

# A Model of Professional Learning Community of Teachers' Learning Management by Using Digital Technology in Basic Educational Institutions

รูปแบบชุมชนแห่งการเรียนรู้ทางวิชาชีพด้านการจัดการเรียนรู้ของครูโดยใช้เทคโนโลยีดิจิทัลในสถานศึกษาขั้นพื้นฐาน

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## Abstract

This research proposed a model of a professional learning community (PLC) of teachers' learning management using digital technologies in basic educational institutions. The researchers divided the research study into four phases. Phase 1 studied current conditions and problems of professional learning community management of teachers' learning management using digital technology in basic educational institutions. The sample included 118 school administrators or academic professional teachers. For Phase 2, the researchers designed a model for digital technologies. Twelve specialists evaluated this model. Next, Phase 3 implemented the model. Finally, in Phase 4, twenty-one experts and participants evaluated the model. The research instruments consisted of a questionnaire, an interview form, and an evaluation form. Research statistics included mean and standard deviation.

The research results revealed that the overall current conditions using technology in PLC were at a high level and the essential problems using technology in PLC were at a moderate level. The results of the design of a model using digital technologies consisted of five components. According to the experiment in the educational institution, it was found that administrators, teachers, and personnel could access the PLC conveniently and quickly from any location simultaneously and the overall satisfaction with the model was at the highest level. Moreover, the results of the overall evaluation of the model regarding suitability, possibility, and profitability of the model were at the highest level.

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### **บทคัดย่อ**

บทความวิจัยนี้มีวัตถุประสงค์เพื่อนำเสนอรูปแบบชุมชนแห่งการเรียนรู้ทางวิชาชีพด้านการจัดการเรียนรู้ของครูโดยการใช้เทคโนโลยีดิจิทัลในสถานศึกษาขั้นพื้นฐาน ประกอบด้วยการศึกษา 4 ระยะเวลา ดังนี้ ระยะเวลา (1) ศึกษาสภาพปัจจุบัน สภาพปัญหาชุมชนแห่งการเรียนรู้ทางวิชาชีพด้านการจัดการเรียนรู้ของครูโดยการใช้เทคโนโลยีดิจิทัลในสถานศึกษาขั้นพื้นฐาน จำนวน 118 คน จากผู้บริหารหรือหัวหน้างานบริหารงานวิชาการ ระยะเวลา (2) สร้างรูปแบบการใช้เทคโนโลยีดิจิทัลโดยผู้เชี่ยวชาญในการตรวจสอบและประเมิน จำนวน 12 คน ระยะเวลา (3) การทดลองใช้รูปแบบจำนวน 1 สถานศึกษา ระยะเวลา (4) ประเมินรูปแบบโดยผู้ทรงคุณวุฒิและผู้มีส่วนเกี่ยวข้องจำนวน 21 คน เครื่องมือประกอบด้วย แบบสอบถาม แบบสัมภาษณ์ และแบบประเมิน สถิติในการวิจัยประกอบด้วย ค่าเฉลี่ยและส่วนเบี่ยงเบนมาตรฐาน

ผลการวิจัย พบว่า สภาพปัจจุบันมีการใช้เทคโนโลยีในการ PLC โดยรวมอยู่ในระดับมาก และสภาพปัญหาด้านการใช้เทคโนโลยีในการ PLC โดยรวมอยู่ในระดับปานกลาง ผลของการสร้างรูปแบบของการใช้เทคโนโลยีดิจิทัลประกอบด้วย 5 องค์ประกอบ จากการทดลองใช้ในสถานศึกษา พบว่าผู้บริหาร ครู และบุคลากรสามารถเข้าถึงชุมชนแห่งการเรียนรู้ทางวิชาชีพได้สะดวกรวดเร็วทุกสถานที่ในเวลาเดียวกัน และมีความพึงพอใจต่อรูปแบบโดยรวมอยู่ในระดับมากที่สุด นอกจากนั้นผลการประเมินรูปแบบความเหมาะสมความเป็นไปได้ และความเป็นประโยชน์รูปแบบโดยรวมอยู่ในระดับมากที่สุด

**คำสำคัญ:** ชุมชนแห่งการเรียนรู้ทางวิชาชีพ การจัดการเรียนรู้ เทคโนโลยีดิจิทัล รูปแบบ

### **Introduction**

The current development of educational management is a significant advance in digital technology, driven by innovations that rapidly transform these technologies. This situation impacts teaching and learning in classrooms and cooperating between teachers and school administrators, teachers and teachers, and teachers and students. The use of media and information in educational management is a critical element in this digital era. Leenaraj (2017) stated that today's society has transitioned into a knowledge-based society where people use their knowledge to work. A key characteristic of these workers is their readiness to learn continually. Essential skills in the digital age include communication skills through information technology and information literacy skills. These skills are critical and facilitate coordination and the use of shared knowledge databases in administrators' and teachers' work within educational institutions.

