and design appropriate teaching activities to create an environment conducive to genuine learning. Additionally, educators must sincerely show love and concern for their learners. The teaching and learning process will only succeed when all parties work together to reduce problems and obstacles hindering the development of educators. The development of educators must proceed at both the policy level and through the self-development of educators to truly become educational personnel in the digital age (Phakakorn Ruangrong et al, 2014).

Since the quality of instruction directly affects the teaching and learning process, high-quality teaching can develop students' skills and abilities in all areas and improve their academic performance. Therefore, instilling high-quality teaching in educators is of utmost importance. Educational institutions should continuously support the professional development of teachers. Additionally, research has shown that quality teaching is one of the methods that help students learn in various ways, and quality teaching is also a crucial component in defining the qualities of a good teacher (Wenglinsky, H., 2006: 29–32). Moreover, the rapid advancement of technology and digital tools renders developing teaching quality even more crucial. Digital Disruption It is a transformation of society towards a digital society, impacting basic education and likely changing the management of education. This involves changing the educational model, where educational institutions must adapt to become learning organizations that build relationships with society and external organizations. It also includes developing curricula and teaching methods that keep pace with changes to align with technological advancements and meet the individual needs of learners. By integrating technology and various media into teaching, it supports learners'

education. Furthermore, technological advancements will lead to a digital society that enhances lessons by creating simulated virtual classrooms and the metaverse.

Thailand's education system needs to set goals for growth, make plans, and teach basic skills to students who will go on to higher education or the job market. They may also need to change their lessons and ways of managing students' learning to be more flexible and inclusive so that students have the knowledge, skills, and abilities to adapt to changes in the digital world now and in the future (Office of the Education Council, 2017). The results of the National Assessment of Educational Progress, conducted by the U.S. Department of Education, indicate that technology significantly impacts student achievement. Furthermore, it confirms that teachers can't effectively use ICT and cannot keep up with the rapid changes in technology. In the education sector, educational scholars have emphasized that basic ICT knowledge is crucial for developing high-quality teachers. High-quality teachers are the most valuable resource of educational institutions, and the improvement of student achievement primarily depends on the care and attention provided by these institutions. Therefore, school administrators can control and manage their respective institutions, as they are key figures in bringing the teaching and learning process into the digital age and creating a modern teaching environment. Additionally, school administrators must have a vision for appropriate ICT preparation to support and strengthen teachers, enabling them to advance and keep pace with modern technological developments. Data and indicators from the Global Information Technology (GIT) Report, which ranks competition and capabilities in information technology, hold significant importance. Technological advancements have also expanded learning beyond traditional classroom systems. We have used technology as a tool to enhance teaching and learning management, encouraging learners to independently seek knowledge through digital media and social media. In higher education, leading universities in the United States have played a significant role in initiating the use of online learning systems, particularly Massive Open Online Courses (MOOCs), which are predominantly offered for free. In Thailand, the Thailand Cyber University (TCU) initiated the use of the Thai MOOC platform in 2013, making it a source of online course markets developed by leading higher education institutions. It focuses on teaching and learning for large groups of people, allowing them to freely choose various subjects. The platform can accommodate a large number of learners and enables distance learning through internet technology. Additionally, the content is open-access, allowing anyone to access it. With the collaboration of over 598 institutions offering more than 631 courses, according to the study by Satapol Kunlaya and Junjira Nunta (2023) found that instructors at one university have knowledge of concepts, theories, technologies, and educational innovations that promote learning development. In terms of knowledge in integrating or applying technology and educational innovations, knowledge in instructional

design using educational technology theories and innovations, and knowledge explaining educational technology and innovation theories, the instructors' knowledge is at a moderate level of competency. They possess knowledge of technology and information, the ability to analyze problems arising from the use of innovations, technology, and information, knowledge about learning resources and learning networks, and knowledge about the design, creation, implementation, evaluation, and improvement of innovations, all at a moderate level in every aspect, and Kanok Sukmanee (2023) provided the idea that although there has been considerable research on digital competencies for educators in various sectors, overall, the competencies and skills necessary for teachers to manage the teaching and learning processes in educational institutions, particularly in higher education, have not been clearly developed. Both teachers and universities play a crucial role in education, including producing graduates that align more closely with the labor market, promoting more flexible education, and fostering intelligent learning with modern technology. Therefore, digital technology has become an essential tool in current teaching and learning, and universities, as higher education institutions, are responsible for developing knowledge and skills for teachers and educational staff, enabling them to improve themselves for the continuous development of the country. This leads to new learning models that help teachers develop sufficient competencies in utilizing digital technology and educational media for communication, performing tasks, self-development, collaboration, creating societal participation, or improving teaching processes or working practices within higher education institutions to be modern, efficient, and secure, while achieving better outcomes for students. Furthermore, educators can leverage digital technology to enhance daily life, engage in various professions, and support lifelong learning.

