The Development of Supervision Training Course on STEM Education Learning Activities for Private School Teachers

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Abstract

The research was to develop and study effects of supervision training course on STEM Education learning activities for private school teachers. The target group for suitability assessment consisted of 5 specialists of curriculum development, educational supervision, academic affairs administration, teaching supervision, and private education encouragement. Research instruments featured a questionnaire. The data were analyzed by mean and standard deviation. In addition, the target group for the study of the results of the training course was 30 teachers of 5 private primary schools in Ranong, obtained by purposive sampling. The research instruments were training course documents, a test, practice assessment form, and questionnaires. The data were analyzed for efficiency of the curriculum and outcomes based on criteria with 80/80 of mean and standard deviation. The findings found that 1) the course included principles and rationale, objectives, structure, training process, materials, including assessment and evaluation. The overall suitability of the course was at the highest level. Considering in each component, it was found that training materials were at a high level, and other components were at the highest level. 2) The effects of using the training course revealed that: 2.1) the efficiency of E1/E2 was 86.38/84.83 percent, higher than the criteria defined; and 2.2) the teachers' satisfaction towards the curriculum use, in overall, was at the highest level. The aspect of supervision and being an academic trainer, also joint planning on promoting STEM Education learning activities was at the high level. However, the other aspects were at the highest level.
Keywords: Supervision Training Course, Learning Activities, STEM Education

Background

STEM Education is an integrated learning approach to prepare learners to be competent for living the life in the 21st century. It is to encourage the learners with critical thinking and be able to create innovations using knowledge of sciences, mathematics, and technology and engineering design processes to enable the learners to better understand scientific and mathematic processes, as well as helping them to transfer their learning to be related. It is believed that if the learners gain more interest and understanding in sciences and mathematics, they would improve their competency in solving engineering problems that lead to innovations and new inventions. (Siripattrachai, 2013; Thananuwong, 2013; Chanprasert, 2015; Inthalapaporn, 2015).

Previously, the integrated learning management in accordance with STEM Education concept still lacked clarity in the practice. As a result, STEM education which is the foundation for manpower, innovation and economic development unable to operate effectively. If Thailand requires improving quality of the learners' learning, increasing the country's competitiveness, including increasing the productivity of Thai workforce, it is necessary to build an

understanding regarding STEM education by promoting the learners to think, conduct, and have various skills and necessary competencies, for life, career, and country development. One of the practices is to develop full-time teachers to have knowledge and understanding of STEM Education so that STEM teachers can develop STEM skills for their students, as well as to create understanding among school administrators and educational personnel to create the capacity of supervision on the development of STEM skills with effectiveness. Therefore, education reform under the STEM education concept is a solution that will help develop the country to be stable, prosperous and sustainable. The most important person in the process of educational and learning development is "a teacher". Still, the teacher is a special person, the most important factor in the classroom, and important person to educational quality. Anyhow, it is because the learners' quality depends on the teacher's quality. It is therefore necessary to prepare the teachers to improve the quality of education and to make education management be related to learning in the 21st century which involves various factors. Especially, the aspect of curriculum, teacher's potential development, and learning management is the primary factor that should be given importance (Pornsima, 2011; Chanprasert, 2013; Office of the Education Council, 2016).

