The Effect of a Professional Learning Community via Cloud Mentoring Model on Teacher Characteristics and Attitudes of Pre-service Teachers in Thailand

Sirirat Petsangsri 1st
School of Industrial Education and Technology, King Mongkut's Institute of Technology Ladkrabang
Bangkok, Thailand
sirirat.pe@kmitl.ac.th

Danaisak Karo 2nd
Faculty of Education,
Phuket Rajabhat University,
Phuket, Thailand
kdanaisak@pkru.ac.th

Kanyarat Sriwisathiyakun 3rd
School of Industrial Education and Technology, King Mongkut's Institute of Technology Ladkrabang
Bangkok, Thailand
kanyarat.sr@kmitl.ac.th

Abstract*— This study investigated the effect of a professional learning community via cloud mentoring model on teacher characteristics, attitudes and PLC capacity of pre-service teachers in Thailand and examined additional feedback from experimenting with the model. The samples were 27 pre-service teachers in Computer Education of Faculty of Education at Phuket Rajabhat University enrolled in a Teaching Internship course and six teaching supervisors. The instruments were a questionnaire of the teacher characteristics assessment in five dimensions, including 1) self-regulation, 2) general in-school performance, 3) field-specific teaching performance, 4) portfolio, and 5) research reporting; a professional learning community (PLC) co-building capacity assessment through information and communication technology (ICT) systems; and an attitude survey on the use of the model. Results revealed that the pre-service teachers' teacher characteristics were rated high; the pre-service teachers actively engaged in building the ICT professional learning community; and the attitudes towards the model, by dimension, were highest.

Keywords*— Online mentoring, professional learning community, information and communication technology, teaching supervision, pre-service teachers

I. Introduction

An emphasis of Thailand's teacher development strategies [1] was to position the teaching profession as a high-level profession. To achieve this aspiring goal, teachers were required to obtain a professional license, teacher education was facilitated, teacher education institutions were improved, and in-service teachers received support for multidimensional development. The National Education Act 1999 is the law that regulates teaching professional development from education, implementation, development, to standard keeping. In compliance with this act, students in Education must achieve a minimum of 160 credits and pass a year of teaching practicum in schools approved by the Teacher's Council. Consequently, teacher education institutions follow the policy by adding required courses such as Teaching Internship to offer students in Education to work as pre-service teachers and apply classroom knowledge in actual classroom practices, e.g., through practical teaching, designing learning activities, solving learners' problems conducting classroom research, and performing in-service teachers' duties. Nonetheless, studies in Thailand over the past years indicated that teacher education institutions had been encountering similar issues, such as distances between the institutions and schools for pre-service teaching, commute safety, excessive teaching and non-teaching workload, and misunderstandings from delayed coordination and distributions of documents [2]. All of these issues need the proper solutions from teachers and administers. Those are professional learning communities, PLC and information and communication technology, ICT.

II. Literature Reviews

Professional learning communities (PLC) are recognized as a valuable instrument for teacher education and development because PLC fosters effective learning [3] Teachers' PLC utilizes community actions and mutual support to generate new ideas and practical implementations for teaching. Hence, it has the potential to help schools transition away from traditional pedagogical cultures to other learner-centered approaches. Education institutions in Thailand, especially Rajabhat universities, which are actively engaged in teacher education and development, had been paying much attention to building a professional learning community. Evidently, according to the newly mandated 20-year local development strategies of Rajabhat universities (2017-2036), Strategy 2 directly tackled teacher education and development. The mandate required teachers and educational employees to develop through a coaching and mentoring system and a PLC process. The Faculty of Education, Phuket Rajabhat University, complied with this policy by re-quiring all pre-service teachers in their teaching practicum sessions in schools to jointly hold PLC meetings and record the results of each meeting [4]. Nevertheless, one of the problems found was that, in practice, the pre-service teachers worked independently with groups without guidance from experts such as their supervisors/advisors. The primary obstacles were schedule conflicts and distances between schools and the university. These issues were also confirmed and evident by previous studies which according to Karo [5] [6] [7] [12].