Another new form of teaching and learning, under the influence of developments in computer technology, is the integration of computer technology with traditional teaching methods to enable more advanced learning. This results in both effectiveness and efficiency in learning. This approach is called "Blended Learning," which is an educational innovation that combines multiple teaching modules. It integrates Distance Learning via online networks with Face-to-Face learning, leading to more effective learning than simply attending traditional lectures. In this approach, selecting appropriate media that align with the learning objectives is crucial to enhancing teaching and learning potential. It promotes mutual exchange and deeper learning through practical application and collaborative learning. As a result, students can learn to their full potential, face challenges, and choose appropriate solutions, contributing to progress and future changes (Fangkamol Phetkliang, 2020).

Teachers can provide individual attention and support to students in a way that aligns with the current and future needs of learners. This approach should be in harmony with the demands of students, the social environment, and people's lifestyles. Blended Learning not only responds effectively to the varying learning styles of students but is also more efficient than traditional one-on-one teaching or purely online learning. Additionally, Blended Learning reduces educational costs by using online classrooms, digital devices, and e-books that can be accessed through digital systems. This helps save on textbook purchases and allows for the integration of software that automatically collects student data, measures academic progress, and provides detailed learning information to teachers, students, and parents. The system automates testing and score collection, tracks student attendance and study time, ensuring accountability. It also accommodates students with special talents or those interested in extracurricular activities outside the regular curriculum, while giving students the flexibility to learn at their own pace and according to their abilities (Tassanee Taraporn et al., 2022).

Based on the aforementioned context and significance, the researcher is interested in studying "Blended Learning to Enhance Information Technology Competence" at Mahachulalongkornrajavidyalaya University. The study aims to explore the knowledge of blended teaching methods among faculty members, as well as the blended teaching competencies of students and faculty. Additionally, the research will investigate the blended learning system designed to enhance the information technology competence of faculty members at Mahachulalongkornrajavidyalaya University, with the goal of applying these findings to improve the teaching and learning processes in the future.

Research Objectives

1. To study university lecturers' knowledge of blended teaching at Mahachulalongkornrajavidyalaya University.

2. To examine the competency of students and lecturers in blended teaching technology at Mahachulalongkornrajavidyalaya University.

3. To develop a blended teaching system to enhance lecturers' proficiency in using information technology at Mahachulalongkornrajavidyalaya University.

4. To evaluate the blended teaching system in enhancing lecturers' proficiency in using information technology at Mahachulalongkornrajavidyalaya University.

Conceptual Framework

This study uses the conceptual framework of Blended Learning, which combines traditional classroom learning with online learning, to enhance educational effectiveness and develop the information technology competencies of both faculty and students at

Mahachulalongkornrajavidyalaya University. can be synthesized into a conceptual framework as follows:

