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A development of a schools' network for co-teacher development to enhance teachers' professional competencies for appropriate instruction in situations of pandemic spread

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Abstract

This research paper is one that can be classified under research and development. The objectives of this research were: (1) to study the conditions of pre-existence network of schools for co-teacher development; (2) to develop a network of schools for co-production of student teachers; (3) to study the effectiveness of a network; and (4) to study the successful factors and obstacles in proceeding with the developed network. The target group consisted of secondary schools in Phitsanulok, Thailand. The desire of the school was to participate in the network for the purpose of improving the production process and developing teachers' competencies designing and implementing appropriate instruction in situations of pandemic spread. The results revealed that: (1) pre-existing teacher network conditions do not provide enough encouragement for student teachers to create engaging online learning activities and assessments; (2) A network was developed characterized by a paradigm shift towards online learning activities, teacher's collaboration, monitoring and giving important suggestions; (3) After the implementation of the developed network model, student teachers' learning management competency was significantly higher than before, at .05 level and also higher than the stated criterion (70%) at .05 level; and (4) A study of successful factors and obstacles in proceeding with the developed network revealed that an exchange of ideas, practical training, technical skills and online media and student teacher attributions for blended learning were successful factors while unreadiness and inability to use instructional materials for blended and inability of some teachers to use various technologies were some of the obstacles.

Introduction

Lockdowns in response to COVID-19 have disrupted traditional schooling, resulting in nationwide school closures in the majority of countries. While the educational community have made concerted efforts to maintain learning continuity during this period, children and students have had to rely more on their own resources to continue learning remotely through the Internet, television or radio. Teachers also had to adapt to new pedagogical concepts and modes of delivery of teaching, for which they may not have been trained. Thus, Teachers' preparedness to support

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digital learning must be developed to elevate the role of teachers from imparting received knowledge towards working as co-creators of knowledge, as coaches, as mentors and as evaluators (The Organisation for Economic Co-operation and Development [OECD], 2020). Teacher development and training institutions, faculty members and academic personnel must be prepared and strengthened for the process of quality teacher development. This will lead to the development of teachers with professional knowledge, morality, competencies and expertise in their job. This expertise includes knowledge, skills and good attitudes for work that emphasizes skills rather than knowledge. Professional teachers must possess knowledge and competencies in instructional management with a wide range of modern knowledge and an awareness of changes in science and technology, etc. It is of utmost importance that that teacher development institutions should modify the curriculum as well as activities from knowledge impartment to focusing on professional competency development curriculum and activities (Rakphonmuang et al., 2017).

Teacher training and development in Thailand has always changed and evolved, but it has not kept pace with the rapid changes of the modern world causing both quantity and quality problems. Quantitative production of teachers is the number of graduates from teacher production courses which exceed the number of new teachers rates each year. Producing teachers in terms of quality entails examinations for new teachers. In some disciplines there are fewer exams than the required rate. From the analysis of current conditions and problems of teacher development, it is found that there are problems in teacher development programs and institution such as the lack of a common plan resulting in ineffective development; lack of mechanisms to combine driving forces to develop the teaching profession, no follow-up on supervision system to assist in teacher development etc. (Office of Policy and Strategy Office of the Permanent Secretary, Ministry of Education, 2020). Kuha and Kaewkabthong (2016) conducted a study regarding teacher professional competency which reflected the problem of student-teachers who are not actively searching for new knowledge and are not up to date with new teaching methods or events, and may want to have a project to continually train and develop potential student teachers. Such should enable student teachers to develop professional skills in order to handle students in all aspects both in and outside the classroom. Therefore, the production process and development of teachers' professional competencies in instructional management in accordance with the aforementioned circumstances should begin with the production process and developing such competency for student teachers. The important concepts that will be used to enhance the professional competencies for teachers in instructional management of student teachers in a network of cooperation with schools must be strengthened to produce student teachers in order for them to develop their professional competence to handle and develop students both in and outside the classroom. Networks of schools are possible to suggest the following ways in which networks with similar, equity-oriented objectives operate to promote positive institutional climates within their member schools. Networks tend to have the following characteristics, namely, short, clear principal-agent links or relationships, guidance and supervision, clarity of objectives, consensus within the community, and evaluation of performance (McMeekin, 2003). Student teachers should be encouraged to learn together through reflection and learning with those who have more experience, which is the concept of a Professional Learning Community (PLC). According to Meyer (2002), professional learning communities are voluntary groups of teachers with skills on learning and teaching. Teachers with no teaching experience learn by listening and seeing what their mentor does. On the other hand, mentors can learn about new course content or teaching methods from teachers with no teaching experience by observing teaching and giving advice. This encourages the exchange of learning and collaborative reflection on students' learning. In addition, using the process of creating a mentor system includes coaching and mentoring to help network members, who are more experienced as educators and role model. Also, they are supporters and guides to those who have more experience to less skill or knowledge with the aim to develop the profession and the personality, make professional knowledge or learn more about work-related content (Vincent, 2004). Based on this study, the research team recognizes the importance of establishing and developing a network of schools in developing student teachers (Project to produce teachers for local development). This can be done by operating in the form of a network with faculties and specialized personnel in the education domain. The Faculty of Education, Naresuan University, as a higher educational institution that focuses on teacher development, has conducted many studies on network development for teacher development. This research aims to develop a network of schools to produce student teachers to enhance professional competence of teachers in instructional management with the changing situations especially in situations of pandemic spread. The development of a network of schools for teachers' development gives student teachers

