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DEVELOPING AN INTEGRATED LEARNING MODEL FOCUSING ON LITERACY AND FOUR KEY CHARACTERISTICS TO ENHANCE COMPETENCY-BASED TEACHING AND LEARNING

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ABSTRACT

The purpose of this research were to 1) study the current situation, problems, needs, and concepts related to integrated learning management focusing on literacy and four characteristics; 2) develop an integrated learning management model emphasizing literacy and four characteristics to enhance competency-based teaching; 3) examine the quality of the developed model in terms of appropriateness, consistency, feasibility, and utility; 4) investigate the outcomes of implementing the developed learning management model; and 5) evaluate the satisfaction of teachers and students toward the implementation of the developed learning management model. This study employed a mixed-methods research design. The population consisted of 120 teachers from Demonstration School of Bansomdejchaopraya Rajabhat University who voluntarily participated, and 500 teachers from network schools affiliated with the Samut Sakhon and Suphanburi Primary Educational Service Area Office 2 who signed an MOU, totaling 620 participants. The research instrument was a questionnaire with an Index of Item Objective Congruence (IOC) of 1.00 and a reliability coefficient of .96. Data were analyzed using mean and standard deviation.

The results showed that 1) The current condition of learning management was overall at a moderate level. Problems encompassed teachers, learners, time, media, AI technology, learning resources, activity design, measurement and evaluation. Needs consisted of six main components: teacher professional development, learning management, AI integration, educational platforms, PLC

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(Professional Learning Community), coaching and mentoring, and competency-based learning supported by AI. The conceptual framework comprised learning management factors and support system factors. 2) The developed learning management model consisted of seven models: the PLAY Model, SMART Model, HAPPY Model, BIACCT Model, V-PRIDE Model, CREATE Model, and SMART INNOVATOR Model. 3) The quality of the model in terms of appropriateness, consistency, feasibility, and utility was at the highest level. 4) The implementation of all seven models demonstrated efficiency meeting the E_1/E_2 criteria. 5) Regarding satisfaction, teachers reported the highest level of satisfaction across all aspects, with measurement and evaluation having the highest mean score. Students also reported the highest level of satisfaction across all aspects, with teachers' roles and learning support having the highest mean score..

Keywords: Intelligence, four characteristics, competency-based teaching

INTRODUCTION

The 21st-century world is facing rapid transformation driven by advances in digital technology, artificial intelligence (AI), automation, and the knowledge economy. These advancements significantly alter how we live, work, and learn. Future learners need competencies beyond rote memorization; they must be able to think critically, solve problems, communicate, collaborate, and effectively apply knowledge in real-world situations. Several international organizations propose a shift in education systems from knowledge-based education to competency-based education to prepare learners for life and work in the future society (OECD, 2019). Future learning, therefore, does not focus solely on acquiring academic knowledge but emphasizes the development of literacy in various dimensions, such as reading literacy, digital literacy, information literacy, and financial literacy. This enables learners to access, analyze, evaluate, and use information critically, coupled with the development of essential qualities for future life and work, such as critical thinking, creativity, communication, and collaboration. (Collaboration) which is a crucial skill internationally recognized as a foundation for the 21st-century workforce (Partnership for 21st Century Learning [P21], 2019; UNESCO, 2021).

The Organisation for Economic Co-operation and Development (OECD) has also proposed the Learning Compass 2030 framework, which aims to develop learners' ability to create new values, resolve conflicts and challenges, and take responsibility for society, emphasizing the integration of knowledge, skills, attitudes, and values so that learners can effectively cope with the uncertainties of the future world (OECD, 2019). In Thailand, educational reform under the competency-based curriculum has mandated that educational institutions adjust their learning management from a content-focused approach to the development of learners' competencies, promoting learning through hands-on activities, problem-solving in real-world situations, and interdisciplinary integration, so that learners can appropriately apply knowledge in diverse contexts. However, teaching in many educational institutions still focuses primarily on content transmission and knowledge assessment, resulting in the development of literacy and essential 21st-century attributes not achieving the goals of competency-based education.