However, the above difficulties in mentoring, coaching, and building a PLC for pre-service teachers could simply be resolved through ICT as ICT solutions could serve as an online PLC platform for community members to discuss and share instructional contents, teaching management methods, and various bodies knowledge anytime and anywhere [8] [9]

978-1-6654-9894-4/22/$31.00 ©2022 IEEE

[10] [11]. Therefore, this study aimed to investigate the effect of a PLC's cloud mentoring model on pre-service teachers, which consisted of E-Management, E-Meeting, E-Coaching and Mentoring, E-Documents, and E-Evaluation [12].

I. METHODS

1) Model development

This study employed a Research and Development (R&D) design which was conducted through the following sequence.

Phase 1: A study of literature on relevant concepts and theories was reviewed. Baseline data and problems of mentoring for pre-service teachers were analyzed and synthesized. Need analysis was also conducted to identify the current necessity of implementing ICT systems in a PLC for pre-service teachers and stakeholders in teacher education and development.

Phase 2: According to Karo ,a draft of PLC cloud mentoring model was designed and developed for pre-service teachers. The draft model contained six components known as CADPRE that stands for each process and components of PLC via Cloud Mentoring Model which are : 1) Community, 2) Analysis, 3) Design, 4) Practice, 5) Reflection, and 6) Evaluation, whereas the cloud solutions consisted of five ICT systems: 1) E-Management, 2) E-Meeting, 3) E-Coaching & Mentoring, 4) E-Documents, and 5) E-Evaluation. The draft model was submitted to experts for a model fit validation and subsequently revised based on feedback. After the revision, the systems were tested for efficiency and bugs before further experimentation in the next phase.

Phase 3: The model was implemented in empirical experimentation involving pre-service teachers in the PLC. Results are to be discussed in later sections.

2) Participants

This study contained two groups of participants. The first group included 27 pre-service teachers in Computer Education from the Faculty of Education, Phuket Ra-jabhat University, who were enrolled in a Teaching Internship course in Academic Year 2019 and pre-service teaching at schools of five southern provinces in Thailand. The second group comprised 6 teaching supervisors.

3) Instruments

The instrument was a questionnaire consisted of teacher characteristics assessment in a five-point Likert scale with teacher characteristics measurements in five dimensions: 1) self-regulation, 2) general in-school performance, 3) field-specific teaching performance, 4) portfolio, and 5) research reporting;

a) The PLC co-building capacity assessment measured in a three-point grading rubric; and

b) The attitudinal survey on the use of the PLC's cloud mentoring model for pre-service teachers in a five-point Likert scale

All the instruments were validated for item-objective congruence (IOC) by five experts. As a result, the IOC values ranged from 0.6 to 1.00. Items were revised as suggested by the experts before implementation.

II. DATA ANALYSIS

1) The obtained data on teacher characteristics and attitude toward the model in five dimensions were analyzed in mean and standard deviation using the following interpretation scales:

4.50-5.00 refers to a highest-level teacher characteristic/attitude.

3.50-4.49 refers to a high-level teacher characteristic/ attitude.

2.50-3.49 refers to a moderate-level teacher characteristic/attitude.

1.50-2.49 refers to a low-level teacher characteristic/ attitude.

1.00-1.49 refers to a very-low level teacher characteristic/ attitude.

2) The data on PLC capacities were analyzed which mean that the question can be used and standard deviation using the following interpretation:

2.50-3.00 refers to a high-level PLC capacity.

1.50-2.49 refers to a moderate-level PLC capacity.

1.00-1.49 refers to a low-level PLC capacity.

V. DATA COLLECTION

The data were collected throughout semesters as the pre-service teachers worked in their assigned schools. A mentoring handbook was constructed and distributed to the pre-service teachers as they participated in the traditional and the online mentoring systems throughout the year-long pre-service teaching session. Also, regular monitoring and following-up was conducted during the session through all the five systems in the following steps:

Step 1 - Preparation: This step involved an orientation to provide the university supervisors, the supervising teachers, and the pre-service teachers' essential knowledge held through the PLC's cloud mentoring model for pre-service teachers.