the opportunity to learn from more experienced teachers and experts, through idea sharing, coaching and through an observation of more experienced teachers performing in their classes leading to the development of efficient teachers with competencies to develop and manage instructions appropriately in situations of pandemics and in accordance with the changing modern situations.

Literature Review

Regarding educational management in the situation of a society with the spread of pandemics and other diseases, a variety of teaching methods, approaches and techniques have been applied to respond to the development of learners. In order to deal with the arising impact from the situations of pandemic spread, which has affected the normal teaching and learning process thereby affecting the functioning of educational institutions, information and communication technology, which can take many forms, has been used in educational management. Teaching and learning through electronic systems using internet technology as a medium of communication between learners and teachers is recommended. Students can study without restrictions on time and place (anytime anywhere), creating opportunities and equality in learning for learners. Students can exchange knowledge and communicate with each other quickly, creating a learning society through electronic systems, especially blended learning. Horn and Staker (2011) define blended learning for learners at grades K-12 as learning in which the learner receives a mass of independent learning experiences through a computer network by students who are able to control self-learning variables in terms of time, place, learning method and rate of self-learning.

Blended learning refers to the organization of learning activities that combine classroom learning and the use of various technologies, focusing on teaching and learning activities that create an environment and atmosphere which is conducive including teachers' teaching method, learners' learning style, instructional materials, communication channels that bring about interaction between learners and teachers, learners with learners, learners with content, learners with diverse learning contexts, and ing teaching. There are also learning activities that emphasize flexibility in order to respond to learners' individual differences, and allow each learner to get the best results from the various instructional processes. Horn and Staker (2011) identified the characteristics of blended learning for learners in grades K-12, whereby such teaching styles can be classified into 6 types as follows:

Model 1: Face to Face Driver is a conventional instructional model where face-to-face learning is conducted between the learner and the classroom teacher by taking online learning on each subject or issue set in the course of studying each time.

Model 2: Rotation is a rotational learning model based on the curriculum content in a given schedule of regular classroom instruction under diverse circumstances and based on individual learning rates.

Model 3: Flex is a flexible, adaptive blended learning style that teachers can provide to learners in a variety of learning styles, either tutoring or small group learning according to interested groups, etc.

Model 4: Online Lab is a blended learning model that focuses on online classroom learning under the condition of fully utilizing an information technology lab where teachers and experts ensure learners' development.

Model 5: Self Blended is a form of blended learning by the learners themselves according to the subject or curriculum. Most of these characteristics are learning at the tertiary or university level where learning information is linked between institutions. In this manner, there is a master control program in the Model 4 laboratory that will supervise and facilitate learning in blended self-paced learning.