Influenced by the digital transformation, the development of Artificial Intelligence (AI), and the knowledge-based economy, education worldwide has shifted from a focus on knowledge transfer to Learning Experience Design (LXD). This design aims to develop learners' competencies so they can effectively apply knowledge, skills, and attributes to solve complex real-world problems (Organisation for Economic Co-operation and Development [OECD], 2019, 2023). Current LXD concepts emphasize learner-centered learning, where teachers act as learning designers rather than knowledge transmitters. Activities must facilitate hands-on learning, collaborative knowledge creation, reflection, and the application of knowledge within real-world contexts. This develops essential future competencies such as critical thinking, problem-solving,

communication, collaboration, and lifelong learning, aligning with the OECD Learning Compass 2030 and the competency-based education concepts of many countries. Simultaneously, the emergence of generative AI, such as ChatGPT and AI-powered learning tools, has created new opportunities for designing flexible and personalized learning experiences for individual learners. (Personalized Learning) and supports Just-in-Time Learning. However, AI should not be used merely to create answers or replace the role of teachers, but rather as a tool to enhance teachers' capabilities in designing activities, promoting higher-order thinking, innovation, and collaborative learning, under the principles of ethics, transparency, and consideration of student data security (UNESCO, 2023; OECD, 2023). Therefore, 21st-century teachers need to have the competence to design learning experiences that can appropriately integrate media and artificial intelligence tools into the teaching and learning process, using AI to stimulate active learning, inquiry-based learning, project-based learning, and problem-based learning. Furthermore, teachers must be able to design assessments that reflect the true competencies of learners, not just measure memorization or rote learning.

In addition, developing learners' competencies in the AI era needs to encompass cognitive skills, social and emotional skills, and AI literacy, which refers to the ability to understand the principles of operation, evaluate limitations, and use AI critically. Furthermore, recognizing the importance of ethics, privacy, and social impact, building AI literacy is a crucial component of future learning and a fundamental competency for digital citizens and the development of digital technologies.

OBJECTIVE

- 1) To study the current situation, problems, needs, and concepts related to integrated learning management focusing on literacy and four characteristics.
- 2) To develop an integrated learning management model emphasizing literacy and four characteristics to enhance competency-based teaching.
- 3) To examine the quality of the developed model in terms of appropriateness, consistency, feasibility, and utility.
- 4) To investigate the outcomes of implementing the developed learning management model.
- 5) To evaluate the satisfaction of teachers and students toward the implementation of the developed learning management model.

RESEARCH METHODOLOGY

This research, titled "Developing an Integrated Learning Model Based on Literacy and Four Key Characteristics to Enhance Competency-Based Teaching," is as follows:

POPULATION

The population consists of 120 teachers from the Demonstration School of Ban Somdej Chaopraya Rajabhat University who voluntarily participated in the project, and 500 teachers from network schools participating in the project and having signed an MOU under the Samut Sakhon and Suphan Buri Educational Service Area Office 2, totaling 620 people.

RESEARCH INSTRUMENT

A tool used to collect data for one purpose. This is the development of a learning management model that integrates intelligence and 4 characteristics to enhance competency-based teaching and learning, which is

a questionnaire. The questionnaire was designed based on 5 aspects of learning conditions in the 21st century, with confidence values for each aspect including:

Section 1: Learning Design. Reliability coefficient = .86

Section 2: Literacy Integration. Reliability coefficient = .87

Section 3: Promoting the Four Characteristics. Reliability coefficient = .89

Section 4: Competency-Based Teaching. Reliability coefficient = .87

Section 5: Application of the Model and Benefits. Reliability coefficient = .92

The satisfaction questionnaire regarding the development of an integrated learning management model focusing on literacy and the four characteristics was used to interpret the data according to the 5-level Likert scale as follows:

5 means the level of belly satisfaction is at the highest level.

4 means the level of belly satisfaction is at a high level.

3 means the level of belly satisfaction is at the average level.

2 means the level of satisfaction is low.

1 means the level of belly satisfaction is at the lowest level.

Interpreting the data from the mean, based on (Likert, 1993), the score ranges are defined as follows:

An average of 4.50 – 5.00 means the highest level.

An average of 3.50 – 4.49 means a high level.

An average of 2.50 – 3.49 means a medium level.

An average of 1.50 – 2.49 means a low level.

An average of 1.00 – 1.49 means the lowest level.