Step 2 - In-school Teaching: In this step, the mentoring was conducted within the PLC using the CADPRE process, where conventional (face-to-face) and ICT mentoring systems were combined. The pre-service teachers working at each school were scheduled to participate in mentoring sessions once a month at their convenience continuously. Simultaneously, the PLC capacity assessment was used to measure their engagement over four months.

Step 3 – Monitoring and follow up: Actions and performance were monitored and followed up in this step as the pre-service teachers returned to their university to attend a seminar. These activities were organized for the pre-service teachers to share experiences and meet with their university supervisors, whose jobs were to examine reports and documents that the pre-service teachers were required to create according to the teaching practicum handbook and submit to the systems. Examples of these reports and documents included lesson plans, research reports, teaching practicum reports, and portfolios.

Step 4 – Assess Teaching Performance: At this stage, the teaching performances of the pre-service teachers were assessed, and the primary goal was to determine their teacher characteristics in each dimension: 1) self-regulation, 2) general in-school performance, 3) field-specific teaching performance, 4) portfolio, and 5) research reporting.

Once the teaching practicum session was over, the quantitative and qualitative data on the utilization of the model were collected from the pre-service teachers and the university supervisors by questionnaires and attitudinal surveys. Subsequently, the obtained data were further used to revise the model. (See Figure 1)

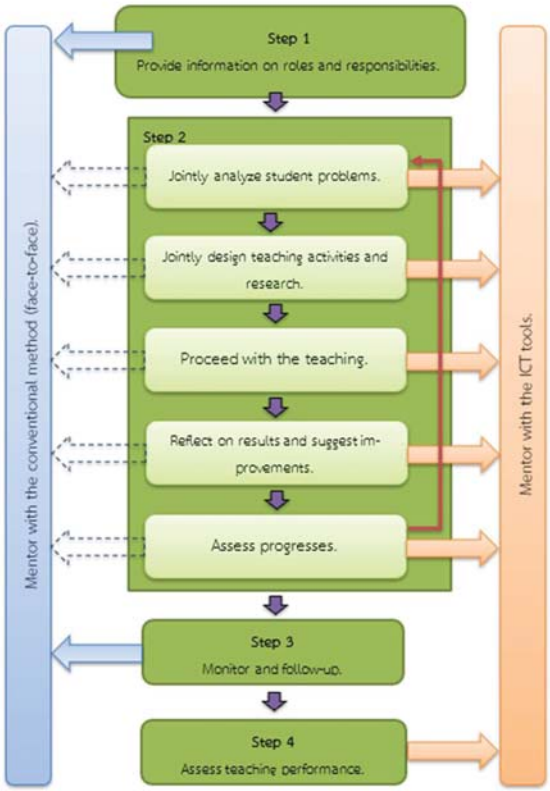

Fig. 1. The PLC's cloud mentoring sequence for the pre-service teachers.

VI. RESULTS

The results of the teacher characteristics assessment

Table 1: Means, standard deviations, and levels of teacher characteristics of the pre-service teachers (n=27)

TABLE I. MEANS, STANDARD DEVIATIONS, AND LEVELS OF TEACHER CHARACTERISTICS OF THE PRE-SERVICE TEACHERS

Items	$\bar{X}$	SD	Level
Self-regulation	4.64	0.16	Highest
In-school performance	4.71	0.23	Highest
Field-specific teaching performance	4.46	0.13	High
Portfolio	4.40	0.26	High
Research reporting	4.25	0.30	High
Overall	**4.49**	**0.21**	**High**

Table 1 shows the following data of the pre-service teachers' teacher characteristics: 1) self-regulation at a highest level (mean=4.64), 2) in-school performance at an highest level (mean=4.71), 3) field-specific teaching performance at a high level (mean=4.46), 4) portfolio at a high level (mean=4.40), and 5) research reporting at a high level (mean=4.25). Overall, teacher characteristics were rated high (mean=4.49), indicating that the PLC's cloud mentoring model positively impacted the pre-service teachers' teacher characteristics.

The PLC capacity assessment was periodically conducted over the four months, and results are shown in Figure 2.