The transition period of Thailand into the development of the country according to the 20-year national strategy framework (2017-2036) and into 12th National Economic and Social Development Plan of 2017-2021, according to the internal situation of the private education system, although the private schools has evolved and has many strengths, there are still problems in many aspects whether in regards to the quality of learners, learner's opportunity, school management efficiency that must be systematically accelerated for improvement and development to enable the private education system can participate in driving the country's educational development towards the goals and directions of national development. For the learners' quality, it is necessary to improve the teachers to be aware of the need for curriculum design, teaching activities, learner assessment and evaluation that serve the needs of person's potential development in accordance with the directions of development of the country, and education quality private schools in accordance with the promotion of STEM Education learning activities at the primary level. The first strategy is to develop the curriculum, teaching activities, assessment and evaluation. The development model is to develop a learning management model that is essential for the learners in the 21st century, by adjusting learning process that encourages the learners to learn from practice and focusing on developing basic skills in sciences, technology, engineering, and mathematics. The third strategy is to enhance the efficiency of education management of the private schools by helping teachers and educational personnel to develop professional standards and to be able to perform more efficiently, and to create an educational supervision system for the private schools by emphasizing internal supervision including effective monitoring and evaluation to ensure quality educational management on academic aspect of the private schools. It is responsible for the private school regulatory agency to direct, promote, support, supervise, monitor, and evaluate academic outcomes in order to improve the educational quality of private schools (Office of the Permanent Secretary, Ministry of Education, 2016).

The creation of an educational supervision of private schools with an emphasis on internal supervision with teaching to improve the educational quality of private schools is consistent with Wehachat (2014) that concluded that educational supervision is an essential task for the growth of teachers even though they are well trained. Yet, the teachers must constantly improve themselves while working in real-life situations. Therefore, they need help and to be guided with up-to-date knowledge. It is related to the changes in society so that the preparation and organization of learning activities are constantly being developed. In addition, consistent with Lao-riendee (2013), mentioned that the supervision to promote learning activities of teachers is an important process of the internal supervision since the

internal supervision process is an activity or method by which the teachers cooperate in helping, promoting and supporting each other. It is a way to help in relationship building between fellow teachers and administrators. The supervision is the development of teachers' learning management affecting the development of learners' learning quality in order to achieve the stated objectives. This is in line with Glickman, Gordon & Ross-Gordon (2007), who described the supervision process as important because it improves teaching quality of teachers that affects the quality of learners. So, the supervision is the development of the teachers to be well-prepared for changes.

One of teacher development to be ready for changes is training. It has been a long-established format and widely used (Sparks and Loucks Horsley, 2001). According to Ranong Provincial Education Office, which is an organization that take cares of the private schools, has supported and promoted the supervision and monitoring of STEM Education learning activities of primary school teachers in private schools in Ranong. It was found that the teachers still lack knowledge and understanding about the integrated curriculum, learning activities, assessment and evaluation based on STEM Education. Most of them provided the learning activities with traditional learning style that focused on memorization. Therefore, STEM Education learning activities cannot be organized in accordance with the 21st century learning management as effective as expected. Moreover, internal supervision to promote the organization of STEM education learning activities is at a low level due to lack of supervisor and supervisors lack knowledge and understanding of supervision techniques, as well as lack of internal supervision management (Ranong Provincial Education Office, 2017). Related to the Office of the Permanent Secretary, Ministry of Education (2016) which found that most private schools continued to provide traditional learning activities, they unable to solve the problem of person's potential improvement in accordance with the directions of national development. This may be due to the problems of educational supervision, for example, a few supervisors, lack of competent and experienced supervisors, coordination, connection of educational supervision to internal supervision and teaching supervision, budget, heavy burden of supervision workload causing not enough time for constant supervision. Therefore, various problems impact on the supervision to encourage teachers to organize the learning activities needed to develop the learners' quality with the skills and characteristics needed in the 21st century. As the statement mentioned above, the researcher is interested in developing the supervision curriculum in order to encourage STEM Education learning activities for private school teachers, to be used as a guideline for promoting STEM Education learning activities for the private school teachers, to promote the private school teachers to enable to provide STEM Education learning activities, and to be able to provide the supervision in order to promote effective STEM Education learning activities. It would be preparation for the learners to have necessary skills and characteristics in the 21st century that are consistent with the current and future social context.