Model 6: Online Driver is a fully blended learning style with online learning for both learners and instructors from a given course. In this model, computer and information technology will play a relatively high role in the driving process.

Teachers' professional competence in instructional management refers to behaviours that demonstrate the ability of student teachers to design and manage learning appropriately in situations of pandemic spread by organizing a variety of learning activities that promote desirable characteristics and important competencies to fully develop learners' potentials through instructional design that is consistent with the content learning activities and learners in a systematic way. The components and indicators of professional competencies are:

1. Ability to design instructional management activities

1) Determine learning outcomes/learning objectives of learners by assigning tasks or projects through clear and appropriate teamwork and for both onsite and online classroom learning activities.

2) Design learning activities that encourage learners to learn through hands-on practice to enable learners to apply their knowledge appropriately in both onsite and online classroom learning activities.

3) Provide opportunities for learners to participate in learning design event and learning evaluation to create readiness for both learners and teachers to organize learning activities in onsite and online classroom.

4) Create a systematic learning management plan which is able to design and integrate media and technology (slides, learning materials, infographic etc.) to be consistent with different sections of learning activities both onsite and online classroom.

5) Carry out critical reflection on the design of both onsite and online classroom learning activities using peer assessment methods for improvement/development and then adapt learning activities according to the situation appropriately.

2. The ability to organize learning activities using multimedia and technology.

1) Use a variety of formats, techniques, and methods of learning management with multimedia and technology (slides, learning materials, infographic etc.) suitable for both onsite and online classroom learning activities to achieve learning outcomes, learning objectives that have been defined.

2) Organize learning activities both onsite and online classroom that encourage learners to acquire knowledge, skills and attributes in which students can participate in performing tasks, or projects through teamwork appropriately.

3) Be a facilitator for learners to take advantage of multimedia various technology and information networks for further study and research suitability for both onsite and online classroom learning activities.

4) Take advantage of multimedia various technology and information networks to organize classroom learning activities for both onsite and online classroom effectively and adapt according to the situation appropriately.

3. The ability to measure and evaluate learning outcomes

1) Design a variety of measurement and evaluation methods. It covers learning outcomes/learning objectives and can use various technologies. It is a part of measuring and evaluating learning outcomes that are suitable for organizing learning activities both in onsite and online classroom.

2) Establish and implement tools to measure and evaluate learning outcomes correctly and appropriate to the learning outcomes/learning objectives defined in both onsite and online classroom learning activities.

3) Use feedback from learning measurements and assessments to develop learners' learning potential and management of both onsite and online classroom learning appropriately.