Steps in Creating the Research Tool:

The research tool used in this study was a questionnaire. The researcher followed these steps:

1. Studying theories, documents, and research related to developing an integrated learning management model focusing on literacy and the four characteristics.

2. Preparing a questionnaire on developing an integrated learning management model focusing on literacy and the four characteristics. The researcher then sent the questionnaire outline to five experts for review and revision based on their suggestions.

3. Checking the Index of Objective Congruence (IOC) of the questionnaire by five experts, resulting in an IOC value of 1.00.

4. Revising the questionnaire based on the experts' suggestions.

5. Distributing the questionnaire to 30 teachers who were not the target group for pilot testing, and analyzing the reliability of the questionnaire using Cronbach's Alpha Coefficient, which was equal to .96.

6. Administering the questionnaire to teachers at a demonstration school. The project involved 120 students from Ban Somdej Chaopraya Rajabhat University who voluntarily participated, and 500 teachers from network schools participating in the project and having signed an MOU under the Samut Sakhon and Suphan Buri Educational Service Area Office 2, totaling 620 people.

Data Collection

The data collection process for this research was carried out as follows:

1. The researcher obtained a letter from the Demonstration School, Rajabhat Ban Somdej Chaopraya University, requesting permission to collect data from 120 teachers from the Demonstration School, Rajabhat Ban Somdej Chaopraya University, who voluntarily participated in the project, and 500 teachers from network schools participating in the project and who had signed an MOU under the Samut Sakhon and Suphan Buri Educational Service Area Office 2, totaling 620 teachers.

2. The researcher distributed questionnaires to the target group of 620 people, totaling 620 sets, representing 100% participation, through the electronic access system at the university level.

Data Analysis

The researcher collected and categorized the data into groups by calculating the mean (μ) and standard deviation (σ).

Statistical Analysis

The researcher used basic statistics, namely the mean (μ) and standard deviation (σ), to analyze the data.

RESEARCH RESULT

The research on "Developing an Integrated Learning Management Model Focusing on Literacy and Four Characteristics to Enhance Competency-Based Teaching" presents the data analysis results as follows:

Part 1: Analysis of the Current Situation, Problems, Needs, and Concepts Related to Integrated Learning Management Focusing on Literacy and Four Characteristics. The results are as follows:

The analysis of the current situation, problems, needs, and concepts related to integrated learning management focusing on literacy and four characteristics at the Demonstration School of Rajabhat Ban Somdej Chaopraya University revealed that the school has potential in learning management and continuously develops a student-centered curriculum. This is within the role of a demonstration school that serves as a testing ground for educational innovations and supports the university's teacher training. However, from the study of documents, interviews, and contextual analysis, it was found that there are still issues that should be developed to align with competency-based education and 21st-century learning. These include designing learning experiences that integrate literacy in various dimensions with the systematic development of key student characteristics; organizing learning activities that are linked to real-world situations; and using assessment tools that truly reflect student competencies. Specifically, 1) Regarding the learning management environment, it was found that most teachers are able to organize learning activities that promote student participation and continuously utilize digital technology in teaching. Furthermore, the school provides support in terms of resources, media, and information systems. This facilitates the development of innovative learning. However, activities in many subjects still primarily focus on the transmission of knowledge according to the curriculum content. Meanwhile, the integration of literacy, the development of higher-order thinking, innovation, and competency assessment through practical application is not yet comprehensive across all learning areas. As a result, the systematic development of student competencies has not occurred. 2) Regarding problems, teachers face limitations in designing learning that integrates literacy and the four key attributes into their teaching due to other workloads, student differences, and time constraints. Furthermore, most assessment tools emphasize academic achievement rather than the assessment of student competencies and learning behaviors, thus failing to fully reflect student potential. 3) Regarding needs, administrators and teachers desire a learning management model with clear components and procedures that can be practically applied in the school context. This model should also help teachers design learning activities that promote literacy and the four key attributes: critical thinking, creativity, communication, and collaboration, alongside student competency development. Additionally, there is a need for guidelines on using digital technology and Artificial Intelligence (AI) to support learning and activity design. And to make authentic assessment more effective.