Literature Review

The development of supervision training course on STEM Education learning activities for private school teachers has been specified a framework from the synthesis of concepts, theories and studies related to the following concepts: 1) the concepts of supervision and the development of being learning community in teaching profession, which are: Preparation (P); Analysis (A); Media preparation (M); Implementation (I); Awareness (A); Planning (P); Classroom observation (C); Developing (D); Learning good practices; and Evaluation (E) (Panich, 2012; Lao-riendee, 2013; Wehachat, 2014; Glickman, Stephen, & Jovita, 2007; Hargrove, 2000; Beach and Reinhartz, 2000; Corria & McHenry, 2002; Blanchard & Thacker, 2004; Knight, 2004; Wiles & Bondi, 2004; Dunne & Villani, 2007; Toby, 2011). 2) The concept of STEM education learning activities is the design of integrated STEM

education unit, preparation of technological media and learning resources, STEM education activities, learning atmosphere management, assessment and evaluation (Panich, 2012; Office of the Education Council, 2016; Institute for the Promotion of Teaching Science and Technology, 2014; Chanprasert, 2015; Yolao et al, 2014; Songkhwae, 2017; Inthalapaporn, 2015; Lantz, 2009; Fioriello, 2011; Herschbach, 2011; Chen, 2012; Pucha and Utschig, 2012; Wayne, 2012; Bybee, 2013; Center for Mathematics Science and Technology of Illinois State University, 2013, DeLuca and Lari, 2013). 