When teachers manage learning, one of the important elements is collaboration for team building to create a professional learning community (PLC), Panich (2012) stated that the PLC is a revolution of the structure, work systems, and work culture within schools, transforming from an individualistic approach to a team-based system or a collective culture. For the structure of work systems, Panto (2020) addressed creating a learning community where people share experiences and challenges in the classroom to find solutions, including innovation for teaching. Learning using technologies is the best solution for managing the PLC for effective results. In addition, Panto pointed out that this methodology also addresses the problem accurately and effectively.

The process of managing PLC serves as a crucial platform for sharing knowledge and solving problems in educational management. In addition, this method also prepares for building a society of sharing important experiences among teams, coaches, fellow teachers, and school administrators. This approach is aligned with the strategies for developing teachers who dare to think and do and are skillful in problem-solving. This approach involves adjusting the previous method and process for solving the problem to the new one. In addition, this method of solving the problem aligns with Thitadhammo (2022), who stated that PLC results in collaboration and shared vision, focusing on student learning, learning, professional development, and a caring community. This collaboration reflects the teachers' and students' shared leadership in working as a team, committed to learning, self-development, and professional development with better results, keeping up with current global advancement. Because of the COVID-19 pandemic, full-scale learning was not effectively conducted in educational management. As a result, learning was not effective during the pandemic. Additionally, multiple issues related to classroom management arose. When teachers cannot manage the students' learning in their classroom, online learning emerged as the best solution to address this challenge.

In the global context of the COVID-19 crisis that schools previously experienced, school administrators and teachers had to adapt different communication methods for managing their schools. The Ministry of Public Health classified COVID-19 as a severe and dangerous infectious disease under the Communicable Disease Act B.E. 2558 (A.D. 2015). The Ministry of Public Health (2015) identified Thailand as one of the countries facing challenges with this communicable disease, which could spread domestically and internationally. The outbreak highlighted multiple issues such as disparities in living conditions, the readiness of risk management systems, and the impacts on education, including teaching management and administration within educational institutions. Many schools adopted digital technologies to address these challenges in the education system, and their use facilitated smoother education management.

Previous research demonstrated the use of digital technologies in managing various aspects of educational institutions. Digital technologies stand out for their communication capabilities and collaboration for developing PLC. However, no clear model has been developed for implementation in educational institutions. Therefore, the researchers were interested in investigating a model for a professional learning community (PLC) of teachers' learning management using digital technology in basic educational institutions under the Inspection Cluster 14. This research aimed to provide a framework for schools and other relevant institutions to apply digital technologies in managing PLC to create an excellent model school of PLC in the future.

## **Objectives**

1. To study current conditions and problems of professional learning community management of teachers' learning management using digital technology in basic educational institutions.
2. To design a model for professional learning community management of teachers' learning management using digital technology in basic educational institutions.
3. To implement the model of professional learning community management of teachers' learning management using digital technology in basic educational institutions.
4. To evaluate the model of professional learning community management of teachers' learning management using digital technology in basic educational institutions.

## Literature Review

### The Study of Concepts Regarding the Model

Khaemmanee (2012) identified four components of a model: 1) the objective of the model, 2) the fundamental concepts of the model, 3) the process of the model, and 4) the outcomes of applying the model. Chomchuan (2012) stated that an effective model of participatory academic administration involving the community in educational institutions consists of six components. These components include 1) the principles of the model, 2) the objectives, 3) the operational mechanisms, 4) implementation, 5) evaluation, and 6) conditions for success. Therefore, in summary, the components of the model include 1) the objectives of the model, 2) the principles of the model, 3) the implementation of the model, 4) the conditions for applying the model, and 5) the model evaluation guidelines.