From the synthesis of concepts and data obtained, it can be concluded that an appropriate learning management model for schools should consist of five important components: (1) Input, which covers the readiness of teachers, learners, curriculum, media, technology, and learning resources; (2) Learning management process, which emphasizes active learning, hands-on practice, problem-based learning, and learning from real-world situations; (3) Literacy Integration, to develop the ability to access, analyze, evaluate, and apply information critically; (4) Development of four key characteristics (4Cs) through learning activities that promote thinking, communication, creativity, and collaboration; and (5) Competency-based Outcomes and Assessment, which uses authentic assessment and reflects the holistic development of learners' competencies.

The above analysis reflects that schools are ready in terms of policy, personnel, and resources to develop competency-based learning management, but still need a systematic learning management model that can link all five components together. This will enable teachers to design learning experiences that are consistent with the context of the learners and the direction of modern educational development, leading to an improvement in the quality of teaching and learning and the development of learners' competencies effectively. This aligns with the school's development approach of promoting innovative and technologically advanced learning and the holistic development of students' potential.

Part 2: Analysis of Competency-Based Instruction Management to Develop an Integrated Learning Model Combining Literacy and Four Characteristics for Enhancing Competency-Based Instruction. The results are as follows:

The analysis of competency-based instruction management to develop a learning model at the Demonstration School of Ban Somdej Chaopraya Rajabhat University revealed that the school has policies and guidelines for education that align with educational reform aimed at developing learners based on the competency-based concept. Emphasis is placed on developing knowledge, skills, attitudes, and characteristics necessary for life in the 21st century through learner-centered learning activities that provide opportunities for learners to learn through hands-on experience. However, data analysis showed that classroom implementation varies according to the experience, expertise, and readiness of each teacher. This results in a lack of a standardized and systematically applicable model for competency-based instruction. In terms of learning design, most teachers can define learning outcomes and plan activities that align with curriculum indicators. However, the design of activities that link learners' core competencies with real-world situations, integrate cross-disciplinary knowledge, and promote higher-order thinking skills is not consistently implemented across all subject areas. Furthermore, some activities still focus on content transmission and preparation for academic assessments rather than creating learning experiences that allow learners to demonstrate competencies through practical application. This includes: 1) The learning process. The findings indicate that: 1) Teachers are increasingly incorporating active learning, collaborative learning, and digital technology into their activities. This results in greater student engagement and improved exchange of ideas. However, the integration of literacy—including reading, information utilization, communication, media and digital literacy—as well as the use of Artificial Intelligence (AI) to enhance learning, still requires systematic development to align with the goals of competency-based teaching. 2) Regarding student attribute development, the school prioritizes promoting critical thinking, creativity, communication, and collaboration through both in-class and out-of-class activities. However, the development of these attributes depends on each teacher's activity style, leading to varying student outcomes. Furthermore, there is no common practice that can be used as a standard for school-wide learning. 3) In terms of assessment, teachers attempt to use diverse assessment methods such as task-based assessment, behavioral observation, and performance-based assessment. However, most assessments still prioritize academic achievement and knowledge measurement over authentic competency assessment. Consequently, the data obtained does not fully reflect the level of student competency development, and the assessment results cannot be effectively used to develop individual learning outcomes.

The above analysis shows that... The competency-based instruction at the Demonstration School of Ban Somdej Chaopraya Rajabhat University has a strong foundation in terms of policy, personnel, and resources. However, there is a need to develop a learning management model with clear components and procedures. This

model would provide guidance for teachers to design learning experiences that systematically link inputs, learning processes, integrating literacy, developing the four key characteristics (4Cs), and competency-based assessment. Such a model would help standardize instruction throughout the school, enhance student competency development, and support the demonstration school's role as a source of educational innovation and a model for competency-based learning that can be scaled up to other educational institutions.

Part 3: The analysis of the quality of the integrated literacy and four character traits learning model, in terms of appropriateness, consistency, feasibility, and utility, yielded the following results:



Figure 1. Innovative Learning Management at the Demonstration School of Ban Somdejchaopraya Rajabhat University

Source: Patchara Dechhome et al. (2026)