3) The concept of training course development using research and development process includes Analysis, Design, Development, and Evaluation (Boonprasert, 2000; Saratana, 2007; Wiratchai and Vongvanich, 2001; Siribanphithak, 2007; Inthalapaporn, 2015; Klangpraphan, 2015; Wittayarat, 2016; Ketkaew, 2016; Kanchanawasi, 2016; Nithiwuttiphak, Phengsawat, & Koomkhinam, 2017; Tassamee, 2017; Chamnongtham, 2017; Simakham, 2018; Masangsom, 2018; Pongsuwan, 2018; Ajpairin, 2018; Guskey, 2000). And 4) the context of private schools includes the first strategy-development of the curriculum, teaching activities, assessment and evaluation. The development model is to develop a learning management model that is essential for the learners in the 21st century, by adjusting learning process that encourages the learners to learn from practice and focusing on developing basic skills in sciences, technology, engineering, and mathematics, and the third strategy-enhancement of the efficiency of education management of the private schools by helping teachers and educational personnel to develop professional standards and to be able to perform more efficiently, and to create an educational supervision system for the private schools by emphasizing internal supervision including effective monitoring and evaluation (Office of the Permanent Secretary, Ministry of Education, 2016), as summarized in Figure 1.
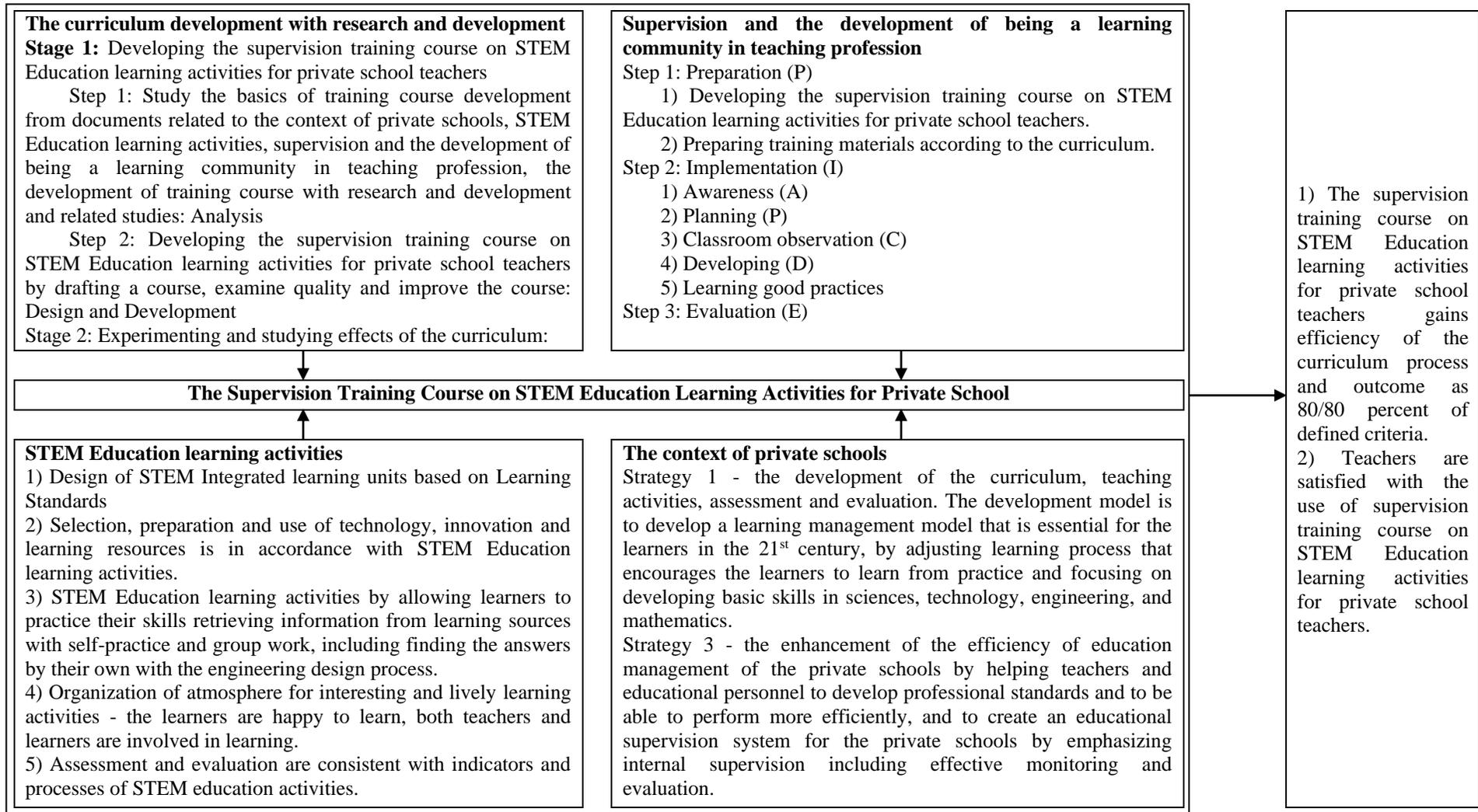
The curriculum development with research and development	Supervision and the development of being a learning community in teaching profession