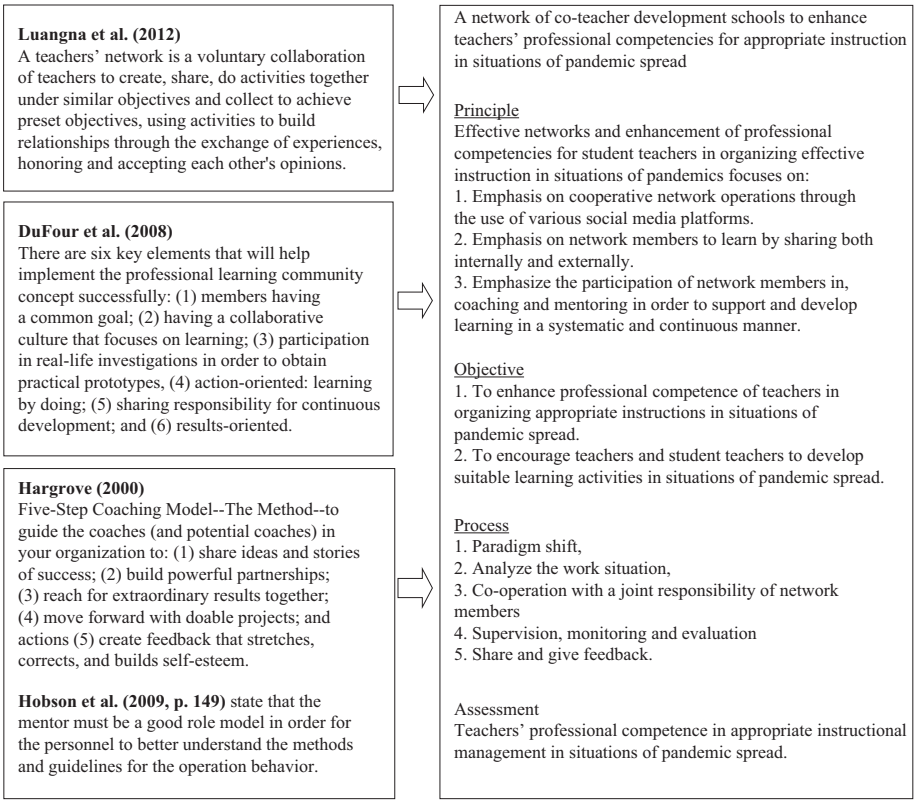

Figure 1 A conceptual framework of a network of co-teacher development schools

Research Objectives

1. To study the conditions of pre-existing school networks for co-teacher development.
2. To develop a network of schools for co-production of student teachers.
3. To study the effectiveness of the developed school network for the co-production of student teachers.
4. To study the success factors and obstacles in the operation of the network of schools for co-production of student teachers.

Methodology

This participatory research was conducted following the steps involved in research and development in four steps as follows:

Step 1: Studying the conditions of pre-existing school networks for co-teacher development.

1. The researchers studied the conditions (strength and weaknesses) of pre-existing school networks for co-teacher development from documents and related studies. Also, a study of the conditions was also done through and observation of other existing networks in the Secondary Educational Service Area Office 39, Phitsanulok.

2. Strategies, policies, roadmaps, and educational projects of network of co-teacher development schools in The Secondary Educational Service Area Office 39 Phitsanulok, were used to determine the value and importance of projects or activities that can be used to enhance teachers' professional competencies in student-teachers for appropriate instruction in situations of pandemic spread (Project to produce teachers for local development).

3. Individual indepth interviews were conducted with educational personnel from Northern Rajabhat Universities, Teacher's Professional Training institutions in order to study and analyze fundamental data from the school's teaching practicum in the project to produce teachers for local development. The research instruments used at this stage consisted of pre-existing school network study form and a semi structured interview. As this stage, data were analyzed using content analysis.

Step 2: Developing a school network for co-teacher production (Project to produce teachers for local development) to enhance teachers' professional competencies for appropriate instruction in situations of pandemic spread.

1. The findings from studying the conditions of pre-existing school networks were used to identify strategies, and activities in a schools' network for co-teacher development to enhance teachers' professional competencies for appropriate instruction in situations of pandemic spread. From such information, a network model for co-student teacher production was developed consisting of principle, objective, learning process, and evaluation. After the development of this network model, a network model handbook was designed.

2. An online meeting was held via "Google meet" with lecturers from the Faculty of Education, Naresuan University and teachers from the network of school's co-teacher production to inform them about the process and evaluate the suitability of a model and network model handbook for a network of school co-production of student-teachers to enhance teachers' professional competencies for appropriate instruction in situations of pandemic spread (Project to produce teachers for local development).

Step 3: Studying the effectiveness of a network of school's co-teacher production. In the 2021 academic year, a model and model handbook for a network of school's co- production of student-teachers were implemented with the target group of student-teachers (Project to produce teachers for local development) at Phitsanulok Pittayakom School, which is part of The Secondary Educational Service Area Office 39 Phitsanulok. Purposive sampling was used to select the target group and the school's desire to participate in the network for the purpose of improving the production process and developing teachers' professional competencies in designing appropriate instructions in situations of pandemics. The following steps about the model and model handbook for a network of school co-production implementation were demonstrated:

1. A expert was invited to provide online practical training through Microsoft Team on September 18th and October 28th, 2021, with the goal of training and sharing ideas with student-teachers at Phitsanulok Pittayakom school on how to create active learning activities in online classrooms. Student teachers were also trained on the use of digital technology for measurement and evaluation in the new era.

