



Mentoring Model through Professional Learning Community with Information and Communication Technology via Cloud Computing for Pre-Service Teachers

Danaisak Karo* and Thanongsak Sovajassatakul

Department of Industrial Education, Faculty of Industrial Education and Technology

King Mongkut's Institute of Technology Ladkrabang, Ladkrabang, Bangkok 10520, Thailand

*Corresponding author. E-Mail address: kdanaisak@pkru.ac.th

Received: 13 February 2020; Revised: 19 April 2020; Accepted: 27 April 2020

Abstract

This study aims to (1) develop mentoring model through Professional Learning Community (PLC) with Information and Communication Technology (ICT) via Cloud Computing for pre-service teachers and (2) evaluate an appropriateness of the mentoring model through PLC with ICT via Cloud Computing for pre-service teachers. Seven information technology and education experts selected by purposive sampling method were participate in the study. Moreover, they evaluated the appropriate of the design and provided suggestions. The research instruments used were: (1) a draft of Mentoring model through PLC with ICT via Cloud Computing for pre-service teachers' model. (2) an appropriate evaluation forms. Data analysis was done by mean (\bar{X}), standard deviation (S.D.), and content analysis. From the results research, the draft of model was found to be high appropriate ($\bar{X} = 4.15$, S.D.= 0.38). A model for mentoring through PLC in 6 steps was obtained, including community, analysis, design, practice, reflection and evaluation. All these steps have been operated with the ICT system via Cloud Computing including E-Management, E-Meeting, E-Coaching and Mentoring, E-Documents, and E- Evaluation.

Keywords: Professional Learning Community, Online Mentoring, Information Communication Technology via Cloud Computing, Pre-Service Teachers

Introduction

The processes of pre-service teacher production and development have been operated based on the applied notions and regulations to support and develop skills of pre-service teachers needed for becoming a professional teacher in the future. Currently, the concept of professional learning community is widely accepted among teachers in Thailand and other countries as an effective innovation for developing teacher profession (Lee & Lee, 2018; Penner-Williams, Díaz, & Worthen, 2017). To be more specific, teachers in Finland will spend a half of a day of each week to collaborative discuss and identify problems on teaching and learning management and learning of the students, and they will collaboratively find the solutions of the problems. In Singapore, there is a **Teacher Network** system which reflects the life- long collaborative learning of teachers in attempting to improve the educational quality. They believed that the teacher network can encourage and support teacher learning and development continuously (Tangkitvanich et al., 2013). The Professional Learning Community (PLCs) is a discussion group of the educational personnel with aims to support teacher professional development and improve learning proficiency level of learners. Those educational personnel have gathered into groups to co-design lesson plans, and follow-up teaching and learning management outcome evaluation of teachers from local people conventions professionally (Blitz, 2013), but the problem of most PLC are travel distance and time of members (Wang et al., 2017; Giglio & Palmieri, 2017; Tang & Lam, 2014; Lim & Lee, 2014).

In Thailand, there has been a growing emphasis on the creation of Professional Learning Community (PLC) among groups of educational personnel from Rajabhat universities across Thailand. Those universities specifically produce and develop pre-service teachers to support schools in the country. They have brought the



concept of PLC into one of new university policies of local community development within 20 years (2017–2036). It is mentioned in the second university policy issue: teacher production and development. The universities will develop teacher and educational personnel qualities by using the Coaching and Mentoring, and Professional Learning Community (PLC) systems. To response to this policy, the faculty of Education of Phuket Rajabhat University has assigned pre-service teachers who were attending the internship course to be a part of the PLC meetings. They have to make a note of meeting results (Teacher Training Center, Faculty of Education, Phuket Rajabhat University, 2017). It has been found that time and distance made the university supervisor unable to attend the PLC meetings. This caused the lack of an expert to give students feedbacks and suggestions on their teaching and learning management. Blitz (2013) and other researchers have noted that the significant elements of PLCs are time, content knowledge of members, teaching experiences and other relevant experiences and skills.

At present, the Information and Communications Technology (ICT) has become the significant part of a borderless education. This is in accordance with the concept of teaching and learning in the 21st century which emphasises on the integration of ICT with administrative management or teaching and learning management especially the use of internet system to facilitate teacher – learner communication, and search for the information without any limitations. This leads to the capability to works on the internet system in the form of Cloud Computing of a computer system (Wangthong & Wannapiroon, 2013). The Cloud Computing, for example, can be applied in the processes of long-distance supervising, information exchanging, coaching and mentoring, and online portfolios creating (Lim & Lee, 2014; Tang & Lam, 2014; Giglio & Palmieri, 2017; Wangthong & Wannapiroon, 2013; Thangkabut, 2012; Khlib-ngoen & Nillapun, 2015). Moreover, to develop teacher profession, online and hybrid PLC has also been employed as a more flexible channel for university supervisors and pre-service teachers to exchange information through the PLC system as concluded by Blitz in the report named “Can online learning communities achieve the goals of traditional professional learning communities? What the literature says” (Blitz, 2013, p. ii). Also, suggested that “As theory and Research evolve, more consideration should be given to how the key characteristics of the online environment can transform traditional PLCs”.