Stage 1: Developing the supervision training course on STEM Education learning activities for private school teachers
 	
Step 1: Study the basics of training course development from documents related to the context of private schools, STEM Education learning activities, supervision and the development of being a learning community in teaching profession, the development of training course with research and development and related studies: Analysis
 	
Step 2: Developing the supervision training course on STEM Education learning activities for private school teachers by drafting a course, examine quality and improve the course: Design and Development
 	
Stage 2: Experimenting and studying effects of the curriculum:
	Step 1: Preparation (P)
	   1) Developing the supervision training course on STEM Education learning activities for private school teachers.
	   2) Preparing training materials according to the curriculum.
	Step 2: Implementation (I)
	   1) Awareness (A)
	   2) Planning (P)
	   3) Classroom observation (C)
	   4) Developing (D)
	   5) Learning good practices
	Step 3: Evaluation (E)

The Supervision Training Course on STEM Education Learning Activities for Private School

STEM Education learning activities	The context of private schools
1) Design of STEM Integrated learning units based on Learning Standards 2) Selection, preparation and use of technology, innovation and learning resources is in accordance with STEM Education learning activities. 3) STEM Education learning activities by allowing learners to practice their skills retrieving information from learning sources with self-practice and group work, including finding the answers by their own with the engineering design process. 4) Organization of atmosphere for interesting and lively learning activities - the learners are happy to learn, both teachers and learners are involved in learning. 5) Assessment and evaluation are consistent with indicators and processes of STEM education activities.	Strategy 1 - the development of the curriculum, teaching activities, assessment and evaluation. The development model is to develop a learning management model that is essential for the learners in the 21st century, by adjusting learning process that encourages the learners to learn from practice and focusing on developing basic skills in sciences, technology, engineering, and mathematics. Strategy 3 - the enhancement of the efficiency of education management of the private schools by helping teachers and educational personnel to develop professional standards and to be able to perform more efficiently, and to create an educational supervision system for the private schools by emphasizing internal supervision including effective monitoring and evaluation.

1) The supervision training course on STEM Education learning activities for private school teachers gains efficiency of the curriculum process and outcome as 80/80 percent of defined criteria.
2) Teachers are satisfied with the use of supervision training course on STEM Education learning activities for private school teachers.

Figure 1 Conceptual Framework

Research Methodology

This study was conducted with research and development. The experiment was divided into 2 stages as following:

Stage 1 is to develop the supervision training course on STEM Education learning activities for private school teachers. It is implemented with 2 steps, which are:

Step 1: The researcher studied the fundamental information for the development of the training course by studying documents related to the context of private schools, STEM Education learning activities, supervision and the development of being a learning community in teaching profession, the development of training courses with research and development, and related studies, then synthesized as a conceptual framework for developing the training course.

Step 2: The researcher developed the supervision training course on STEM Education learning activities for private school teachers by drafting the curriculum, examining the quality, improving the curriculum, and evaluating suitability of the curriculum. The target group of curriculum examination and suitability evaluation consisted of 5 specialists on curriculum development, supervision, academic administration, teaching supervision and promotion of private education management. The research instrument was a questionnaire with IOC value between 0.80-1.00. The data for evaluating the suitability of training course were collected from university lecturers, school administrators, supervisors, and teachers with experience in STEM Education. The data were analyzed for mean and standard deviation.

Stage 2 is to study the effects of using the supervision training course on STEM Education learning activities for private school teachers, implemented by applying the training course and studying its effects by 2.1) studying the effectiveness of the training course; and 2.2) studying the satisfaction of using the training course. The target group consisted of 30 private school teachers in Ranong, by purposive sampling. In addition, the target group was the teacher in primary level from 5 private schools, with 6 teachers from each school, namely: 2 science teachers, 2 math teachers and 2 computer teachers, which the school administrators have notified to have their teachers to attend the training course on June 16-July 12, 2019. The research instruments included a training course document, comprehensive test on STEM Education learning activities and teaching supervision with IOC values as 0.80-1.00. The performance assessment of STEM Education learning activities and teaching supervision with 3 aspects had IOC values as 0.80-1.00, with reliability of .86. Furthermore, the reliability regarding STEM Education learning activities was .83, teaching supervision was .79, and the outcome of STEM Education learning activities was .96. The teachers 'satisfaction towards using the supervision training course on STEM Education learning activities for private school teachers gained 0.8-1.00 of IOC, with the reliability as .84. Data collection was conducted on the effectiveness of the course process from the performance of STEM Education learning activities and teaching supervision, as well as the effectiveness of the curriculum effects after using the training course, and the satisfaction of the teachers towards the training course. The data were analyzed by investigating the course process and outcome efficiency according to the criteria of 80/80 (Promwong, 2013), mean and standard deviation.

Research Results

1) The findings of the development of the supervision training course on STEM Education learning activities for private school teachers revealed training course consist of as following:
1.1) Principles and rationale is the training course that focuses on participants to gain knowledge, understanding of supervision to promote STEM Education learning activities, and the ability to apply knowledge and understanding to create a community of practitioners to develop STEM Education lessons together, also to take turns the supervision of STEM

education learning activities. The participants actually practice both outside and inside the schools, using the assessment and evaluation procedure according to the actual conditions.