### The Study of Principles Regarding Professional Learning Communities

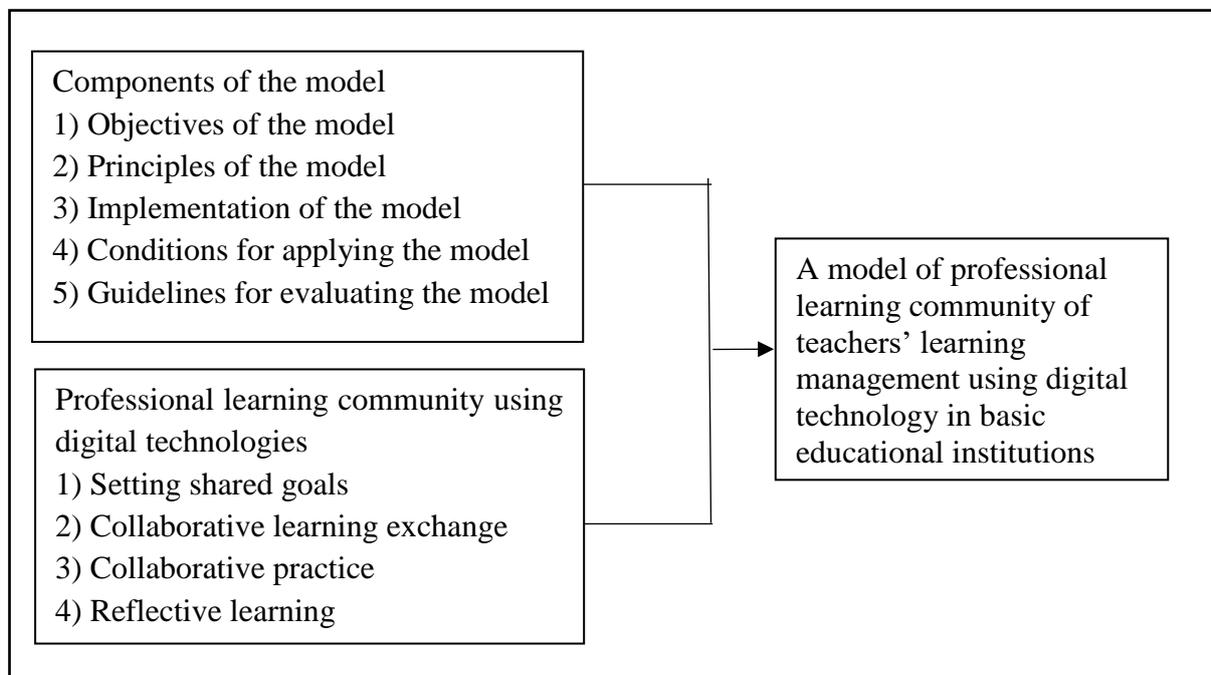
DuFour (2010) stated that a professional learning community is a group of individuals who share a common goal and engage in mutual learning on topics of shared interest, particularly in the continuous development of education. This development promotes knowledge-seeking and acquiring and developing how to work continuously.

For the definition of a professional learning community, Panich (2012) stated that “a professional learning community is a gathering of teachers within a school or educational service area to exchange and learn teaching methods that enable students to acquire life skills in the 21st century”. Therefore, the process of the PLC using digital technologies consists of 1) setting shared goals, 2) mutual knowledge exchange, 3) collaborative practice, and 4) reflective learning.

According to the study of concepts regarding patterns and the principles of professional learning communities, the current research conceptual framework consisted of components of the model, PLC using digital technologies as shown in Figure 1.

### Figure 1

*Research Conceptual Framework*



*Note.* This figure shows the conceptual framework of a model of PLC of teachers' learning management using digital technology in basic educational institutions.

## **Research Methodology**

This study focused on the development of PLC for teachers in three main areas of instructional management: 1) Design and Implementation of Learning Activities 2) Educational Technology and Learning Environment, and 3) Assessment and Evaluation of Learning Outcomes. The research was conducted in four phases as follows.

**Phase 1:** The researchers studied the current conditions and problems of professional learning community management of teachers' learning management using digital technology in basic educational institutions.

1.1. Literature Review: This literature review involved studying theories and research related to the establishment of PLC for teachers' instructional management using digital technologies in basic educational institutions. The objective was to formulate an initial conceptual framework for the research, focusing on the components and processes of creating professional learning communities.

1.2. Current Situation and Challenges: This step investigated the current situation and challenges in establishing PLC for teachers' instructional management using digital technology in basic educational institutions.

**Population:** The population included 164 school administrators or heads of academic affairs in secondary education offices within Government Inspection Area 14 in the academic year of 2022.