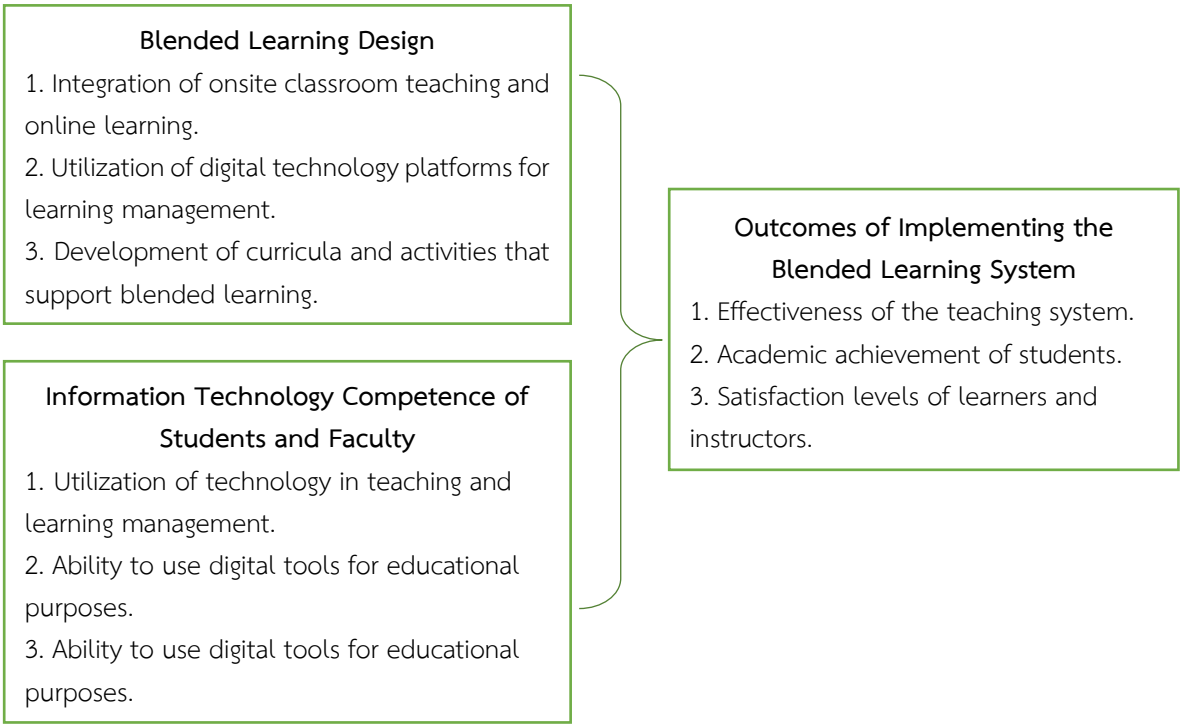

Fig.1 Conceptual Framework

Research methodology

Research methodology includes the sample group consisting of administrators, faculty, and staff of Mahachulalongkornrajavidyalaya University, totaling 244 people. We collected data through questionnaires and structured interviews. Data analysis was conducted using basic statistics, including percentages, mean, standard deviation, along with inferential statistics such as F-tests and t-tests, comparing the means between independent and dependent variables. The significance level for statistical significance used in this data analysis is set at 0.05, and for qualitative analysis, data is analyzed using descriptive methods.

Research Result

Experts had a high level of opinion regarding the evaluation of the blended teaching system prototype to enhance IT competency, with an overall average rating of 4.01. When considering each aspect, ranked by average score, the highest average score was 4.04 for the feasibility of implementation, followed by the suitability of the prototype

with an average score of 4.02. The lowest average score was 3.98 for alignment with objectives.

Regarding the blended teaching system to enhance IT competency, the overall score was high, with an average of 3.96. When considering each aspect, experts rated the highest average score of 4.04 for system usability, followed by the accuracy of the system's functionality, with an average score of 3.97. The lowest average score was 3.90 for system security.

In terms of student learning achievement, after implementing the blended teaching process and the blended teaching system to enhance IT competency, pre-test and post-test scores of students were 23.07 and 26.93, respectively. When comparing the scores before and after learning, it was found that students' post-test scores were significantly higher than pre-test scores at a 0.01 statistical level.

Satisfaction regarding IT competency enhancement was rated high, with an average of 3.88. When considering each aspect, ranked by average score, the highest average score was 3.93 for the instructors, followed by the content with an average score of 3.91. The lowest average score was 3.83 for assessment and evaluation.

From in-depth interviews, it was found that blended learning is a teaching method with diverse values, offering significant differences and similarities in the context of teaching behaviors. The test results also revealed that blended teaching provides learners with opportunities to access education in various forms, regardless of location or economic status, enabling access to various professional fields worldwide. It addresses problems related to economy, society, and culture by adapting the educational system to meet the learners' needs universally.

Discussion of Results

From the research on blended learning to enhance IT competency, it was found that the knowledge of blended teaching among lecturers at Mahachulalongkornrajavidyalaya University (MCU) plays a crucial role in the development of digital-age education. The integration of traditional and online learning provides flexibility for both learners and instructors while also fostering essential IT skills for modern education.

Development of Knowledge and IT Competency

The study revealed that lecturers and students have improved their ability to use IT tools for teaching and learning. Blended learning allows lecturers to design curricula that align with the learners' context and utilize digital platforms to enhance teaching effectiveness. Additionally, continuous technological advancements and training programs contribute significantly to improving IT competencies among faculty and students.

Outcomes of Implementing the Blended Learning System

An evaluation of the blended learning model indicated that experts considered the system highly feasible and appropriate, with an overall evaluation score of 4.01. Furthermore, the effectiveness of the blended learning system was rated highly, with an average score of 3.96. These results highlight the positive impact of using IT to enhance learning.