The quality assessment of the integrated learning management models based on four literacy and character traits, aimed at enhancing competency-based teaching at the Demonstration School of Ban Somdej Chaopraya Rajabhat University, revealed that experts and specialists unanimously agreed that the developed models are of high quality and can be appropriately used as a guideline for competency-based teaching. These models consist of: 1) PLAY Model, 2) SMART Model, 3) HAPPY Model, 4) BIACCT Model, 5) V-PRIDE MODEL, 6) CREATE MODEL, and 7) SMART INNOVATOR Model. The evaluation covered four aspects: appropriateness, consistency, feasibility, and usefulness. This reflected the models' completeness in terms of principles, concepts, components, operational processes, and application within the school context. Specifically, in terms of 1) Propriety, the models' components were found to be consistent with the context of the Demonstration School of Ban Somdej Chaopraya Rajabhat University and clearly addressed the competency-based education approach. This included objective definition, model components, learning activity steps, the roles of teachers and students, and assessment methods, enabling the models to comprehensively support the development of students' competencies. The evaluation assessed the model's effectiveness in three aspects: 1) Knowledge, skills, attitudes, and attributes necessary for the 21st century; 2) Congruity: The results showed that all components of the model are systematically interconnected, from inputs and the learning process to literacy integration, the development of the four key attributes (4Cs), and competency-based outcomes and assessment. Each component supports the others, resulting in a unified model that can be used as a clear learning framework and aligns with the principles of competency-based learning; and 3) Feasibility: Experts believe the

model is practical for school contexts because the implementation steps are clear, uncomplicated, and consistent with school management. It can be integrated with the school curriculum and current lesson plans used by teachers, and allows teachers to adapt it to different grade levels, subject areas, and learner differences. However, to maximize the model's effectiveness, it requires support from school administrators in terms of policy, teacher development, resource allocation, and the creation of professional learning communities. (Professional Learning Community: PLC) 4) Utility: The evaluation results indicate that the model can be used as a concrete guideline for developing the quality of competency-based teaching and learning. It helps teachers design learning experiences that integrate literacy, the four attributes, and the appropriate use of digital technology. This results in students having the opportunity to develop competencies through learning from practice, problem-solving, communication, and collaboration. In addition, the model can be used as a framework for developing school curricula, teaching supervision, teacher development, and educational quality assurance.

From the above, the quality assessment results reflect that the developed learning management model has all the characteristics according to the standards for evaluating educational models and innovations. That is, it is appropriate for the school context, it is consistent in its components, it can be implemented in practice, and it will benefit the development of the quality of competency-based teaching and learning at both the classroom and school levels. The analysis results therefore show that the model is ready for pilot testing and expansion to other schools with similar contexts. It can serve as a model for learning management that promotes literacy, the four attributes, and the essential competencies for learners in the 21st century effectively.

Part 4: The Effects of Using the Developed Integrated Literacy and Four Characteristics Learning Model on Competency-Based Teaching, Considering the Outcomes in Student Competencies, Literacy, and the Four Characteristics, are as follows:

Analysis of the use of the developed integrated literacy and four characteristics learning model on competency-based teaching reveals that the model can concretely promote the development of student competencies. Students show development in knowledge, skills, thinking processes, and characteristics necessary for life in the 21st century. This reflects that designing learning that links literacy with the four characteristics (4Cs) under the competency-based learning concept helps students apply knowledge to solve problems, make decisions, and perform tasks in real-world situations more effectively. This includes: 1) In terms of student competency outcomes, it was found that students can demonstrate competencies through activities, project work, problem-solving, and collaborative work effectively. They are able to connect knowledge from multiple disciplines to analyze and solve problems that arise in real-world situations. Furthermore, they can plan their learning, track their own progress, and reflect on their learning outcomes to lead to continuous self-improvement. This shows that activities that emphasize hands-on practice, learning from real-world situations, and authentic assessment are effective. It plays a significant role in developing learners' competencies holistically. 2) In terms of literacy, it was found that learners have developed the ability to access information, search for, select, analyze, and evaluate the credibility of information before using it. They are also able to communicate, transmit, and apply knowledge appropriately through digital media and technology. Learners are able to use reasoning to make decisions and demonstrate media literacy in the context of learning and daily life. This reflects that the learning management model can effectively integrate literacy into learning activities and helps build a foundation for lifelong learning.