**Sample Group:** The sample group included 164 school administrators or heads of academic affairs in secondary education offices within Government Inspection Area 14 in the academic year of 2022. The sample size was determined using a percentage of the population according to Krejcie and Morgan's table (Krejcie & Morgan, 1970).

The proportions were distributed across four provinces: 1) Forty people from Sisaket Province; 2) Twenty people from Yasothon Province; 3) Forty-two people from Ubon Ratchathani Province; and 4) Sixteen people from Amnat Charoen Province. The total population was 118 people, selected using stratified random sampling.

**Research Instrument:** The research instrument consisted of a questionnaire designed to assess the current situation and challenges of PLC for teachers' instructional management using digital technology in basic education institutions.

**Instrument Quality Assessment:** Five experts, including university professors, school administrators, education supervisors, and teachers evaluated the quality of the instrument. The researchers presented the questionnaire to the experts. The experts reviewed the content validity of the questionnaire. Finally, the researchers analyzed the content validity based on the experts' feedback.

1.3. Site Visits: The study included site visits to educational institutions recognized for excellence in implementing PLC for teachers' instructional management using digital technology. The researchers administered the structured in-depth interviews with school administrators, deputy directors of academic affairs, or heads of academic management who have expertise and experience in PLC using digital technology. These institutions were selected through purposive sampling from three schools, including one large school, one medium school, and one small school. These schools were not included in the sample group in the current conditions and challenges in establishing PLC for teachers' instructional management using digital technology.

**Research Instrument:** The instrument used in this research study included an interview guide designed to explore the model of PLC for teachers' instructional management using digital technology in basic education institutions.

1.4. Data Collection and Synthesis: The researchers collected data from Phase 1 for synthesizing a model that would be used for the model in Phase 2 of the study.

**Phase 2:** The researchers created a model for PLC management of teachers' learning management using digital technology in basic educational institutions.

2.1. The researchers created a draft of a model for PLC management of teachers' learning management using digital technology in basic educational institutions based on the synthesized model from Phase 1. The components of the drafted model included:

1) principles of the model, 2) objectives of the model, 3) implementation of the model, 4) conditions for applying the model, and 5) guidelines for evaluating the model. The process of implementing the model consisted of four main processes: 1) Setting shared goals, 2) collaborative learning exchange, 3) collaborative practice, and 4) reflective learning. This model was used for PLCs for teachers' instructional management in three areas: 1) design and implementation of learning activities, 2) educational technology and learning environment, and 3) assessment and evaluation of learning outcomes.

2.2. The researchers conducted a seminar based on connoisseurship to evaluate the suitability and feasibility of the model. The participants included 12 scholars, education administrators, school administrators, and teachers.

2.3. The researchers revised and improved the model based on the recommendations provided by the experts to enhance its completeness.

2.4. The researchers created a manual based on the contents related to the model. This manual was used as a guideline for implementing the PLC model for teachers' instructional management using digital technology in basic education institutions in Phase 3.

2.5. The researchers then evaluated the suitability of the manual according to the model of PLC for teachers' instructional management using digital technology in basic education institutions. Twelve scholars, education administrators, and school administrators evaluated this manual.

2.6. Finally, the researchers revised the manual according to the expert recommendations to further enhance its completeness.

**Phase 3:** The researchers tested the model of PLC management of teachers' learning management using digital technology in basic educational institutions. The pilot test was conducted with one specifically selected school that has a well-established digital technology setting. The target group for the pilot included 40 school administrators and teachers who were proficient in using digital technology. The trial took place from November 2023 to January 2024. The involved procedures are as follows:

1) Defining the Target Group: The researchers identified the target group for the pilot test of the PLC model for teachers' instructional management using digital technology in basic education institutions.

2) Creating Understanding: The researchers provided guidance and explanations on how to implement the model according to the established procedures.

3) Conducting the Pilot Test: The researchers implemented the PLC model according to the guidelines in the Phase 2 manual.

The instrument used included the evaluation form of the model implementation results. The evaluation involved calculating the mean ( $\bar{x}$ ) and standard deviation (S.D.) based on predefined criteria.

**Phase 4:** The researchers evaluated the model of PLC management of teachers' learning management using digital technology in basic educational institutions.

Twenty-one school administrators, teachers, and experts evaluated the model of PLC of teachers' learning management using digital technology in basic educational institutions. These participants were in two groups: 1) Stakeholders in the schools implementing the model (eleven people who were directly involved with the implementation of the model in their institutions) and 2) Experts (Ten experts with knowledge and expertise in school administration).

