บันทึกข้อความ

ส่วนราชการ หลักสูตรสาขาวิชาเทคโนโลยีสื่อสารมวลชน คณะครุศาสตร์อุตสาหกรรมและเทคโนโลยี

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เรื่อง รายงานผลการตีพิมพ์ผลงานวิจัยในวารสารวิชาการระดับนานาชาติ

เรียน คณบดีคณะครุศาสตร์อุตสาหกรรมและเทคโนโลยี

ข้าพเจ้า ผู้ช่วยศาสตราจารย์อภิชญา ขวัญแก้ว และคณะ ได้รับการตอบรับและตีพิมพ์ผลงานวิจัย เรื่อง “Enhancing Professional Competencies with a Digital Learning Platform in a Flipped Classroom” ในวารสารวิชาการระดับนานาชาติ "Journal of Educators Online, Volume 22, Issue 4, September 2025 ซึ่งอยู่ในฐานข้อมูลที่ได้รับการจัดอันดับโดย SCOPUS ควอไทล์ ๓ (Quartile 3) โดยบทความวิจัยดังกล่าวเป็นส่วนหนึ่งของ โครงการย่อยที่ ๒ การพัฒนาดิจิทัลแพลตฟอร์มทางการศึกษาเพื่อพัฒนาสมรรถนะวิชาชีพและคุณภาพการเรียนรู้ในพื้นที่นวัตกรรมการศึกษา จังหวัดสงขลา ภายใต้แผนงานวิจัย “การพัฒนานวัตกรรมและยกระดับนิเวศการเรียนรู้ดิจิทัลเพื่อพัฒนาสมรรถนะวิชาชีพและคุณภาพการเรียนรู้ในพื้นที่นวัตกรรมการศึกษา จังหวัดสงขลา ได้รับงบประมาณสนับสนุนด้านการวิจัยจากหน่วยบริหารและจัดการทุนด้านการพัฒนาระดับพื้นที่ (บพท.) สำนักงานสภานโยบายการอุดมศึกษาวิทยาศาสตร์ วิจัยและนวัตกรรมแห่งชาติ (สอวช.) ชุดโครงการวิจัยภายใต้แผนงานสำคัญ (Flagship) พื้นที่นวัตกรรมการศึกษา ประจำปีงบประมาณ ๒๕๖๕

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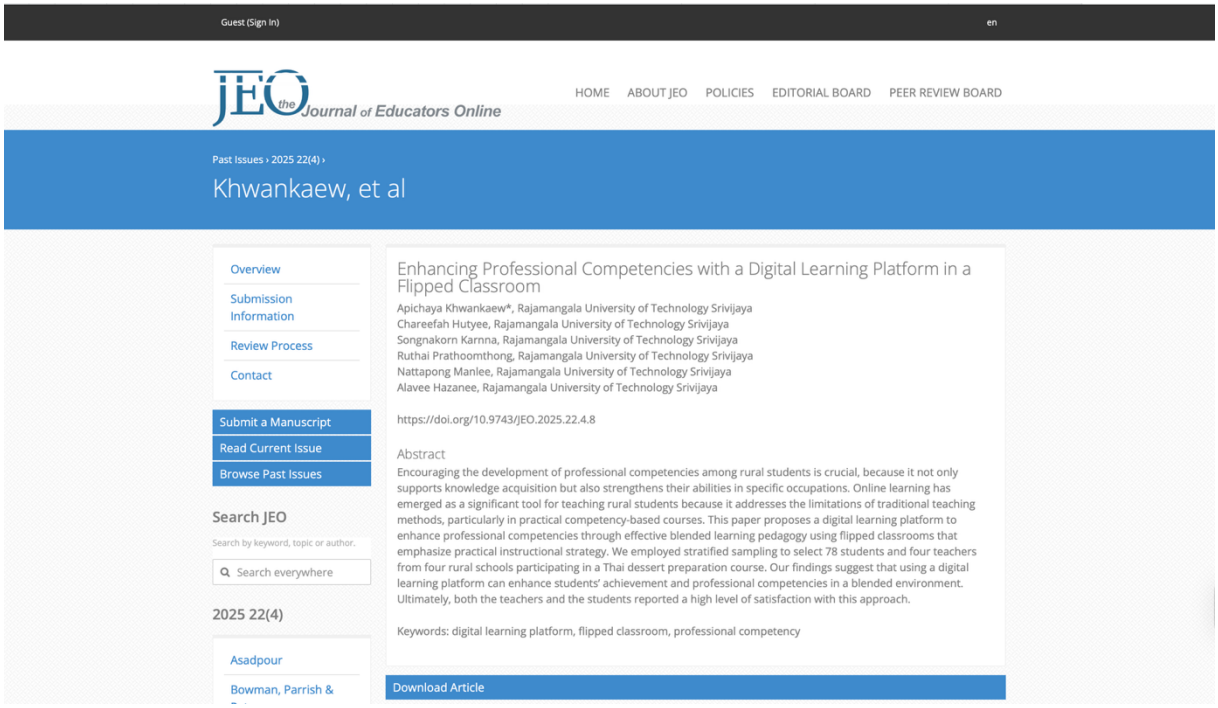