From the previous mentioned about the problems of teacher professional development and the benefits of ICT to teacher professional development, the researchers are interested in applying the professional learning community through the ICT into the internship procedure. The university supervisors could use the ICT as a channel to connect with pre-service teachers and solve the problems. The ICT could be an additional channel for collaborative learning through the professional learning community (PLC) system at any time and places. Also, it could be used as a guideline for other teacher training institutions to produce and develop their pre-service teachers to become professional teachers in the near future.

Research Objectives

1. To develop mentoring model through Professional Learning Community (PLC) with Information and Communication Technology (ICT) via Cloud Computing for pre-service teachers
2. To evaluate the appropriateness of the mentoring model through PLC with ICT via Cloud Computing for pre-service teachers.



Conceptual Framework

This research studied the principles, concepts, theories and related researches about Teacher Production and Development Standards, Professional Learning Community, Coaching and Mentoring through Information and Communications Technology via Cloud Computing. The study applied them to create the conceptual framework as follows:

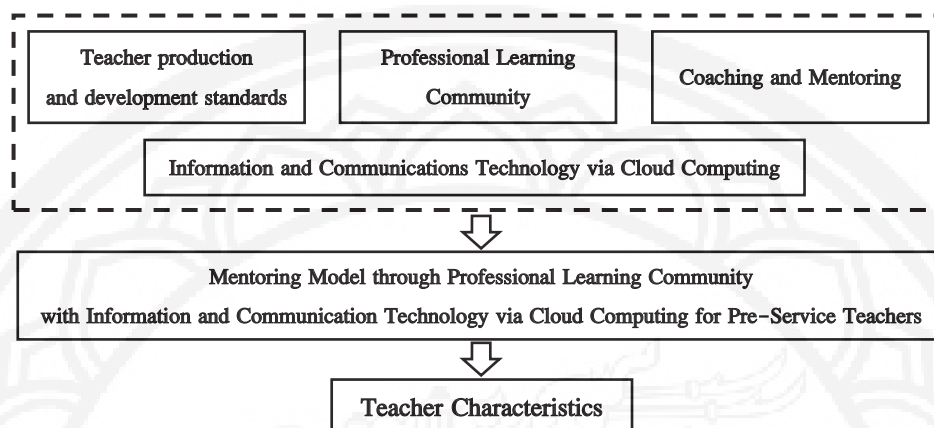


Figure 1 Conceptual Framework of the Study

Methods and Materials

The development of mentoring model through professional learning community with Information and Communication Technology via Cloud Computing for pre-service teachers is divided into two steps as follows:

Step 1: Develop the mentoring model framework through the PLC with the ICT system via Cloud Computing for pre-service teachers following these steps.

1. Study and analyze the document and research relevant to the mentoring procedure, the PLC and the Cloud on the ICT to synthesis and develop the model, and interview people involved in the pre-service teacher internship to identify problems and needs.

2. Develop the mentoring model through the PLC via the ICT on the Cloud for pre-service teachers following these steps.

- 1) **Community:** This step is the creation of group of people for collaborative learning. Those people include university supervisors, mentors and pre-service teachers. In the community, each member has an agreement on his/her roles and responsibilities.

- 2) **Analysis:** In this step, all the members have to think collaboratively and critically to find ways to solve teaching and learning management problems of pre-service teachers following an actual classroom context.

- 3) **Design:** To make the classroom management more effective, all the members collaboratively design classroom activities, lesson plans and classroom research in this step.

- 4) **Practice:** It is the step that allows the pre-service teachers to bring the designed activities and lesson plans into the actual classrooms, and there are other members to observe performance of the pre-service teachers and their classroom management and learners.



5) **Reflection:** In this step, all the community members hold meetings to reflect and analyze the results from the use of designed activities and lesson plans. This gives benefits to the next classroom teaching and learning management.

6) **Evaluation:** University supervisors and mentors evaluate the results of the mentoring model usage on pre-service teacher development intermittently.

The elements of information system of the mentoring model through the PLC with the ICT via Cloud Computing for pre-service teachers includes:

1) **E-Management:** It is used in the process of communication system, online group creation, presentation, and mentoring processes of university lecturers, mentors and pre-service teachers.