2. Researchers, educational supervisors, and supervising teachers served as coaches or mentors to student teachers, supervising, monitoring, and advising them on how to design appropriate and suitable instruction in situation pandemics.

3. A student-teachers' professional competencies scoring rubric was developed and validity was checked by experts. The competency assessment form had an IOC ranging from 0.67 to 1.00. Following that, the competency of student teachers was evaluated in three areas: learning

activity design, instructional management using multimedia and technology, and learning assessment and evaluation between pre- and post-test. The binomial sign test was used to compare student teachers' competency of the post-test according to a stated criterion (70%), whereas the Wilcoxon signed rank-test was used to compare student teachers' competency between the pre- and post-test.

Step 4: Studying the successful factors and obstacles in proceeding with a network of schools' co-production of student-teachers.

1. An online meeting was held via Google meet with the aim of presenting student teachers' learning activities and evaluating the output of a network of school co-production of student teachers. In this meeting, researchers, educational supervisors, and supervising teachers expressed and reflected their thoughts with each other on the successful factors and obstacles in proceeding with a network of school's co-production of student-teachers.

2. The researchers, educational supervisors, and supervising teachers summarized guidelines for the development of a network of schools' co-production of student teachers (Project to produce teachers for local development) to enhance teachers' professional competencies for appropriate instruction in situations of pandemic spread. The results of studying the successful factors and obstacles in proceeding with a network of school's co-production of student teachers were analyzed using content analysis.

Research Participants

The research population consisted of all students in the undergraduate program and second-year master's degree students in the division of curriculum and instruction who were sent out for teaching practice in schools under the basic education. Equally, the faculty administration, lecturers (supervisors), practicing school, and teachers who are in charge of mentoring and coaching student teachers or cooperating teachers are also included.

The sample consisted of 22 student teachers under the project to produce teachers for local development from the Faculty of Education, Naresuan University who were sent to do their teaching practice in Phitsanulok Pittayakom School under the Office of Secondary Education Area 39, Phitsanulok Province in the second semester of 2021 academic year.

Research Instruments

The research instruments consisted of semi-structured interviews, document analysis form of the co-production school network of student teachers (Project to produce teachers for local development) past/existing, professional competency assessment form, student-teachers' professional competencies scoring rubrics.

Data Analysis

Data from the semi-structured interview and document analysis form of the co-production school network of student teachers were analyzed using content analysis while data from student teachers' professional competency assessment were analyzed using mean, standard deviation and percentages. Comparison of differences in teacher professional competency in instructional management before and after the development, including after the development with good level criteria, was done using Binomial sign test and Wilcoxon signed rank-test statistics.

Results

1. The results of studying the conditions of pre-existing network of school's co-production of student teacher revealed that the pre-existing teacher's network conditions do not provide enough encouragement and opportunities for student teachers to create engaging online learning activities and use digital technology in assessing learners' performance during the spread of COVID-19. However, a network of schools' co-production of student teachers should develop and implement a systematic evaluation plan that includes activities that encourage collaboration between educational institutions, The Educational Service Area Office, and schools to share learning experiences, supervise, and monitor student teachers. Furthermore, lecturers from institutions of education and educational supervisors must serve as coaches and mentors to student teachers.

2. Based on the development of a network, the findings revealed that, a model for a network of school co-production of student teachers to enhance teachers' professional competencies was developed with four components: principle, objective, learning process, and assessment (Figure 2). A suitability evaluation of a model and model handbook for a network of school co-production of student teachers to enhance teachers' competency revealed that the model and model handbook were suitable.