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Enhancing Professional Competencies with a Digital Learning Platform in a Flipped Classroom

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https://doi.org/10.9743/JEO.2025.22.4.8

Abstract

Encouraging the development of professional competencies among rural students is crucial, because it not only supports knowledge acquisition but also strengthens their abilities in specific occupations. Online learning has emerged as a significant tool for teaching rural students because it addresses the limitations of traditional teaching methods, particularly in practical competency-based courses. This paper proposes a digital learning platform to enhance professional competencies through effective blended learning pedagogy using flipped classrooms that emphasize practical instructional strategy. We employed stratified sampling to select 78 students and four teachers from four rural schools participating in a Thai dessert preparation course. Our findings suggest that using a digital learning platform can enhance students' achievement and professional competencies in a blended environment. Ultimately, both the teachers and the students reported a high level of satisfaction with this approach.

Keywords: digital learning platform, flipped classroom, professional competency

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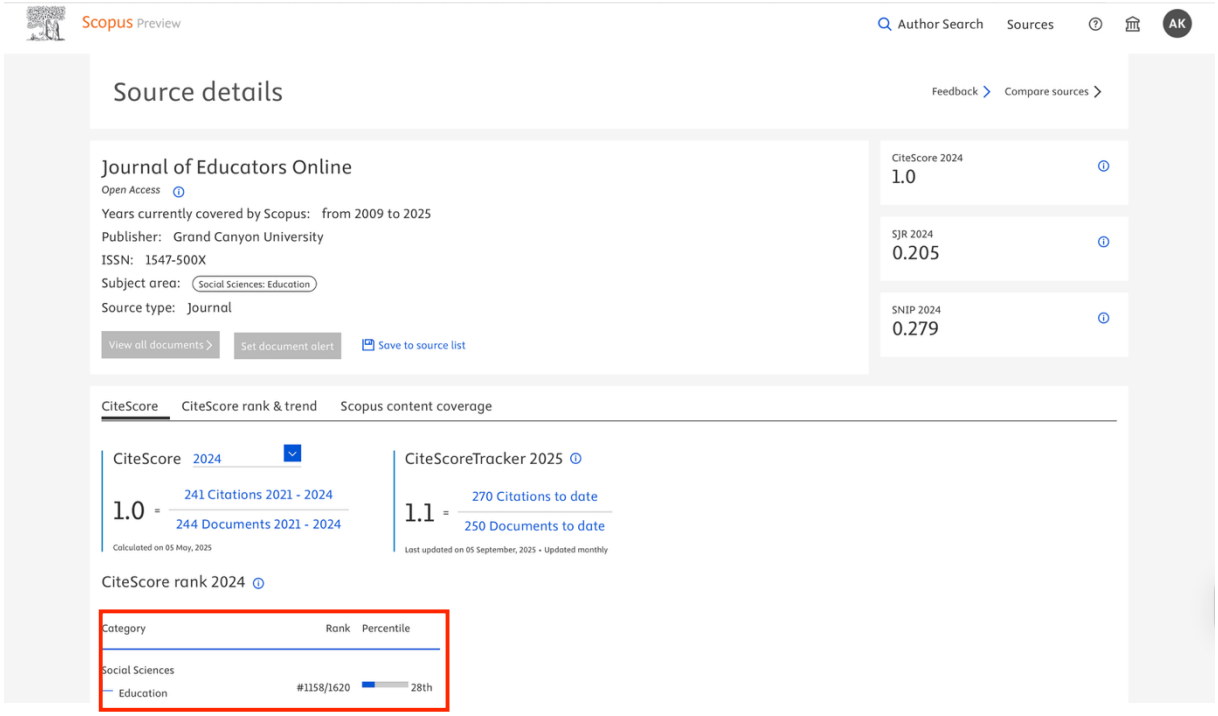

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ENHANCING PROFESSIONAL COMPETENCIES WITH A DIGITAL LEARNING PLATFORM IN A FLIPPED CLASSROOM

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ABSTRACT

Encouraging the development of professional competencies among rural students is crucial, because it not only supports knowledge acquisition but also strengthens their abilities in specific occupations. Online learning has emerged as a significant tool for teaching rural students because it addresses the limitations of traditional teaching methods, particularly in practical competency-based courses. This paper proposes a digital learning platform to enhance professional competencies through effective blended learning pedagogy using flipped classrooms that emphasize practical instructional strategy. We employed stratified sampling to select 78 students and four teachers from four rural schools participating in a Thai dessert preparation course. Our findings suggest that using a digital learning platform can enhance students' achievement and professional competencies in a blended environment. Ultimately, both the teachers and the students reported a high level of satisfaction with this approach.