The evaluation tool consisted of a questionnaire for evaluating the suitability, feasibility, and usefulness of the model in terms of its implementation, operation, and outcomes. The questionnaire included a 5-point Likert scale (Level 5 indicates the highest level; Level 4 indicates a high level; Level 3 indicates a moderate level; Level 2 indicates a low level; and Level 1 indicates the lowest level). Data analysis consisted of calculating the mean ( $\bar{x}$ ) and standard deviation (S.D.) (Srisaard, 2002).

## Findings

The findings of the study according to the first objective showed the current conditions of PLC management of teachers' learning management using digital technology in basic educational institutions. The study found that the overall current state of technologies use in PLC was at a high level ( $\bar{x}=4.00$ , S.D.= 0.89). When considering individual aspects, it was found that the aspect with the highest average score was collaborative learning exchange ( $\bar{x}=4.02$ , S.D.= 0.90), collaborative practice ( $\bar{x}=4.01$ , S.D.= 0.89), and setting shared goals ( $\bar{x}=3.99$ , S.D.= 0.90). The aspect with the lowest average score was reflective learning ( $\bar{x}=3.97$ , S.D.= 0.87).

For the problems in using technologies in PLC, the results showed a moderate level ( $\bar{x}=2.63$ , S.D.= 0.80). When considering individual aspects, the aspect with the highest average score was collaborative learning exchange ( $\bar{x}=2.65$ , S.D.= 0.77), followed by setting shared goals ( $\bar{x}=2.64$ , S.D.= 0.78), reflective practice ( $\bar{x}=2.62$ , S.D.= 0.84), and the lowest average score was collaborative practice ( $\bar{x}=2.32$ , S.D.= 0.83).

The synthesis of the model components from the study of the current state and problems of technology use in PLC revealed that the model consisted of five components: 1) the principles of the model, 2) the objectives of the model, 3) the implementation of the model, 4) the conditions for applying the model, and 5) the guidelines for evaluating the model.

The results of current conditions of problems revealed that digital technologies were used through platforms, applications and social media as tools to facilitate the PLC process in schools to increase modernity and efficiency in all aspects (shared goals, collaborative learning exchange, collaborative practice, and reflective learning). Particularly, the support from school administrators in managing technology systems and internal communication networks effectively was fundamental for social media use among school personnel, aiming to modernize and enhance the efficiency of work processes or organizational systems. This action is critical because the world is rapidly changing and digital technologies significantly influence living and working.

The study of problems in technology use within PLC highlighted the necessity of establishing a stable and comprehensive network infrastructure to ensure access to reliable networks. This study also emphasized the importance of promoting expertise and diversity in the use of platforms, applications and social media for presenting information, exchanging information, and communication among teachers and educational personnel.

The findings, according to the second objective revealed that a model of PLC management of teachers' learning management using digital technology in basic educational institutions consisted of five components (See Table 1).

**Table 1**

*The Components of a Model of PLC of Teachers' Learning Management Using Digital Technology in Basic Educational Institutions*

The Components of the Model	Subcomponents of the Model
1. Principles of the Model	<ul style="list-style-type: none"> <li>- Principles of participation in a PLC in schools for developing administrators, teachers, and educational personnel to enhance the ability to use digital technologies within the schools.</li> <li>- Principles of applying digital technologies to drive PLC for teacher instructional management in schools.</li> </ul>
2. Objectives of the model	<ul style="list-style-type: none"> <li>- To provide guidelines for administrators, teachers, and educational personnel involved with PLC to implement technologies in the PLC process.</li> <li>- To enhance the effectiveness of PLC in teacher instructional management within schools.</li> </ul>
3. Components of the Model	<ul style="list-style-type: none"> <li>- Setting shared goals</li> <li>- Collaborative learning exchange</li> <li>- Collaborative practice</li> <li>- Reflective learning</li> </ul>
4. Evaluating the Model	<ul style="list-style-type: none"> <li>- Evaluating the skills for applying technology in PLC for instructional management within schools.</li> </ul>
5. Conditions for Success	<ul style="list-style-type: none"> <li>- Administrators, teachers, and educational personnel are involved and capable of using digital technologies in PLC.</li> <li>- Administrators, teachers, and educational personnel can adapt and apply digital technologies in schools while continuously driving the community forward</li> <li>- School administrators support the effective management of technology systems and communication networks within the school.</li> </ul>