For the development of 4 characteristics (4Cs): Critical Thinking, Creativity, Communication, and Collaboration. (Collaboration) found that students' learning behavior has changed in a better direction. They can analyze problems and propose reasonable solutions. Have creative ideas in designing pieces or solutions. Able to communicate opinions and exchange knowledge with others appropriately. Including working together by accepting different opinions. Be responsible for your own roles and responsibilities and work together to achieve the group's goals effectively Such changes clearly reflect that the developed learning management model can promote the characteristics necessary for living and working in the future. The results of using the model also show changes in the teaching and learning process of teachers. The teacher plays the role of learning experience designer and facilitator. (Facilitator) rather than the one-sided conveyor of knowledge. Questions

are used to stimulate thinking. Organizing a variety of activities Using appropriate technology and learning resources Including evaluation that emphasizes reflection of students' competencies according to actual conditions. As a result, the learning environment is flexible. Provide opportunities for students to participate in learning and take more responsibility for their own learning.

from the above The results of using the learning management model that integrates intelligence and four characteristics show that the developed model can effectively enhance competency-based teaching and learning. both in terms of developing students' competencies Promoting intelligence and strengthening the four characteristics through a learning management process that connects knowledge with actual practice. Promote active learning advanced thinking Proper use of technology and evaluation according to actual conditions The results of the above analysis reflect that the model has the potential to be applied to improve the quality of competency-based teaching and learning in educational institutions. and can be a model for developing learners to have competencies that are consistent with the needs of society and the world of the future in a sustainable way.

Overall research results found that Organizing competency-based teaching in all 7 formats, including PLAY Model, SMART Model, HAPPY Model, BIACTT Model, V-PRIDE Model, CREATE Model and SMART INNOVATOR Model, is related to the development of 4 characteristics according to the Royal Policy on Education. Each format has different steps and focuses. But there are important common characteristics, which are the provision of learning experiences that allow students to participate, take action, think analytically, solve problems, and work together with others. Apply knowledge and reflect on learning outcomes This facilitates the development of learners in both intelligence and desirable characteristics simultaneously. When considering the relationship with the 4 characteristics, it was found that 1) having the right attitude towards the country It can be developed through organizing learning situations that are linked to real contexts, communities, society, and countries, making learners understand their roles. See the value of the collective and be able to apply knowledge to live life appropriately. 2) In terms of having a stable life foundation and having morals, this is reflected through a learning process that requires students to be disciplined. Follow the agreement Know how to think and make decisions. Listen to opinions as well as distinguishing and selecting appropriate courses of action. which is directly related to development Having discipline and eagerness to learn. 3) In terms of having a job and having a career, all 7 learning formats give importance to learning from doing, solving problems, creating pieces of work or results. application of knowledge and work development from feedback This process helps students develop work skills. Be determined, know how to plan, divide responsibilities, and work until you reach your goals. This is an important basis for self-reliance and future careers. 4) Good citizenship. It is promoted through collaboration, communication, listening to opinions. Respecting the rules Taking responsibility for one's role and duties and considering the impact on others and the public is important.

Part 5: The results of the analysis of teacher and student satisfaction with the use of the integrated learning management model combining literacy and the four characteristics are shown in Table 1.

(n=620)

Developing a learning management model that integrates intelligence and four characteristics to enhance competency-based teaching and learning	$\bar{x}$	S.D.	Interpret the results
Section 1: Learning Design	4.95	0.25	highest
Section 2: Literacy Integration	4.87	0.32	highest
Section 3: Promoting four key characteristics	4.85	0.20	highest
Section 4: Competency-Based Instruction	4.82	0.22	highest

Section 5: Application of the model and benefits obtained	4.80	0.35	highest
Sum	4.86	0.27	highest

Table 1 shows that the overall results of the analysis

of teacher and student satisfaction with the use of the integrated literacy and four character traits learning management model were at the highest level ($\bar{x} = 4.48$, S.D.= 0.86). The research results in each aspect ranged from highest to lowest as follows: The aspect with the highest level was Aspect 1, Learning Design ($\bar{x} = 4.95$, S.D.= 0.25), followed by Aspect 2, Literacy Integration ($\bar{x} = 4.87$, S.D.= 0.32), Aspect 3, Promoting the Four Character Traits ($\bar{x} = 4.85$, S.D = 0.20), Aspect 4, Competency-Based Teaching ($\mu = 4.82$, $\sigma = 0.22$), and Aspect 5, Application of the Model and Benefits Received ($\bar{x} = 4.80$, S.D = 0.35).