Keywords: *digital learning platform, flipped classroom, professional competency*

INTRODUCTION

The traditional teaching method is teacher-centered where the students are limited to learning within a certain period from the same teacher. The content they study will be the same for all students, and the students develop at the same pace by learning together in large groups. Students receive classroom instruction according to a specified criteria and time; however, students who study faster need to wait for the others to complete the required material. One solution to this classroom situation is for the instructor to adapt information technology innovations to provide quality and effective education. They can use these innovations in education to encourage students to seek knowledge on their own (Haleem et al., 2022). Teachers can develop these educational innovations to better serve the students and encourage them to complete learning objectives. In addition, a learning platform can be developed to present the lessons and transmit knowledge in a user-friendly environment that enables students to learn at their own pace. The learning content is presented in the form of digital media, which consists of texts, images, videos, and online interactions to achieve the expected learning outcomes.

The focus of education in the 21st century is on preparing students to live and work effectively and to keep up with changes in the global community. They need to learn the competencies, knowledge,

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skills, and abilities they need from self-study and classroom instruction. Therefore, online lessons support students by using computer technology delivered through the internet so the student can access a curriculum anytime and anywhere. However, there are issues that affect managing education in rural areas in Thailand so the students learn the appropriate material and gain competencies in their field. These issues consist of the following:

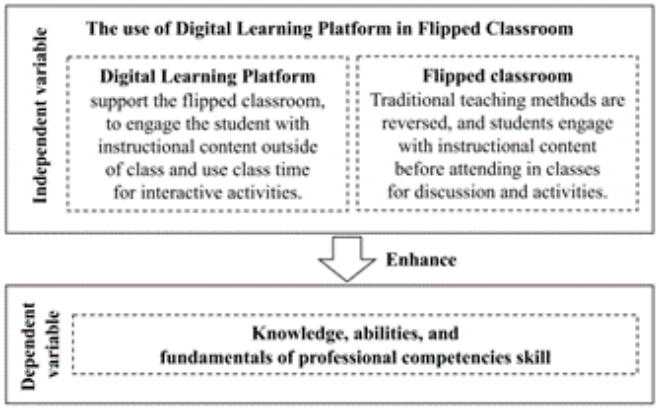
a. improving student learning achievement in attitude, skills, and knowledge,
b. reducing inequalities in accessing education and technology and improving learning outcomes for poor students,
c. providing innovations in administering education at the local level, and
d. establishing partnerships with the public sector (Vandeweyer et al., 2020). Moreover, the study by Hutyee (2023) demonstrates the need for learning management and achievement measurement using educational platforms in Songkhla Province, Thailand. Educational innovations are promoted by organizations that have specific expertise to provide technical support in preparing instructional materials and planning learning activities, including assessments, and in developing highly demanding professional courses in specific content areas.

This paper introduces the use of Digital Learning Platforms (DLPs) to improve professional competencies through effective flipped classrooms. It emphasizes practical instructional strategies and discusses the evaluation of DLPs from the viewpoints of students and teachers. This study investigated the following question:

Does using a DLP enhance student achievement and professional competencies in a flipped classroom environment?

Challenges arise when training students in rural areas in Thailand through Educational Opportunity Expansion Schools, which focus on competency-based learning. Therefore, we explored the advantages of flipped classrooms in the educational process and we will demonstrate how our DLP can enhance students' professional competencies, as shown in the conceptual framework in Figure 1.

Figure 1.
Conceptual Framework



INSTRUCTIONAL STRATEGIES

Competency-Based Education (CBE) can be described as an instructional method that includes curriculum design and learning assessment to teach students the professional competencies to perform tasks, demonstrate skills, and achieve educational objectives. In the classroom, students learn by completing the assigned tasks and performing on the job at their own pace. CBE requires authentic assessment methods to measure student performance in the classroom and evaluate student achievement, such as real-world evaluation methods.

Our teaching development plan was as follows: The first step was conducting a needs analysis to determine the actual needs for curriculum development. The next step involved developing instructional programs and materials that provide individualized instruction. The instructional media focused on specific objectives for each task and allowed for the measurement of student competency. This helped determine the training approach and how to implement a plan to measure performance. The final stage was completed using formative and summative evaluations to collect data for making decisions on maintaining or improving the instruction. These involved collecting data on the overall instructional process, program outcomes, student progress, and course effectiveness. Completing this stage provided the necessary data and feedback to focus on the quality and improvement of the course (Sudsomboon, 2010).

DIGITAL LEARNING PLATFORMS IN THE FLIPPED CLASSROOM

DLP creates an adaptive teaching environment, such as a flipped classroom, in which teachers can use interactive educational technologies and various types of assessments to evaluate students. These advancements bring new demands for professional competence in education. DLP supports the flipped classroom in which students engage with instructional content outside of class and use class time for interactive activities, discussions, hands-on experiments, etc. (Kim et al., 2014).

DLP allows teachers to upload video lectures, interactive resources, online exercises, quizzes, and other materials, such as formative and summative assessments that provide students with immediate feedback, give guidance, and offer support outside of class.

At the same time, students can follow their progress and identify areas for improvement through personalized learning that is self-paced and based on their performance (Bergmann & Sams, 2012; Hew & Lo, 2018). In addition, online forums and collaboration tools allow students to participate in discussions, ask questions, communicate with the teacher, and work together on projects outside of classroom. (Lai & Hwang, 2016).