The evaluation results of the draft of the model of PLC management of teachers' learning management by using digital technology in basic educational institutions revealed that the overall model was highly appropriate ( $\bar{x}= 4.44$ , S.D.= 0.57). When considering individual aspects, regarding the appropriateness of the model, the highest average score was the conditions for success ( $\bar{x}= 4.48$ , S.D.= 0.63), followed by components of the model ( $\bar{x}= 4.45$ , S.D.= 0.52) and the evaluation guidelines for the model ( $\bar{x}= 4.41$ , S.D.= 0.84). The lowest average scores were the principles of the model ( $\bar{x}= 4.36$ , S.D.= 0.67) and objectives of the model ( $\bar{x}= 4.36$ , S.D.= 0.67). Regarding the feasibility of the model, the model was very feasible ( $\bar{x}= 4.53$ , S.D.= 0.57). The highest average score was the conditions for success ( $\bar{x}= 4.58$ , S.D.= 0.63), followed by components of the model ( $\bar{x}= 4.55$ , S.D.= 0.52), evaluation

of the model, ( $\bar{x}$ = 4.50, S.D.= 0.69) and principles of the model ( $\bar{x}$ = 4.50, S.D.= 0.69) respectively. The lowest average score was the objectives of the model ( $\bar{x}$ = 4.36, S.D.= 0.67).

The findings from the third research objective indicated the trial implementation of a model of PLC management of teachers' learning management by using digital technologies in basic educational institutions as follows:

3.1. The implementation of a model of PLC management of teachers' learning management using digital technologies in basic educational institutions enabled administrators, teachers, and school personnel to easily and quickly access the PLC from any location simultaneously. This approach allowed them to express opinions, present information, and collaboratively analyze data, as well as effectively share and exchange knowledge. It could be implemented in parallel with the traditional PLC model while modernizing the process to keep pace with changes, and reducing redundant tasks through an internet-based data collection system. This system helped conserve resources and reduced the risk of data loss due to damage to storage devices.

3.2. The satisfaction evaluation of a model of professional learning community management of teachers' learning management using digital technologies in basic educational institutions showed that overall satisfaction was high ( $\bar{x}$  = 4.45, S.D. = 0.65). When considered by specific aspects, the highest satisfaction was found in the aspect of collaborative learning exchange ( $\bar{x}$  = 4.58, S.D. = 0.53), followed by of reflective learning ( $\bar{x}$  = 4.53, S.D. = 0.68), collaborative practice ( $\bar{x}$  = 4.48, S.D. = 0.69), and setting shared goals ( $\bar{x}$  = 4.23, S.D. = 0.70), respectively.

The findings from the fourth research objective showed the evaluation of a model PLC management of teachers' learning management using digital technology in basic educational institutions by 21 school administrators, teachers, and experts. The results indicated that the overall evaluation of the model's suitability, feasibility, and usefulness was at the highest level ( $\bar{x}$  = 4.78, S.D. = 0.43). When considering each aspect individually, the overall suitability was at the highest level ( $\bar{x}$  = 4.73, S.D. = 0.46); the overall feasibility was also at the highest level ( $\bar{x}$  = 4.76, S.D. = 0.46), and the overall usefulness was at the highest level ( $\bar{x}$  = 4.89, S.D. = 0.37) (See Table 2).

**Table 2**

*The Suitability, Feasibility, and Usefulness of a Model of Professional Learning Community Management of Teachers' Learning Management Using Digital Technologies in Basic Educational Institutions.*

Evaluation Criteria	$\bar{X}$	S.D.	level
<b>Suitability</b>			
– This model is suitable to be used as a guideline for managing a learning community using digital technologies in basic education institutions.	4.81	0.43	highest
– This model aligns with the guidelines for managing a learning community using digital technology in basic education institutions.	4.81	0.43	highest
– This model specifies the components for managing a learning community using digital technologies in basic education institutions.	4.71	0.47	highest
– This model follows practical process steps.	4.71	0.47	highest