SUMMARY AND DISCUSSION

The research findings on "Developing an Integrated Learning Model Combining Literacy and Four Characteristics to Enhance Competency-Based Teaching" revealed that, overall, the learning model was highly appropriate. This reflects the fact that the developed model aligns with the principles of competency-based learning, appropriately integrates key components of 21st-century learning, and can be practically applied in teaching. When considering each aspect individually, the Learning Design aspect had the highest average score. This indicates that the setting of objectives, activity design, sequencing of learning experiences, selection of media and technology, and evaluation are consistent with the competency-based learning concept that emphasizes learners as the center and learning through practice. This finding aligns with the Organisation for Economic Co-operation and Development (OECD, 2019)'s Learning Compass 2030 framework, which states that learning design should link knowledge, skills, attitudes, and values so that learners can create new values, solve complex problems, and be socially responsible. Furthermore, it aligns with the Office of the Secretariat of the Council of Education (2023), which suggests that competency-based learning must begin with designing activities that allow learners to demonstrate competencies through practice in real-world situations. The Literacy Integration aspect had the second highest average score. The study demonstrates that the model can promote learners' ability to critically access, analyze, evaluate, and use information, knowledge, and technology—a crucial foundation for lifelong learning. This research aligns with UNESCO (2021), which emphasizes the development of literacy in multiple dimensions to prepare learners for quality life in a digital society, and with the OECD (2023), which indicates that integrating literacy into learning enhances learners' capacity to apply knowledge to solve real-world problems. Regarding the promotion of the four key attributes (4Cs): Critical Thinking, Creativity, Communication, and Collaboration, the average scores were found to be at the highest level. This reflects the effectiveness of the learning model in developing essential 21st-century skills through learning activities that allow learners to think, analyze, exchange ideas, and work collaboratively. These results are consistent with the Partnership for 21st Century Learning Framework (P21, 2019), which identifies the 4Cs as core competencies that all learners should develop. This aligns with the work of Cardona, M. A., Rodríguez, R. J., & Ishmael, K. (2023), which indicates that integrated digital and artificial intelligence learning designs can effectively promote higher-order thinking, communication, and collaboration. Regarding competency-based learning, the research shows that the model can link learning with practical application, promote the application of knowledge, and provide learners with opportunities to demonstrate competencies through diverse tasks or situations. These results are consistent with the Office of the Secretariat of the Council of Education (2019), which defines core competencies for learners, and the OECD (2019) concept, which suggests that competency-based learning should aim to develop the ability to integrate knowledge, skills, attitudes, and values, rather than solely measuring memorization of content. Finally, while the average score for the model's implementation and benefits is lower than other aspects, it remains at the highest level, indicating its feasibility in practice and its potential to improve the quality of competency-based instruction. However, limitations may exist in terms of teacher readiness, resources, technology, and the context of each school. Therefore, continuous support from administrators and teacher professional development are necessary. These

results are consistent with the OECD (2025) proposal that competency-based learning initiatives are successful when teachers are developed into learning designers and supported by the school's management system.

When considering the five components of the model, namely (1) Input, (2) Learning Management Process, (3) Literacy Integration, (4) Development of the Four Characteristics (4Cs), and (5) Competency-based Outcomes & Assessment, it was found that all components are systematically interconnected. That is, quality inputs support an effective learning management process. This process promotes literacy integration and the development of the four characteristics, leading to competency outcomes for learners and enabling effective real-world assessment. This aligns with the concepts of OECD (2019), UNESCO (2021), and the Office of the Secretary-General of the Council of Education (2023), which suggest that the development of learners' competencies requires the design of a learning system that links all components in a unified manner in order to sustainably improve the quality of learning and prepare learners for life in the 21st century and the future society.

SUGGESTION

Suggestions for Applying Research Findings:

1) School administrators should systematically establish policies and support competency-based learning, integrating the developed learning model into school development plans, action plans, and monitoring to ensure consistent student competency development throughout the school.

2) Administrators should promote continuous teacher professional development through training or the creation of Professional Learning Communities (PLCs) to enhance teachers' abilities in designing learning experiences, integrating literacy, the four key attributes (4Cs), and the appropriate use of technology or artificial intelligence (AI) in competency-based teaching.