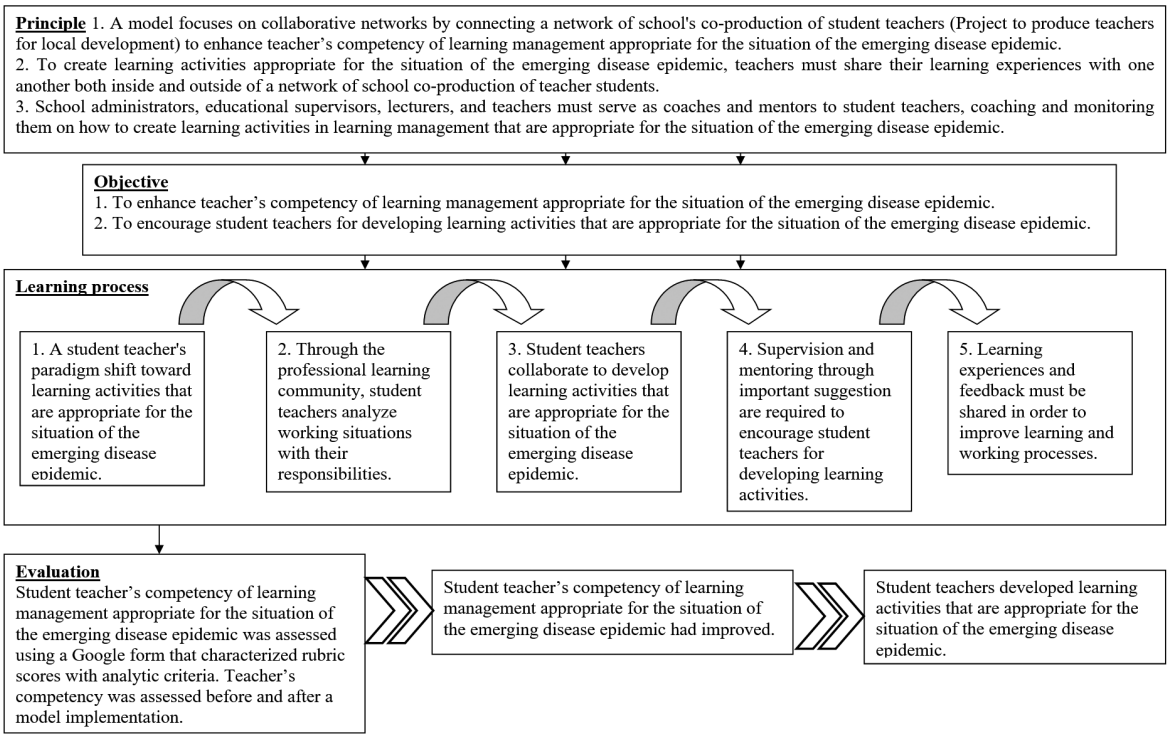

Figure 2 A model for a network of school's co-production of student teachers (Project to produce teachers for local development) to enhance teachers' professional competencies for appropriate instruction in situations of pandemic spread.

3. The findings from studying the effectiveness of a network of school co-production of student teachers revealed as follows:

1) The findings from comparing teacher's competency for instructional management before and after a model for a network of school's co-production of teacher student's implementation.

Table 1 shows that after the implementation of a model for a network of school's co-production of student teachers, the findings revealed that student teachers' instructional management competency was significantly higher than before at .05 level.

After the implementation of a model for a network of school's co-production of student teachers, the findings revealed that student teachers' instructional management competency was significantly higher than before at .05 level.

2) The findings from a comparison of teachers' competency for instructional management after the implementation of a model for a network of school's co-production of student teachers with the criterion (70%) revealed as follows.

Table 2 shows that after the implementation of a model for a network of school's co-production of

Table 1 Comparison of teachers' competency for instructional management before and after the implementation of a model for a network of school's co-production of student teacher

Teacher's competency for instructional management	Sample group (n)	Full score	*X*	*SD*	Z	*p*
Pre-test	22	48	42.59	6.14	2.19*	.01
Post-test			44.91	3.85		

Note: *$p < .05$.

Table 2 Comparison of teachers' competency for instructional management after the implementation of a model for a network of school's co-production of student teachers with the criterion (70%)

Teacher's competency of learning management	Sample group (n)	Full score	Criteria score	$\bar{x}$	*SD*	Standard	Binomial Exact *p*
Post-test	22	48	33	44.91	3.85	.70	.00

Note: *$p < .05$.

student teachers, the findings revealed that student teachers' instructional management competency was significantly higher than the stated criterion (70%) at a significant level of .05.