DLP BASED ON THE ADDIE MODEL

The ADDIE model is an instructional design tool used by instructional designers to create effective learning experiences. ADDIE consists of five phases: Analysis, Design, Development, Implementation, and Evaluation.

Analysis Phase

The instructional designers identify the learning needs of students and provide clear and measurable learning outcomes that align with the learning objectives of the course (Smith & Ragan, 2004). The learners' characteristics are analyzed based on their prior knowledge, skills, and learning environment, to find any limitations that could impact the learning design and DLP development process (Morrison et al., 2019). In addition, the learning environment is evaluated on its technological infrastructure and organizational context to determine the feasibility of implementing the DLP (Branch, 2009). Further, a needs assessment is performed to identify performance gaps and training needs in the development of the DLP (Dick et al., 2005).

Design Phase

The instructional designers create a blueprint for the learning solution to achieve the learning outcomes by writing specific, measurable, achievable, relevant, and time-bound (SMART) educational goals. These guide content development and involve defining learning objectives by selecting appropriate instructional strategies, media, content, and assessment methods to facilitate learning (Merrill, 2012). The designers outline the structure and sequence of the learning materials by creating a storyboard or prototype as a layout with a user interface and navigation structure for the DLP (Quinn, 2011). In addition, they select appropriate technologies such as tools, software, and platforms that support the instructional goals and meet the technical requirements of the course (Reiser& Dempsey, 2012).

Development Phase

The instructional designers then create instructional materials, such as content, multimedia, and interactive components, based on the design specifications of the course. This phase often involves collaboration among instructional designers, subject matter experts, multimedia developers, and other stakeholders to ensure the quality and effectiveness of the learning materials. The DLP is developed using a web-based application to assemble an interactive learning environment that includes simulations, quizzes, and discussions to engage students and promote active learning (Kapp, 2012; Siemens, 2008).

Implementation phase

Next, the learning experience is implemented through the relevant delivery methods in the blended learning environment. Training and support are provided to teachers and students to facilitate successful implementation of the DLP by gathering feedback and identifying usability issues (Allen, 2016; Piskurich, 2015; Rosenberg, 2003).

Evaluation Phase

Evaluating the effectiveness of the learning solution includes gathering feedback from teachers and students, assessing student achievement, and analyzing the impact of the instructional intervention on the educational experience. Evaluation

findings are utilized to revise and enhance instructional materials, which will inform future design and development efforts to improve content, activities, and features, and thus increase the effectiveness and usability of the DLP. (Kirkpatrick & Kirkpatrick, 2006; Richey et al., 2011).

DPL in Educational Opportunity Expansion Schools in Thailand

Previously, educational technology in teaching and learning was delivered by the Office of the Basic Education Commission, and some resources came from free videos on YouTube. These limitations affected teaching plans that were required to align with the core curriculum, including having the content and media match the appropriate assessment and the evaluation be in line with the course objectives. As a result, teachers expressed a need for educational technology that aligns with the core curriculum and provides complete content and up-to-date pedagogy, including authentic assessment that provides learners in rural areas with professional competencies that are relevant to their future professions, even if they do not pursue higher education. The students' preferences aligned with those of teachers; they wanted materials for self-paced learning that were free from time constraints, allowing them the flexibility to attend classes at their convenience.

This study examines the viewpoints of teachers and students on teaching and learning approaches that enhance professional competency. We divided our need analysis into three areas: (1) current use of educational technology in teaching and learning, (2) limitations in utilizing educational technology, and (3) prospects for educational technology. After completing the design and development processes, we presented the DLP to five experts who specialize in educational technology. The results were evaluated and the DLP was determined to be sound. The experts also recognized the benefits of using our DLP to enhance professional competencies, given its user-friendly system design and practical content. The use of the DLP will be explained in the next section.

METHODOLOGY

Four teachers and 78 students in four schools in rural Thailand were invited to teach and learn in practical classrooms for a Thai dessert culinary course. The instruction involved using actual ingredients, materials, and equipment in preparing Thai desserts. Our study demonstrated teachers' readiness to teach and the students' interest in the topic. During implementation, the teachers followed authentic assessment through rubric scoring as shown in Figure 2.

Our study employed the flipped classroom to encourage students in rural areas to acquire professional competencies skills for Thai dessert preparation. This study used a mixed methods approach to analyze both the qualitative and quantitative data. We used a Digital Learning Platform (DLP) to present to the students a pretest, online materials (such as PDFs and Videos), quizzes, workshops, a posttest, and a satisfaction survey.