– The procedural steps of this model for implementation are clearly defined in practice.	4.62	0.50	highest
<b>Total</b>	<b>4.73</b>	<b>0.46</b>	<b>highest</b>
<b>Feasibility</b>			
– This model can be appropriately applied in real school situations.	4.81	0.43	highest
– The model is accepted and practical for implementation.	4.62	0.51	highest
– It is feasible for basic education institutions to adopt this model.	4.81	0.43	highest
– The model is beneficial for basic education institutions.	4.81	0.47	highest
<b>Total</b>	<b>4.76</b>	<b>0.46</b>	<b>highest</b>
<b>Usefulness</b>			
– Applying this model will enhance the effectiveness of managing a learning community using digital technologies in basic education institutions.	4.90	0.36	highest
– Implementing this model results in beneficial outcomes for managing a learning community using digital technologies in basic education institutions at each step.	4.95	0.27	highest
– Reports on the results from applying this model will serve as a guideline for managing a learning community using digital technologies in basic education institutions.	4.81	0.47	highest
<b>Total</b>	<b>4.89</b>	<b>0.37</b>	<b>highest</b>
<b>Overall total</b>	<b>4.78</b>	<b>0.43</b>	<b>highest</b>

## Discussion

1. The overall current conditions using technology in PLC were at a high level. Specifically, the aspect with the highest average rating was collaborative learning exchange, which aligns with Pewdum's (2021) study. Pewdum stated that PLC is an essential tool for driving student learning. These communities involve groups of two or more individuals who share a common vision and engage in academic knowledge exchange, teaching innovations, and instructional management techniques. They operate with a professional work process. The study demonstrates that knowledge sharing is the most crucial element in the PLC process using digital technology.

The present study found that the current state and problem of PLC using digital technologies in basic education institutions was at a moderate level. The overall problem with using technologies in PLC was at a moderate level. This is a collaborative learning exchange, which is hindered by a lack of proficiency in using technologies within the PLC. This finding aligns with Apiparinya's (2019) study which noted that one of the most significant problems in implementing PLC is the lack of knowledge and understanding of PLC among administrators and teachers. This issue leads to inaccuracies in the process of establishing PLC in schools. The study suggests that there should be efforts to build understanding and proficiency in using digital technology for effective knowledge sharing within PLC.

2. A model of PLC of teachers' learning management using digital technologies in basic educational institutions includes four key driving processes: 1) setting shared goals; 2) collaborative learning exchange; 3) collaborative practice; and 4) reflective learning. When comparing the use of technologies to advance the PLC in teaching management with the research of Thanachotekitkuekool (2020), who studied the management model of professional learning communities in the digital era, it is evident that there are similar processes.

Thanachotekitkuekool's study identified six components: 1) creating shared norms and values; 2) jointly setting goals and taking responsibility for student learning; 3) engaging in collaborative efforts; 4) practicing reflection; 5) supporting the structure and relationships among individuals; and 6) promoting shared and supportive leadership. The processes of setting shared goals, collaborative knowledge exchange, joint practices, and reflective learning were found to be aligned with these components.

3. The researchers divided the results of the pilot implementation of the PLC model for teaching management using digital technologies in basic education institutions into two main aspects as follows:

3.1. The pilot implementation of the PLC model for teaching management using digital technologies in basic education institutions revealed that administrators, teachers, and educational personnel could effectively drive the PLC process in all four aspects using digital technology. This result aligns with Thanachotekitkuekool's (2020) study which discussed the management of PLC in the digital era to enhance the quality of teaching and improve student achievement. The use of digital technologies in management processes, work, and communication with everyone rapidly and efficiently from any location is emphasized. In terms of technology utilization, schools could operate in parallel with traditional PLC while modernizing the process to keep pace with changes, reducing redundant tasks, and storing data through internet-based systems. This approach conserves resources and minimizes the risk of data loss due to hardware damage. This finding is consistent with Chaipalad's (2015) study investigating issues related to information technology in education management. Chaipalad's study also suggested that schools should encourage staff members to develop knowledge and skills in creating educational media and innovations. In addition, this study also suggested supporting staff members' understanding and use of computer networks and access to learning communities to facilitate their knowledge exchange and access to media and innovations that enhance teaching efficiency.

Similarly, Padiworn (2021) stated that developing digital technology skills demonstrates the ability to use current digital tools and technologies in professional tasks. Developing digital technology skills among school administrators includes four components to enhance the digital skills of government officials and public sector personnel: 1) Use; 2) Understanding; 3) Creation, and 4) Access.