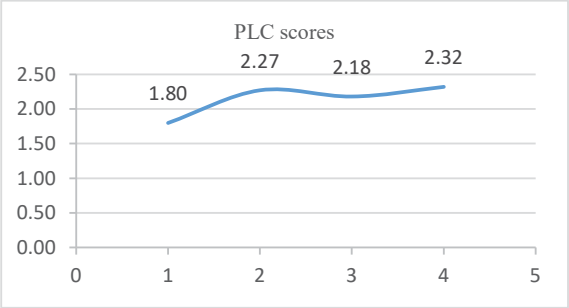

Fig. 2. The results of the PLC capacity assessment through Cloud Mentoring Model

The PLC co-building capacity assessment was periodically conducted and revealed that the first, the second, the third and the forth assessment were at moderate levels of quality with means of 1.80, 2.27, 2.18, and 2.32, respectively. Overall, the results of the PLC co-building capacities through ICT were rated as moderate (mean=2.14). However, note that the mean scores gradually improved as time progressed.

3.3 The attitudes of using PLC via Cloud Mentoring Model

TABLE II: MEANS, STANDARD DEVIATIONS, AND THE PRE-SERVICE TEACHERS' ATTITUDES TOWARDS USING THE PLC'S CLOUD MENTORING MODEL (N=33)

Items	$\bar{X}$	SD	Level
Components	4.62	0.49	Highest
Utilization process	4.70	0.49	Highest
Results	4.72	0.46	Highest
Overall	4.68	0.44	Highest

Table 2 informs that the pre-service teachers' attitudes towards using the PLC's cloud mentoring model were overall Highest (mean=4.68, SD=0.44).

Additional comments from the pre-service teachers on using the model revealed that all the pre-service teachers worked at the schools in their hometowns. Hence, they were able to quickly fit in because they were well familiar with local school teachers. Some reported that their supervising teachers were those who taught them during their secondary education. Besides, another noteworthy conclusion was about the pre-service teachers' financial burdens. Teaching at schools in their hometowns helped reduce accommodation costs since they could stay at their own homes while teaching.

VII. DISCUSSION

After implementing the PLC model for pre-service teaching using the CADPRE components, this study discovered that the pre-service teachers were competent enough to join the group and share their teaching experiences. The model was advantageous as it allowed the pre-service teachers who went separately and alone to remote schools in other provinces. Advanced scheduling for meetings and video conferencing was employed to reduce

limitations of locations and time. Consequently, a virtual meeting was held monthly. The meetings benefited the pre-service teachers from increased teaching confidence and more effective problem-solving because they could ask questions and gain suggestions from peers regarding their classroom situations. Furthermore, working through the five systems, i.e., E-Management, E-Meeting, E-Coaching and Mentoring, E-Documents, and E-Evaluation, was consistent and seamless because these tools were already available in Google for Education. For instance, Google Sites was used as the E-Management system to create web pages to present information. Similarly, Google Classroom was used as the E-Coaching and Mentoring system for a community meeting, knowledge sharing, asynchronous learning, the pre-service teachers' task monitoring (e.g., lesson plans and instructional videos), and co-reflections. Google Meet or Google Hangout was used as the E-Meeting system for joint meetings and online teaching broadcasts. Google Documents was used as a report generator, and generated reports were stored in Google Drive. Google Forms was used as the E-Evaluation system to create instruments to assess the pre-service teachers. Finally, to create portfolios for presentations and reports of data obtained from the pre-service teaching, Google Sites was used as a medium for its convenient data retrieval and website display functions and its organization as required by the operating manual. This notion was consistent with previous studies which applied ICT systems for online mentoring [8] [9] [10] [11]. Furthermore, Tsiotakis and Jimoyiannis [10] incorporated a wide variety of tools in its online mentoring (e.g., Joomla CMS for website creation, Moodle for community building, Mahara for e-portfolio creation, and BigBlueButton for an online meeting) and suggested that different choices of platforms produced different activity participation effects among online community participants. Therefore, selecting integrable tools within Google for Education was projected to create positive impacts on the participation of community members, and this notion was confirmed by the pre-service teachers' attitudes towards using the PLC's cloud mentoring model, which were rated Highest overall (mean=4.68, SD=0.44). Furthermore, after the implementation of the model for communication, discussion, and distribution of informing, it was found that the community members opted to use the Line app as their communication platform. This phenomenon reflected the fact that even if an organization for teacher education and development chooses to introduce a set of solutions to users as deemed suitable, the users might still not utilize the solutions at full potential if they were not something the user were familiar with. This missing link could cause involvement issues in any online community.