As a first step, the teachers introduced information about the course that included demonstrating the tool they would use in the classroom using our DLP. The DLP was designed for teaching theory with practical tasks that required students to participate in workshops in class. Teachers then evaluated the students' work according to the criteria of scoring rubrics that were based on the structure of the system, as shown in Figure 3. At the end of the course, the students were assigned

Figure 2.
Practical Classrooms

Figure 3.
Course System Structure in the DLP

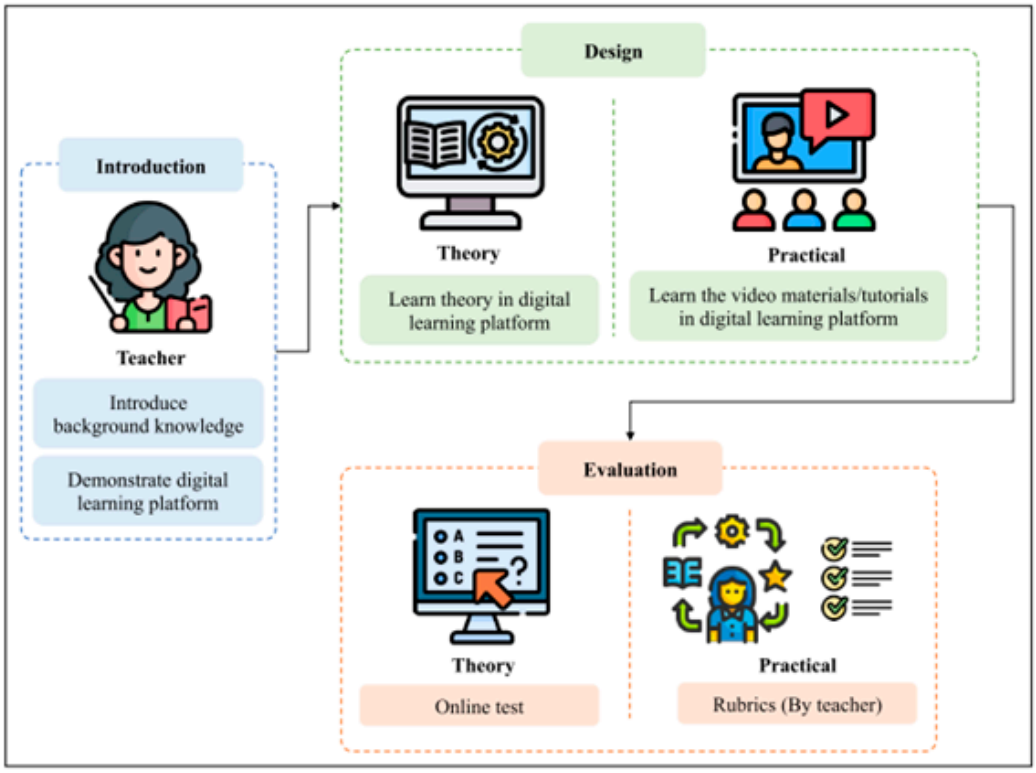
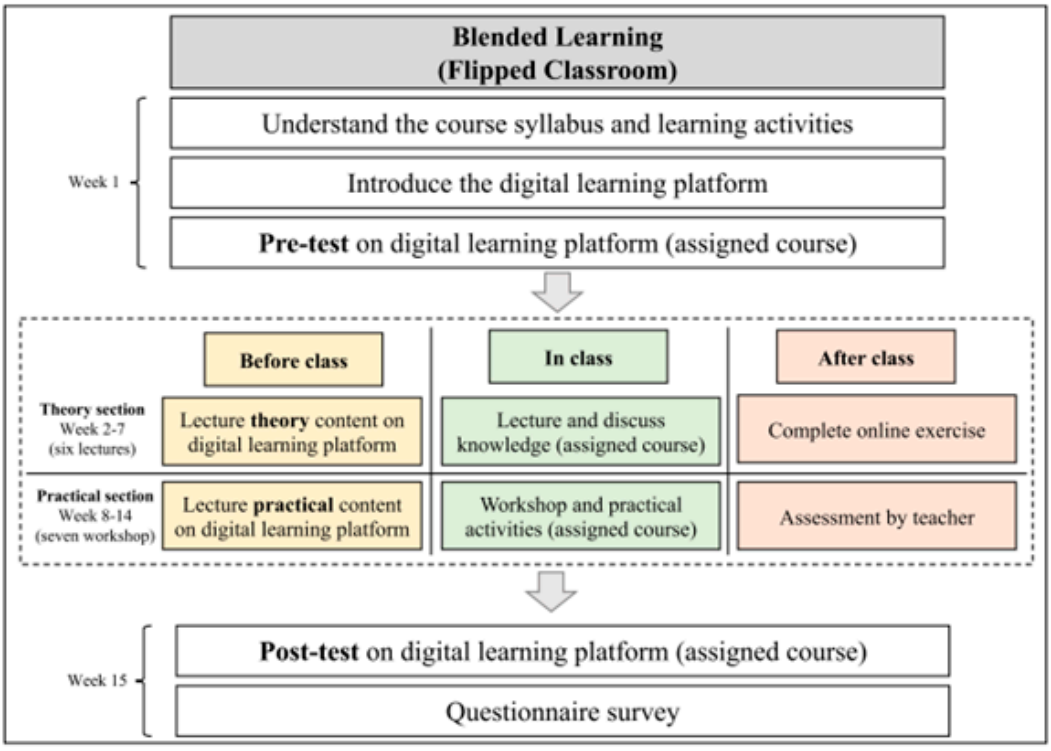


Figure 4.
Flipped Classroom Procedures



a posttest to evaluate their learning achievement through using the DLP.