3.2. Results of the evaluation of satisfaction with the use of a model of PLC of the teachers' learning management using digital technologies in basic educational institutions indicated that the overall satisfaction was at a high level. When considering each aspect individually, it was found that satisfaction with collaborative learning exchange was the highest, followed by the reflection on learning outcomes, collaborative practice, and setting shared goals, respectively. These results are consistent with the study of Chookamnerd et al. (2015) which stated that a collaborative team in learning exchange involves the development of a working group with a shared goal, mission, vision, and objectives, resulting in a common purpose for collaboration and achieving outcomes. It involves learning as a team based on joint thinking, shared understanding, joint planning, agreements, decision-making, practices, evaluations, and responsibilities.

4. Results of the evaluation of the suitability, feasibility, and usefulness of the PLC of teachers' learning management using digital technology in basic educational institutions showed the overall highest level. When considering each aspect individually, suitability, feasibility, and usefulness were the highest for all aspects of using digital technologies in the PLC model for teachers. This is because the incorporation of digital technologies into the PLC model contributed to conducting activities quickly, timely, and accurately. This result aligns with Intaramanee's (2019) study which showed that digital technologies allow school administrators to promote and support teachers in using technologies for teaching and learning,

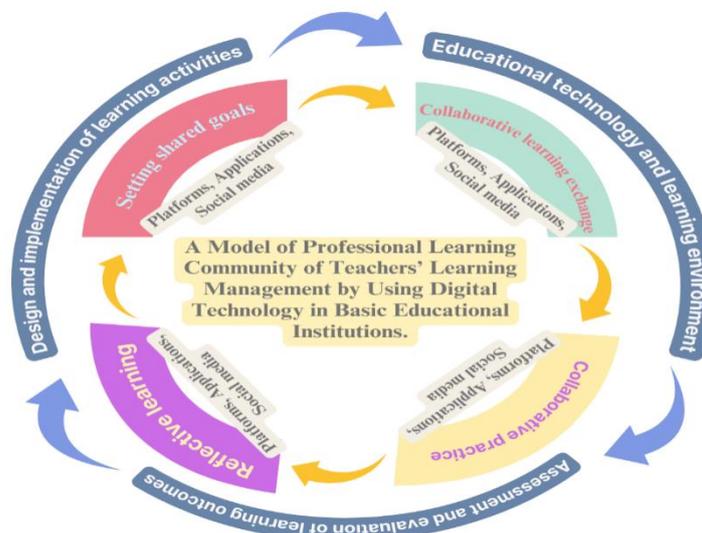
and for researching and developing their knowledge. Additionally, this condition enables the use of technologies for school management, including setting the vision, mission, and goals of school education, having clear management plans, and establishing infrastructure related to location, equipment, and personnel development.

The result is also consistent with PhraSaroj Dhtrabhaddo Nimniam's (2018) study which noted that technologies and learning innovations in the digital age involve technologies related to data management—creation, analysis, processing, storage, retrieval, and systematic reuse using principles and innovative media technologies through communication networks.

According to the present study's results of a model of PLC of teachers' learning management using digital technology in basic educational institutions, the components of the research model are summarized in Figure 2.

**Figure 2**

*Summary of the Components of the Model*



*Note.* This figure shows the components of the model of PLC of teachers' learning management using digital technologies in basic educational institutions.

The study of a model of PLC of teachers' learning management using digital technologies in basic educational institutions comprised five key components as follows:

- 1) Principles of the model
- 2) Objectives of the model
- 3) Implementation of the model that consists of four main processes: setting shared goals, collaborative learning exchange, collaborative practice, and reflective learning to be implemented in PLC on teacher learning management in three aspects (design and implementation of learning activities; educational technologies and learning environment; and assessment and evaluation of learning outcomes).
- 4) Conditions for applying the model
- 5) Guidelines for evaluating the model using digital technologies through applications and social media

## Recommendations

### 1. Recommendations for Implementation

1.1. Awareness and Understanding: School administrators or those responsible for the PLC should ensure that all teachers and educational staff understand the integration of technologies in the school setting.

1.2. Combining Digital and Face-to-Face Processes: The implementation of the PLC process using digital technology should be complemented with face-to-face meetings to maximize effectiveness.

1.3. Policy Development: Educational districts should establish policies for integrating technology into school management to ensure efficient operation alongside traditional management practices.

### 2. Recommendations for Future Research

2.1. Effective Technology Use: Future research should explore models of effective technology use in school management.

2.2. Excellence in Digital Era Management: Future research should investigate strategies for outstanding school management in the digital age.

2.3. Technologies: Future research should study multiple technologies, such as school management systems, information systems used in schools, and other applications. Additionally, the administrators should conduct internal supervision to gather data on PLC related to teacher learning management more effectively.

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