VIII. Conclusions

This study conducted an empirical investigation of the effect of a PLC's cloud mentoring model on the pre-service teachers and the university supervisors. After implementing the model, it was found that participation was well facilitated, and school-university distance problems could be solved through this model. It was beneficial for the pre-service teachers who went to other provinces for their teaching practicum sessions. Also, participants enjoyed reduced time consumption through this model since the university supervisors were able to simultaneously meet with many of their pre-service teachers to discuss and share teaching and non-teaching problems and experiences together as a group. Furthermore, the model also helped decrease the university supervisors' travel-related costs and risks. Also, based on the additional comments from the pre-service teachers who went to work in other provinces, the schools that they went to were the ones in their hometowns. Consequently, they were able to quickly fit in because they were well familiar with local school teachers. Another noteworthy conclusion was about the pre-service teachers' financial burdens, which significantly decreased because returning to the hometowns meant that they could stay at home for a lower cost. This notion was reflected by a pre-service teacher stating that "my mother said that having me at home during the pre-service teaching was as if she won a lottery because her expenses decreased significantly."

Acknowledgment

Thank you, Dean at the Faculty of Education, Phuket Rajabhat University for the permission research team to collect data on that period.

References

[1] Office of the Education Council. (2020). Guidelines for Teacher Development (Online) *(references)* http://www.onec.go.th/index.php

[2] Promsinong, P. and Sriwongkol, W. (2013). Appropriate Assessment of Management Model on Teaching Profession Practicum for Technical Education Students. Proceeding of The 6th National Conference on Technical Education (PP.367-372). Bangkok: King's Mongkut's University of Technology North Bangkok.

[3] DuFour, R., DuFour, R., Eaker, R., & Many, T. (2010). Learning by doing: A handbook for profes-sional learning communities at work (2nd ed.). Bloomington, IN: Solution Tree.

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

[5] Ensher, E., Heun C., Blanchard, A. (2003). Online mentoring and computer-mediated communication: New directions in research. *Journal of Vocational Behavior,* 63(2), 264-288.

[6] Tsiotakis, P. & Jimoyiannis, A. (2016). Critical factors towards analysing teachers' presence in on-linelearning communities. *The Internet and Higher Education*. 2016(28), 45-58. https://doi.org/10.1016/j.iheduc.2015.09.002.

[7] 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*, 2017(52), 1-9.

[8] Lim, P. C. & Chi-Kin Lee, J. (2014). Teaching e-portfolios and the development of professional learning communities (PLCs) in higher education institutions. *The Internet and Higher Education*, 2014(20), 57-59.

[9] Redmond, P. (2015). Discipline specific online mentoring for secondary pre-service teachers. *Computers & Education*, 2015(90), 95-104.

[10] Tsiotakis, P. & Jimoyiannis, A. (2016). Critical factors towards analysing teachers' presence in on-linelearning communities. *The Internet and Higher Education*. 2016(28), 45-58. https://doi.org/10.1016/j.iheduc.2015.09.002.

[11] Giglio, C. & Palmieri, R. (2017). Analyzing Informal Learning Patterns in Facebook Communities of International Conferences. *Procedia - Social and Behavioral Sciences*, 2017(237), 223-229. https://doi.org/10.1016/j.sbspro.2017.02.067.

[12] Karo, D., Petsangsri, S. (2020). The effect of online mentoring system through professional learning community with information and communication technology via cloud computing for pre-service teachers in Thailand. *Education and Information Technologies*. https://doi.org/10.1007/s10639-020-10304-2