The training process for the flipped classroom consisted of several essential components based on Youhasan et al. (2023), Zimmerman (1998), and Zimmerman & Moylan (2009). Figure 3 outlines the procedures as follows:

1. **Week 1:** Before the course, the teacher shares the course outline and classroom activities, introduces the DLP, and assigns preassessments to the students.
2. **Weeks 2–7:** Students learn theoretical content through the platform before entering class. In class, they learn through a group discussion, and after class the students do the exercises.
3. **Weeks 8–14:** Students learn practical content through the DLP, in which the content is presented in the form of videos the students watch before coming to class. In class, the students have hands-on learning with actual materials. After finishing class, the teacher evaluates the student's competencies using rubrics.
4. **Week 15:** A post assessment of the entire course is given to the students to ensure that they have a comprehensive knowledge of the material. This is followed by a survey of class satisfaction.

This 15-week training process aims to integrate theoretical and practical tasks and to foster an interactive learning environment for the students. Each step contributes to the overall student learning effectiveness by encouraging the development of professional competencies and skills.

Participants

Ten Educational Opportunity Expansion Schools in rural areas in Songkhla Province, Thailand volunteered to participate in this study. The course that received the greatest interest was on preparing Thai desserts, which was taught in four schools and selected by us for its readiness to teach. Four teachers and 78 students were invited to participate in the study.

We informed both teachers and students that their work or any comments would remain anonymous and assured them that the data were anonymized based on the ethical process for guarding the rights of participants.

Data Collection and Analysis

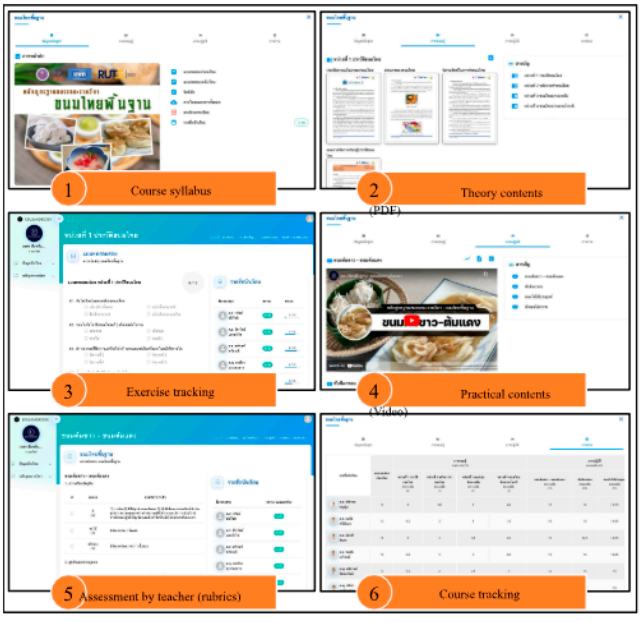
All data responses were collected in the DLP, including student responses to the pretests, posttests, and satisfaction surveys. The teachers responded through practical task assessments (rubrics) and followed up on student progress, including approving course completion. MANOVA was used to analyze the relationship between our treatment and the scores (posttest and practical scores) of students who used the DLP; the significance level was set to .05. Further, an analysis of variance (ANOVA) was used on the posttest and practical scores of the students.

Research Instrument

We developed a web-based application for the DLP, which served as both a learning aid and a motivational tool. The DLP addressed challenges to remote learning and the limited availability of professional competency materials. The widespread use of web applications enhances educational access and quality.

The teacher's point of view when using the DLP was to select an appropriate competency-based course for their students by considering the course outline before selecting and adding students (see Figure 5.1). The theory section had text illustrations and interactive quizzes with multiple-choice questions (see Figure 5.2), and a function for tracking each student's response so the teacher can

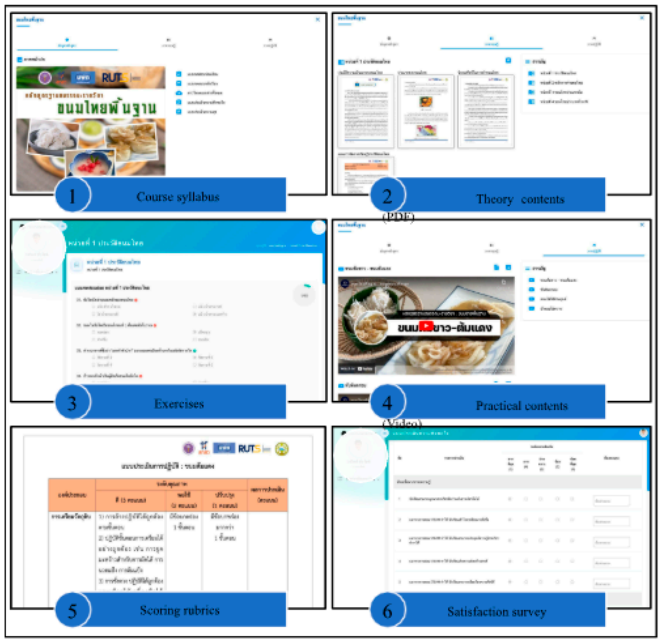
Figure 5.
DLP Screens for Teacher Point of View



check the results directly (see Figure 5.3). Practical sessions involved video tutorials that teachers used in preparing classroom practice (see Figure 5.4). The DLP incorporated a function for evaluating performance with scoring-rubrics (see Figure 5.5) and presented an overall evaluation to approve course completion (see Figure 5.6).