2) **E-Meeting:** This system is applied as a medium tool for holding online meetings of members through the synchronous PLC model.

3) **E-Coaching and Mentoring:** This system allows the university lecturers and mentors to give advice and suggestions about classroom teaching and learning management to pre-service teachers through the online asynchronous PLC system at any convenient time and place.

4) **E-Documents:** It helps the PLC members to manage the documents which allows the members to collaboratively work on the online PLC system.

5) **E-Evaluation:** This system works as an aid to gather the results of pre-service teachers' follow-up evaluation. This could help the university supervisors and the mentors to evaluate the pre-service teachers' actual characteristics in all needed aspects intermittently through the online system.

Step 2: In the evaluation of the appropriateness of mentoring model through the PLC with the ICT system via Cloud Computing for pre-service teachers, it has been carried out by proposing seven experts to engage in the group communication. These seven experts will evaluate the appropriateness of the use of the developed model and suggests methods for improvement. After that, the researchers take experts' suggestions into consideration to improve the appropriateness and quality of the model.

Results

According to the results in Step 1, the design of mentoring model through the PLC with the ICT system via Cloud Computing for pre-service teachers named "CADPRE Model" consists of six categories: (1) Community, (2) Analysis, (3) Design, (4) Practice, (5) Reflection, and (6) Evaluation. All these steps have been managed through the Clouds on the ICT system including (1) E-Management, (2) E-Meeting, (3) E-Coaching and Mentoring, (4) E-Documents, and (5) E-Evaluation as shown in Figure 2.

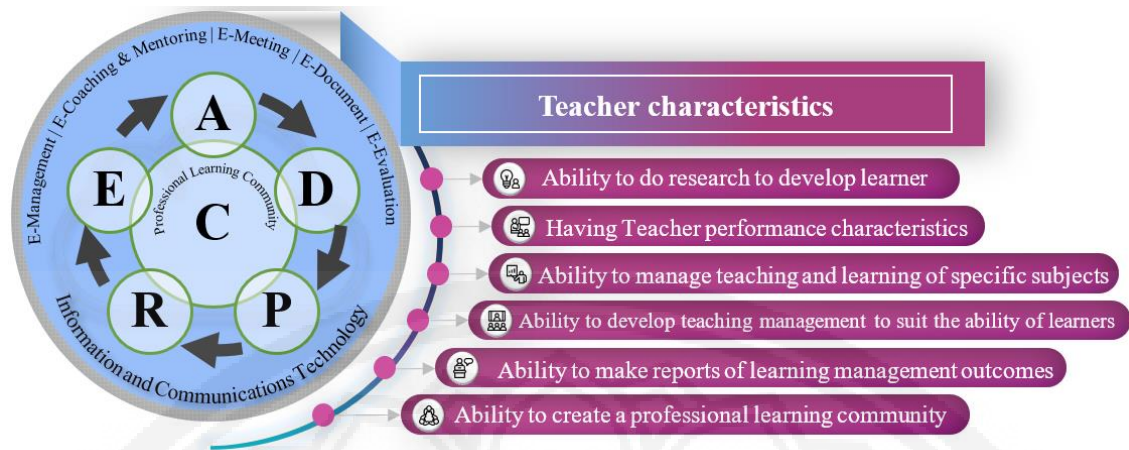


Figure 2 Mentoring Model through PLC with ICT via Cloud Computing for Pre-Service Teachers

In Step 2, the results of the appropriateness of the mentoring model through PLC with the ICT system via Cloud Computing for pre-service teachers from experts is shown in Table 1.

Table 1 Results for Appropriate Evaluation of the Model'S Draft

Lists of Items	Evaluation Results		
	\bar{X}	S.D.	Level
Community			
PLC group creation for pre-service teachers' supervisions	4.20	0.45	High
PLC members' role and responsibility assignment	4.00	0.71	High
Agreement on group activities	4.20	0.45	High
Online group creation for information exchange through the E-Management system	4.20	0.45	High
Total	4.15	0.34	High
Analysis			
Collaborative proposition of teaching and learning management problems	4.20	0.45	High
Collaborative discussions of existent problems and causes on teaching and learning management	4.20	0.45	High
Collaborative working to seek for problem solutions concerning the actual context of the classroom	4.20	0.45	High
Collaborative and analytical thinking through the synchronous E-meeting room	4.40	0.55	High
Collaborative and analytical thinking through the asynchronous E-Coaching and Mentoring	4.25	0.50	High
Record of analysis results through E-Documents, the online document management system	4.20	0.84	High
Total	4.24	0.43	High
Design			
Design Lesson plan, teaching method, learning activity and collaborative evaluation method designs based on the conclusions	4.40	0.55	High
Create Information, teaching and learning activity, and lesson plan with E-Documents via Cloud	4.00	0.71	High
Total	4.13	0.61	High