3) Teachers should apply the developed learning model in designing learning activities, emphasizing active learning, problem-based learning, real-world integration, interdisciplinary integration, and the use of digital media or AI to promote literacy, higher-order thinking skills, and essential 21st-century attributes in students.

4) Teachers should develop a competency-based assessment and evaluation system. By using a variety of assessment methods such as authentic assessment, portfolio, performance assessment, and assessment for learning, to comprehensively reflect the competencies of learners.

5) Educational institutions should build a network of cooperation between administrators, teachers, parents, the community, and external agencies to jointly develop a learning environment that is conducive to building competencies, literacy, and the four key attributes of learners, as well as exchanging knowledge and innovative learning management practices that can be effectively extended to other educational institutions.

Next research suggestion:

1) Administrators should study the results of using learning management models in various contexts, such as different educational levels. Various learning subject groups or educational institutions with different contexts To compare the effectiveness of the models and develop application guidelines appropriate to each context.

2) Teachers should study the integration of digital technology and artificial intelligence (AI) with learning management models. By analyzing the effects on the development of competency, intelligence (Literacy), the 4 characteristics (4Cs) and the academic achievement of students. To be consistent with learning in the 21st century

3) Executives should research and monitor long-term results. (Longitudinal Study) to study the durability of competencies and changes in intelligence, four characteristics, and the ability to apply knowledge of students after using the learning management model. Including studying the factors that affect the success of using the model in educational institutions.

REFERENCE

- Ministry of Education. (2022). Report on the Implementation of Educational Reform under the National Reform Plan. Ministry of Education. Competency-Based Curriculum Development Project (CBE Thailand).
- Office of the Secretariat of the Council of Education. (2019). Core Competency Framework for Learners at the Basic Education Level. Ministry of Education.
- Office of the Secretariat of the Council of Education. (2023). Understanding Competencies Simply for the Public and Understanding the Competency-Based Curriculum Simply for Teachers, Administrators, and Educational Personnel (Revised Edition). Ministry of Education.
- Office of the Secretariat of the Council of Education. (2024). Report on the Development of Competency-Based School Curriculum. Ministry of Education.
- Cardona, M. A., Rodríguez, R. J., & Ishmael, K. (2023). Artificial intelligence and the future of teaching and learning. U.S. Department of Education.
- Extance, A. (2023). ChatGPT has entered the classroom: How LLMs could transform education. *Nature*, 623(7987), 474–476. <https://doi.org/10.1038/d41586-023-03507-3>
- Leadership Theory: A Different Conceptual Approach. *Journal of Leadership Education*, 17(2), 149-161.
- Mishra, P., Warr, M., & Islam, R. (2023). TPACK in the age of ChatGPT and generative AI. *Journal of Digital Learning in Teacher Education*, 39(4), 235–251.
- Organisation for Economic Co-operation and Development. (2019). OECD Learning Compass 2030: A series of concept notes. OECD Publishing.
- Organisation for Economic Co-operation and Development. (2019). OECD Learning Compass 2030. OECD Publishing.
- Organisation for Economic Co-operation and Development. (2023). OECD Digital Education Outlook 2023: Towards an effective digital education ecosystem. OECD Publishing. <https://doi.org/10.1787/c74f03de-e>
- Partnership for 21st Century Learning. (2019). Framework for 21st century learning definitions. Battelle for Kids.
- Romero, M., Heiser, L., & Lepage, A. (2023). Teaching and learning in the age of artificial intelligence. arXiv. <https://arxiv.org/abs/2303.06956>
- UNESCO. (2021). Recommendation on the ethics of artificial intelligence. UNESCO.
- UNESCO. (2023). Guidance for generative AI in education and research. UNESCO.
- United Nations Educational, Scientific and Cultural Organization. (2021). Reimagining our futures together: A new social contract for education. UNESCO.
- Viberg, O., Cukurova, M., Feldman-Maggor, Y., et al. (2023). What explains teachers' trust of AI in education across six countries? arXiv. <https://arxiv.org/abs/2312.01627>
- Vincent-Lancrin, S., & van der Vlies, R. (2020). Trustworthy artificial intelligence (AI) in education: Promises and challenges (OECD Education Working Paper No. 218). OECD Publishing. <https://doi.org/10.1787/a6c90fa9-en>