The student's point of view using the DLP differed from the teacher'. The first page showed the course outline (see Figure 6.1). Next, the theory section had text illustrations (see Figure 6.2) and interactive quizzes with multiple-choice questions (see Figure 6.3). The practical sessions included video tutorials (see Figure 6.4) and sections where the students could check the criteria of the scoring rubric (see Figure 6.5) before class and provide feedback on their satisfaction with the class (see Figure 6.6).

Figure 6.
DLP Screens for Student Point of View



RESULTS AND DISCUSSION

A statistical analysis was conducted on the data collected from the students who completed the pretest, posttest, and practical assessment. The descriptive statistics of four schools in the three sets of examinations are shown in Table 1. The normality of the data distribution was confirmed for the three sets of examinations ($p > .05$).

Table 1.
Result of the Shapiro–Wilk Test of Normality

	Groups	Shapiro–Wilk		
		Statistic	df	Sig.
Pretest	SchoolA	.942	16	.380
	SchoolB	.928	20	.139
	SchoolC	.943	24	.191
	SchoolD	.923	18	.147
Posttest	SchoolA	.892	16	.061
	SchoolB	.905	20	.052
	SchoolC	.918	24	.053
	SchoolD	.903	18	.065
Practical	SchoolA	.956	16	.594
	SchoolB	.935	20	.189
	SchoolC	.939	24	.156
	SchoolD	.947	18	.375

As shown in Table 2, one sample *t*-test was employed to analyze cognitive ability (*t*-value = 17.931) and the results of the significance value for the Cognitive Ability (Posttest) variable was less than .05. This shows that our treatment was effective in terms of students' cognitive ability with Excellent Remarks (Noor et al., 2020)—*Mean* = 18.365/20, *SD* = 1.155, *d* = 2.030 (Cohen's *d*)—at a huge Effect Size (Sawilowsky, 2009).

Table 2.
One Sample t-test Cognitive Ability (Posttest)

t	df	Sig. (1-tailed)	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper
17.931	77	< .001	2.359	2.10	2.62

As shown in Table 3, one sample *t*-test was employed to analyze psychomotor ability (*t*-value = 34.133) and the results of the significance value for Psychomotor Ability (Practical) variable was less than .05. This shows that our treatment was effective in terms of students' psychomotor ability with Excellent Remarks (Noor et al., 2020)—*Mean* = 58.038/60, *SD* = 1.055, *d* = 3.865 (Cohen's *d*)—at a huge Effect Size (Sawilowsky, 2009).

Table 3.
One Sample t-test Psychomotor Ability (Practical)

t	df	Sig. (1-tailed)	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper
34.133	77	< .001	4.036	3.801	4.272

Table 4 shows a paired sample *t*-test that estimated the mean difference between the pretest and posttest data (*Mean* = 8.013, *SD* = 2.201, *t*-value = 32.154) at a confidence level of 95%. Also, the *p*-value (< .001, 1-tailed) was less than the significance level of .05, suggesting the posttest score is higher than the pretest score, confirming a statistically significant improvement, and thus the null hypothesis was rejected.

Table 4.
Paired Sample t-test

	Mean	*Std. Deviation*	t	df	Sig. (1-tailed)
Posttest–Pretest	*8.013*	*2.201*	*32.154*	*77*	*< .001*

Table 5.
MANOVA Results

	Value	F	Sig
Pillai's Trace	.025	.317	.927
Wilks' Lambda	.975	.314	.929
Hotelling's Trace	.026	.311	.931
Roy's Largest Root	.022	.548	.651

The pretest variance analysis had a value = .050, F = 1.797, Sig = .173; thus, the null hypothesis was accepted as there was significantly no difference in this treatment. Therefore, Multivariate Analysis of Variance (MANOVA) was employed. MANOVA is particularly suited for multiple dependent variables to evaluate mean differences between achievement (Posttest Scores) and professional competencies (Practical Scores).

Before conducting the MANOVA, several assumptions were evaluated about the normal distribution and homogeneity of variance-covariance matrices to enhance the data quality and ensure multivariate normal distribution. The MANOVA result revealed a significant no difference between the Posttest Score and Practical Score at a significant level $p > .05$ when using DLP in the four schools (see Table 5).