**Table 1** (Cont.)

Lists of Items	Evaluation Results		
	\bar{X}	S.D.	Level
Practice			
Implement the lesson plans usage in actual classrooms	4.20	0.84	High
Classroom observations and data collections of group members	4.40	0.55	High
Exchange ideas, reflective results and suggestions	4.40	0.55	High
Classroom observations through the synchronous E-meeting room	4.20	0.45	High
Classroom observations through the asynchronous E-Coaching and Mentoring	4.00	0.00	High
Result records from reflections, and suggestions through E-Documents, the online document management system	4.40	0.55	High
Total	4.28	0.45	High
Reflection			
A conclusion of results for publishing or improving regulations	4.20	0.45	High
Records through E-Documents, the online document management system	4.20	0.45	High
Reflective through the synchronous E-meeting room	4.20	0.45	High
Reflective thinking through the asynchronous E-Coaching and Mentoring	4.25	0.50	High
Total	4.21	0.33	High
Evaluation			
Evaluation of Pre-service teacher performance	3.50	0.58	High
Evaluation of Pre-service teacher performance evaluation through the E-Evaluation system	4.00	0.82	High
Total	3.75	0.65	High
Total Scores from All Steps	4.15	0.38	High

From Table 1, the experts' evaluation results regarding the appropriate of the model's draft at the high level respectively as follows. Practice ($\bar{X} = 4.28$) Analysis ($\bar{X} = 4.24$) Reflection ($\bar{X} = 4.21$) Community ($\bar{X} = 4.15$) Design ($\bar{X} = 4.13$) and Evaluation ($\bar{X} = 3.75$). Moreover, the overall average was at 4.15 and the Standard deviation was at 0.38 which elaborated that Mentoring Model through Professional Learning Community with Information and Communication Technology via Cloud Computing for Pre-Service Teachers were appropriate at the high level.

Discussion and Conclusion

From the study, develop mentoring model through Professional Learning Community (PLC) with Information and Communication Technology (ICT) via Cloud Computing for pre-service teachers consists of 6 steps as follows: 1) Community, 2) Analysis, 3) Design, 4) Practice, 5) Reflection, and 6) Evaluation. Consistent with the concept of the professional learning community process of Dachakupt & Yindeesuk (2017) as follows: Analyze, Plan, Do & See, Reflect and redesign through coaching and Mentoring. All these steps have been managed with the ICT system via Clouds Computing including 1) E-Management, 2) online E-Meeting, 3) E-Coaching and Mentoring, 4) E-Documents, and 5) E-Evaluation. Consistent with the research work of many researchers People who apply ICT in counseling students through the online PLC. For example, the use of the Facebook application as an online community and support online meetings, create e-portfolios, Blog-based to create online PLC, etc. (Blitz, 2013; Tang & Lam, 2014; Prenger, Poortman, & Handelzalts, 2017; Giglio & Palmieri, 2017; Lim & Lee, 2014).



The evaluation results from the experts revealed that the mentoring model has the appropriate score in using at the high level. Interestingly, in terms of the evaluation of pre-service teacher performance, it can be seen that the evaluation results are at the lowest level ($\bar{X} = 3.50$). This was because the evaluation might not have an effect on the online mentoring. Experts suggested that in the evaluation process, it should have clear tools and the evaluation of online mentoring success. This could be concluded that the model could be one of channels for university supervisors and mentors to give teaching management advice to pre-service teachers. It could solve the difficulties of time and distance of the university lecturers when visiting pre-service teachers at schools. It could prevent possible problems that could occur during the internship, classroom research conduct, and university supervisors' travel to the school. These are similar to the results of previous studies which investigated the problems of the supervision during the internship of pre-service teachers. The results from those previous studies (Sungpum & Jeerungsawan, 2017; Khlib-ngoen & Nillapun, 2015; Weahama, Kerdtip, & Sungtong, 2016) suggested that the university lecturers and mentors should use technology system to solve the supervision problems. For example, they should conduct research to study the usability of broadcast mentoring model to give advice to the pre-service teachers and information technology models and how to use them to support the supervision procedure.