After the implementation of a model for a network of school's co-production of student teachers, the findings revealed that student teachers' instructional management competency was significantly higher than the stated criterion (70%) at a significant level of .05.

4. The results from studying the successful factors and obstacles in proceeding with a network of school's co-production of student teachers revealed that meetings for ideas and experience exchange in a network, practical trainings, technical skills and online media uses of student teachers and mentors, and student teacher attributions for blended learning were all successful factors. On the other hand, the obstacles included the readiness of instructional materials in instructional management in situations of pandemic spread due to the differences in environments between online and on-site, as well as communication issues caused by the use of technological tools that aren't suitable for working in a network versus Face-to-Face.

Discussion

1. The results of studying the conditions of pre-existing school networks revealed that student teachers are not given enough encouragement and opportunities to design engaging online learning activities as well as use digital technology in assessing students' learning performance in the context of COVID-19 spread. A network of schools that co-produces student teachers, on the other hand, should develop and implement a systematic evaluation plan that includes activities that encourage collaboration between educational institutions, The Educational Service Area Office, and schools to share learning experiences, supervise, and monitor student teachers. Furthermore, educational supervisors and lecturers from educational institutions must serve as coaches and mentors to student teachers. The results were in line with the Ministry of Education Strategic Plan (2020–2222) Office of Policy and Strategy Office of the Permanent Secretary, Ministry of Education (2020), which focuses on teacher development to improve teachers' ability in designing integrated learning activities that address multiple intelligences. Furthermore, teachers and educational personnel have been trained to improve their language and digital skills, as well as their instructional management competencies, through collaboration with higher education institutions and teacher training colleges to develop a plan for teacher production and development that meets the demand for instructional management in any type of education.

2. The results of a network development revealed that the developed network consisted of four components, namely: principle, objective, learning process, and evaluation. The network's learning process included five key steps: (1) A student teacher's paradigm was shifted towards appropriate learning activities that were able to teach their pupils in situations of pandemic spread; (2) Student teachers analyzed work situations with their responsibilities through the professional learning community; (3) Student teachers worked together to create appropriate learning activities that were able to teach their pupils in situations of pandemic spread; (4) Student teachers were trained to develop active learning activities that were able to teach their pupils in situations of pandemic spread. Supervision and mentoring were given for student teachers to provide important suggestions on how to create blended learning activities; and (5) The members of a school's network shared learning experiences and feedback in order to improve learning and working processes. A model was suitable for participation in recognition and performance. The results were consistent with Tanya et al. (2016), who developed a teaching learning network according to educational reform guidelines in basic education institutions in Nakhon Ratchasima Province, and used a focus group with ten experts to evaluate suitability and feasibility of using strategies in a learning network.

3. Following the implementation of a model for a network of school co-production of student teachers, the findings revealed that student teachers' instructional management competency was significantly higher than before at .05 level, and student teachers' instructional management competencies were significantly higher than the stated criterion (70%) at .05 level. Several factors accounted for the significant enhancement of student teachers' instructional management competency. During the implementation of a model for a network of school co-production of student teachers, the model focused on collaborative networks by connecting a network of school co-production of student teachers (Project to produce teachers for local development) to improve teachers' instructional management competency in situations of pandemic spread. Teachers shared their learning experiences with each other both inside and outside of a network of school co-production of student teachers in order to develop appropriate instructional activities in situations of pandemic spread. Furthermore,

school administrators, educational supervisors, lecturers, and teachers coached and mentored student teachers on how to develop appropriate learning activities for effective instructional management in situations of pandemics. The findings were consistent with Gerdeman et al. (2018), who used Teacher Professional Learning through Teacher Network Programs to establish core teacher and support network establishment, and were also in line with Kearney and Maher (2019), who used mobile learning in pre-service teacher education with professional learning networks to encourage pre-service teachers to socialize with others and use digital tools for learning in the school practicum.