Academic Performance and Satisfaction of Students and Lecturers

Data analysis showed that students' average test scores increased from 23.07 to 26.93, with a statistically significant difference at the .01 level. This indicates that blended learning effectively improves student academic performance. Additionally, the satisfaction level of both students and lecturers regarding the blended learning system was high (average score of 3.88), reflecting positive reception towards the use of technology in education.

Limitations of the Study

Despite the benefits of blended learning, certain limitations remain, including unequal access to technology among students, the complexity of designing courses that require advanced technology, and difficulties in monitoring students' progress. Additionally, privacy concerns related to online platforms need to be addressed for future improvements.

Future Development Directions

The research findings suggest that blended learning effectively enhances IT competency among lecturers and students. However, to further improve its effectiveness, curricula should be adapted to integrate IT appropriately, and continuous training and resource support should be provided. Moreover, future studies should investigate the long-term impacts of blended learning and compare it with other teaching methods to identify the most effective approach for advancing education.

Knowledge from Research

1. Blended Learning Enhances Accessibility and Reduces Economic and Social Barriers

1.1 Blended learning enables students to access education anytime, anywhere, eliminating location and financial constraints.

1.2 Students from remote areas can access high-quality learning resources through online platforms.

2. Flexible Curriculum Design Enhances Learning in the Digital Age

2.1 The integration of online and onsite learning should be balanced, such as 70% online and 30% onsite.

2.2 Course content should align with technology use, incorporating multimedia, video-based instruction, and Learning Management Systems (LMS).

3. Teachers' Technological Competency is a Key Factor in the Success of Blended Learning

3.1 Instructors need proficiency in digital tools, including LMS platforms, online communication tools, and data analytics software.

3.2 Continuous training programs should be implemented to enhance educators' digital literacy.

4. Students' Academic Achievement Significantly Improves with Blended Learning

4.1 Research findings show a statistically significant increase in students' test scores after engaging in blended learning.

4.2 Both students and teachers expressed high levels of satisfaction with the blended learning system.

5. Developing Critical Thinking Skills and Lifelong Learning is a Core Objective of Digital Education

5.1 Beyond technological proficiency, blended learning should promote analytical thinking, problem-solving, and teamwork skills.

5.1 Learners should be trained to use technology for lifelong learning and continuous self-improvement.

Suggestions

1. Policy Recommendations

1.1 Appropriate budget allocation should be made for investment in information technology and the necessary infrastructure for blended learning, such as upgrading the Learning Management System (LMS), enhancing internet network efficiency, and procuring modern digital devices.

1.2 Support should be given for acquiring educational resources and digital tools necessary for effective blended learning.

1.3 A clear and systematic policy for the use of information technology in teaching should be established to ensure effective implementation of blended learning. Continuous training and development of faculty members' ability to use information technology should be supported, including organizing training sessions and seminars on the use of new technologies.

1.4 Research related to blended learning and the use of information technology should be supported to develop innovations and effective teaching methods. An environment that supports blended learning should also be created, such as providing

spaces for collaborative learning, access to diverse learning resources, and promoting group work.

2. Practical Recommendations

2.1 The curriculum should be improved to appropriately integrate the use of information technology and emphasize the integration between classroom learning and online learning.

2.2 The learning content should be diversified, and new technologies such as multimedia learning materials, instructional videos, and online learning tools should be utilized to enhance learning effectiveness.

2.3 Training and workshops should be organized for instructors to develop skills in using information technology in teaching, including the use of Learning Management Systems (LMS) and other digital tools. Training and support should also be provided to students to help them effectively use online learning tools and information technology.

2.4 Manuals and guidelines for using information technology in teaching should be created to ensure that instructors and students can easily access information and instructions. A technical support and consultation center should also be established to address issues and provide guidance on the use of information technology.

3. Suggestions for Future Research

3.1 Research should be conducted with a diverse target group, such as different levels of education or disciplines, to provide a comprehensive understanding of the use of information technology in education.

3.2 New models of blended learning should be developed and tested, which may include the use of new technologies or innovative teaching methods, to assess the ability to enhance information technology competence. Additionally, new research tools such as questionnaires, satisfaction measurement tools, and learning progress tracking systems should be developed and tested to improve the accuracy and comprehensiveness of data collection.

3.3 A long-term study should be conducted to assess the impact of blended learning systems over time, to observe any changes or developments. Comparative research should also be done between blended learning and other teaching methods, such as traditional teaching or fully online learning, to analyze the differences and effectiveness of each method.

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