References

- Blitz, C. L. (2013). *Can Online Learning Communities Achieve the Goals of Traditional Professional Learning Communities? What the Literature Says (REL 2013-003)*. Washington, DC: U.S.: Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Mid-Atlantic. Retrieved from <https://files.eric.ed.gov/fulltext/ED544210.pdf>
- Dachakupt, P., & Yindeesuk, P. (2017). *7C Skills of Teachers 4.0*. Bangkok: Chulalongkorn University Printing House.
- Giglio, C., & Palmieri, R. (2017). Analyzing Informal Learning Patterns in Facebook Communities of International Conferences. *Procedia-Social and Behavioral Sciences*, 237, 223-229. <https://doi.org/10.1016/j.sbspro.2017.02.067>
- Khlib-ngoen, W., & Nillapun, M. (2015). The Development of a Mentoring Social Media Technology Blended Model for Pre-Service Teachers Professional Experience Practices. *Silpakorn Educational Research Journal*, 7(1), 163-176.
- Lee, D. H. L., & Lee, W. O. (2018). Transformational Change in Instruction with Professional Learning Communities? The Influence of Teacher Cultural Disposition in High Power Distance Contexts. *Journal of Educational Change*, 19(4), 463-488. DOI: 10.1007/s10833-018-9328-1
- Lim, C. P., & Lee, J. C.-K. (2014). Teaching E-Portfolios and the Development of Professional Learning Communities (PLCs) in Higher Education Institutions. *The Internet and Higher Education*, 20, 57-59. DOI: 10.1016/j.iheduc.2013.10.002



Penner-Williams, J., Díaz, E. I., & Worthen, D. G. (2017). PLCs: Key PD Component in Learning Transfer for Teachers of English Learners. *Teaching and Teacher Education*, 65, 215–229. DOI: 10.1016/J.TATE.2017.03.014

Prenger, R., Poortman, C. L., & Handelzalts, A. (2017). Factors Influencing Teachers' Professional Development in Networked Professional Learning Communities. *Teaching and Teacher Education*, 68, 77–90. DOI: 10.1016/j.tate.2017.08.014

Sungpum, W., & Jeerungsuwan, N. (2017). Development of Teacher Field Experience Information Technology System for Pre-Service Teachers, Faculty of Education, Rajabhat Dhonburi University. *Technical Education Journal King Mongkut's University of Technology North Bangkok*, 8(1), 191–199. Retrieved from <http://ojs.kmutnb.ac.th/index.php/jote/article/view/1238>

Tang, E., & Lam, C. (2014). Building an Effective Online Learning Community (OLC) in Blog-Based Teaching Portfolios. *The Internet and Higher Education*, 20, 79–85. <https://doi.org/10.1016/j.iheduc.2012.12.002>

Tangkitvanich, S., Junvith, P., Lathapipat, D., Siriprapanukul, P., Tongliemnak, P., Wongkitrungrueng, W., & Sasiwuttiwat, S. (2013). *The Creation of Basic Educational Reform to Create the Responsibility* (Research report). Bangkok: Thailand Development Research Institute. Retrieved from <http://tdri.or.th/wp-content/uploads/2014/03/Final-Paper.pdf>

Teacher Training Center, Faculty of Education, Phuket Rajabhat University. (2017). *Teacher Training Manual: Internship 1*. Phuket: Teacher Training Center, Faculty of Education, Phuket Rajabhat University.

Thangkabutra, T. (2012). The Development of Long Distance Supervision for Undergraduate Students in Professional Training Experience. In *National e-Learning Conference (NEC2012), Integrating ASEAN Online Learning: Policy and Process, 14–15 August 2012* (pp. 147–151). Bangkok: Thailand Cyber University. Retrieved from <https://www.thaicyberu.go.th/th/taxonomy/term/202>

Wang, D., Wang, J., Li, H., & Li, L. (2017). School Context and Instructional Capacity: A Comparative Study of Professional Learning Communities in Rural and Urban Schools in China. *International Journal of Educational Development*, 52, 1–9. DOI: 10.1016/j.ijedudev.2016.10.009

Wangthong, K., & Wannapiroon, P. (2013). Development of Information System for Knowledge Sharing via Cloud Computing. In *National e-Learning Conference (NEC2013), Strengthening Learning Quality: Bridging Engineering and Education, 5–6 August 2013* (pp. 16–22). Bangkok: Thailand Cyber University. Retrieved from <https://www.thaicyberu.go.th/th/taxonomy/term/219>

Weahama, W., Kerdtip, C., & Sungtong, E. (2016). Needs Assessment for Supervisors of Pre-Service Teachers' Professional Experiences in the Three Southern Border Provinces. *Academic Services Journal, Prince of Songkla University*, 27(3), 24–34. Retrieved from <https://journal.oas.psu.ac.th/index.php/asj/article/view/879>