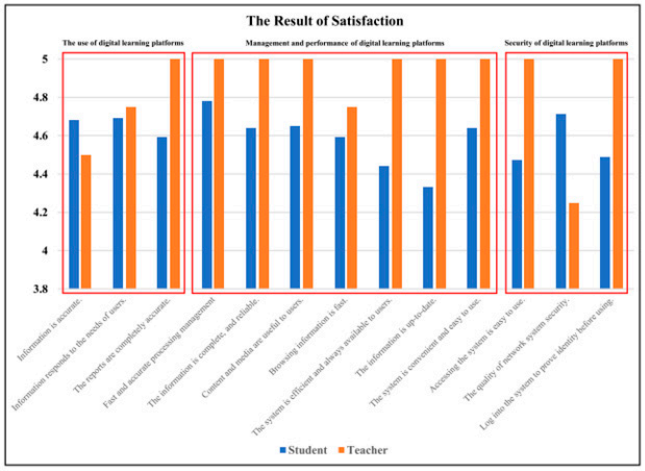
Table 6.
Analysis of Variance and Multiple Comparison

					Levene's test		ANOVA						Post Hoc Test
DV	IV	n	Mean	S	W	Sig.	SS (df)		MS		F	Sig.	
Posttest Scores	SchoolA	16	18.44	.96	.695	.558	SSB	.492	MSB	.164	.117	.950	No difference
	SchoolB	20	18.45	1.23			(dfB)	3					
	SchoolC	24	18.29	1.20			SSW	103.457	MSW	1.398			
	SchoolD	18	18.28	1.23			(dfW)	74					
Practical Scores	SchoolA	16	58.21	1.03	.330	.804	SSB	1.821	MSB	.607	.547	.652	No difference
	SchoolB	20	58.05	1.20			(dfB)	3					
	SchoolC	24	58.11	.99			SSW	82.170	MSW	1.110			
	SchoolD	18	57.78	1.00			(dfW)	74					

Analysis of variance (ANOVA) for each variable found that the means of the Posttest Scores and Practical Scores were significantly not different among the four schools, as shown in Table 6. The overall results indicate that our DLP treatment enhanced professional competencies in both cognitive and psychomotor abilities in all schools.

In addition, the student satisfaction evaluation was essential feedback provided to researchers concerning the DLP design and development. The satisfaction survey contained 13 questions grouped in three categories: (a) the use of the digital learning platform, (b) the management and performance of the digital learning platform, and (c) the security of the digital learning platform. Overall, both the teachers and the students were very satisfied with the DLP (see Figure 7). It is obvious from the teachers' perspective that the highest level of satisfaction was 5 for the following factors: (a) The reports are completely accurate. (b) Fast and accurate processing management. (c) The information is complete, and reliable. (d) Content and media are useful to users. (e) The system is efficient and always available to users. (f) The information is up-to-date. (g) The system is convenient and easy to use. (h) Accessing the system is easy to use. and (i) Log into the system to prove identity before using. On the other hand, the quality of network system security had the lowest satisfaction score. Overall, the students were also very satisfied. They were most satisfied with "Fast and accurate processing management" and least satisfied with "The information being up to date."

Figure 7.
The Result of Satisfaction



Further, the qualitative data asked for reflections from teachers and students. The teachers' responses addressed the needs of the students in the selected courses. The teachers desired to encourage students to be competent in their learning. The DLP supported the teaching and learning activities with complete instructional media and clear content that included teaching plans and guidelines for measuring students' theoretical and practical tasks. Moreover, the DLP was a medium that played an important role in supporting teachers by providing tools for teaching and allowing them to follow the progress of learners. However, teachers did request a session on introducing secure networking to address the students' concerns when implementing DLP.

The students reflected that, before using DLP they were unable to prepare before entering the classroom and did not have support during the class, including reviewing lessons because they were in the classroom. After using DLP, the students recognized the importance of being able to learn from home. They could study anywhere and anytime they wanted, and they could also attend classes and review the lessons by themselves without waiting for the teacher. The other advantages of the DLP were that there were interesting learning videos and the students could take exams or online exercises by themselves after completing each learning unit. Moreover, they could also understand the scoring rubric criteria through the system. However, our study only focused on the course content of preparing Thai desserts, and from the students' perspective, they would like to also prepare fusion dishes in order to be more international.

CONCLUSION

This study assessed the effectiveness of using a DLP to enhance the professional competencies of students in a Thai dessert culinary class in rural Thailand. The results indicate that our treatment promoted learning and skill acquisition through a flipped classroom in the rural areas. Our study provided evidence of positive student achievement and participant satisfaction.

The results of using DLP for teaching and learning reveal success in encouraging professional competencies for the students. Moreover, the participants expressed positive motivational

reflection on the DLP, which further endorsed the findings obtained from the qualitative analysis. Therefore, we are confident that using a DLP provided an instructive and innovative approach for promoting professional competencies in rural areas in Thailand, which can be applied in other educational contexts as well.

Future research should expand on the widespread use of DLP and examine the need to increase the stability and completeness of the system. This includes producing courses based on diverse learner competencies, and if the course content is in English, our approach could enhance professional skills related to Thai culture.

ACKNOWLEDGMENT

The authors would like to express their gratitude to all of participants who positively participated in this study, and for the research supervision by Rajamangala University of Technology Srivijaya, Thailand and the funding support from Program Management Unit on Area Based Development (PMU A).

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