4. Meetings for ideas and experiences exchange or sharing in a network, practical trainings, technical skills and online media use of student teachers and mentors, and student teacher attributions for blended learning were all successful factors. The obstacles, on the other hand, included the readiness of instructional materials in managing instruction during pandemic spread as a result of differences in environments between online and on-site, as well as communication issues caused by the use of technological tools that aren't suitable for working in a network versus Face-to-Face. The findings were consistent with the results of Baas et al. (2019), who studied teachers' adoption of open educational resources in higher education and discovered that teachers had better learning through reflection with others and were also capable of making positive changes and applying the knowledge for their profession after studying in a professional learning community for teachers' adoption.

Conclusion and Recommendation

This research had as its focal point to enhance pre-service teachers' professional competencies for appropriate instruction in situations of pandemic spread through a network of co-teacher development schools. A network principle focused on effective networks and enhancement of professional competencies for student teachers in organizing effective instruction in situations of pandemics. The objective of the model aimed: (1) To enhance professional competence of teachers in organizing appropriate instructions in situations of pandemic spread; and (2) To encourage teachers and student teachers to develop suitable learning activities in situations of pandemic spread. The process of the model consisted of: (1) Paradigm shift; (2) Analyzing the work situation; (3) Co-operation with a joint responsibility of network members; (4) Supervision, monitoring and evaluation; and (5) Sharing and giving feedback. The assessment of the model aimed to assess teachers' professional competence in appropriate instructional management in situations of pandemic spread. A suitability evaluation of a model and model handbook were suitable. After the implementation of the developed network model, student teachers' learning management competency was significantly higher than before, at .05 level and, also, higher than the stated criterion (70%) at .05 level. A study of successful factors and obstacles in proceeding with the developed network revealed that an exchange of idea, practical training, technical skills and online media and student teacher attributions for blended learning were successful factors while unreadiness and inability to use instructional materials for blended and inability of some teachers to use various technologies were some of the obstacles.

Recommendations for a model of a network of school's co-production of teacher student's implementation

1. Based on the results of the implementation of a network model of school's co-production of student teachers (Project to produce teachers for local development) to enhance teachers' professional competencies for appropriate instruction in situations of pandemic spread, successful factors should be supported and obstacles reduced in proceeding with a network of school's co-production of student teachers. The learning process should focus on teachers' collaboration with lecturers and educational supervisors, who serve as coaches and mentors to share fundamental data and advise teachers on how to develop learning activities. Furthermore, a network should take account of teachers' competency in designing and developing appropriate instructions in situations of pandemics. Meetings and practical trainings are required for teachers to share learning experiences, improve teachers' technological skills, and improve teachers' attitude towards developing appropriate blended learning activities in situations of pandemic spread.

2. A network of school's co-production of student teachers should take into consideration the network's learning process, which includes five key steps: (1) A teacher's paradigm shift towards designing appropriate instructional activities appropriate for situations in pandemic spread; (2) Teachers analyze work situations with their responsibilities through the professional learning community; (3) Teachers work together to create appropriate learning activities in situations of pandemic spread; (4) Encourage student teachers to develop learning activities, supervision and mentoring through important suggestions; and (5) In order to improve the learning and working processes,

learning experiences and feedback must be shared. Linked with Luangna et al. (2012), a teachers' network is a voluntary collaboration of teachers to create, share, do activities together under similar objectives and collect to achieve preset objectives, using activities to build relationships through the exchange of experiences, honoring and accepting each other's opinions.

Recommendations for Future Research

1. The research scope focused on enhancing teacher's competency considering only appropriate instructional management in a situation of pandemic spread concentrating on Project to produce teachers for local development. Further research should concentrate on developing other teacher's competency-enhancing network in order to improve other teacher's competencies in other institutions or target groups such as local government organization, non-formal education, and informal education.

2. Supervision and monitoring should be provided to assess the sustainability of proceeding in a network of school's co-production of student teachers, and apply the findings of this research for developing appropriate learning activities in situations of pandemic spread. Student teachers can solve problems in their class by using the teacher's competency of instructional management, which is an important competency for teachers and educational personnel.

Conflict of interest

The authors declare that there is no conflict of interest.

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