1.2) Course objective is to enhance knowledge and understanding of supervisor teachers and supervised teachers on the need for STEM Education learning activities, providing STEM Education learning activities, internal supervision and teaching supervision, supervision and the development of being a learning community in teaching profession, and examining STEM Education learning activities to strengthen teachers' skills in organizing learning activities and teaching supervision.

1 .3) Curriculum structure consists of 5 learning units, namely Necessity of STEM Education learning activities, Providing STEM Education learning activities, Planning in supervision to promote the organization of STEM education activities, Supervision and learning practices to develop STEM education learning activities, and Supervision sharing to promote STEM Education learning activities, with a total of 40 hours.

1.4) Training process consists of training preparation. The training was conducted in 3 stages: Stage 1-Holding a workshop; Stage 2-Practice on STEM Education learning activities and internal supervision; and Stage 3-Organizing a workshop for sharing knowledge on STEM Education learning activities.

1.5) Training materials consist of videos and online documents related to STEM Education learning activities, handout, worksheet, equipment, and recording forms for practicing in each unit.

1.6) Assessment and evaluation use a practice assessment method during the training, a post-training test, and questionnaire for satisfaction after the training.

The results of the suitability assessment of the supervision training course on STEM Education learning activities for private school teachers are shown in Table 1.

Table 1 The results of the suitability assessment of the supervision training course on STEM Education learning activities for private school teachers

Components	Suitability		Meaning
	$\bar{x}$	S.D.	
Principles and rationale	4.80	0.45	Highest
Objectives	4.60	0.55	Highest
Structure	4.80	0.45	Highest
Training process	4.80	0.55	Highest
Training materials	4.40	0.55	High
Assessment and evaluation	4.60	0.55	Highest
Average	**4.67**	**0.31**	**Highest**

From Table 1, it was found that the overall suitability of the supervision training course on STEM Education learning activities for private school teachers was at the highest level ($\bar{x}$ = 4.67), which the aspect of training materials was at a high level ($\bar{x}$ = 4.40), principles and rationale, objectives, structure, training activities, assessment and evaluation were at the highest level ($\bar{x}$ is between 4.60 and 4.80).

2) The effects of using the supervision training course on STEM Education learning activities private school teachers with a target group of 30 participants found that:

2.1) The details of effectiveness of the supervision training course on STEM Education learning activities private school teachers are as shown in Table 2.

Table 2 The effectiveness of the supervision training course on STEM Education learning activities private school teachers

Results	Target Group (Person)	Full Scores	Participants' Total Scores	Average Scores	Percentage
While training (E1)	30	150	3,887	129.57	86.38
After training (E2	30	20	509	16.97	84.83

From Table 2, the results of the effectiveness assessment of the supervision training course on STEM Education learning activities private school teachers revealed E1/E2 of efficiency score as 86.38/84.83%, which is higher than the criteria defined of 80/80.
 2.2) The results of the teachers' satisfaction towards using the supervision training course on STEM Education learning activities private school teachers are shown in Table 3.

Table 3 The results of the teachers' satisfaction towards using the supervision training course on STEM Education learning activities private school teachers

Particulars	Satisfaction Levels		
	$\bar{\text{x}}$	S.D.	Meaning
1) The availability of training materials	4.80	0.41	Highest
2) Appropriate coordination	4.43	0.50	High
3) Building awareness of the need for supervision to promote STEM Education learning activities	4.67	0.48	Highest
4) Joint planning in supervision to promote STEM Education learning activities	4.47	0.51	High
5) Supervision operation and learning supervision practices to promote STEM Education learning activities	4.80	0.48	Highest
6) Development of STEM education learning activities	4.80	0.48	Highest
7) Evaluation of supervision practices to promote STEM Education learning activities	4.80	0.48	Highest
8) knowledge and understanding examination about supervision practices to promote STEM Education learning activities and teaching supervision	4.80	0.48	Highest
9) Assessment of operation on STEM Education learning activities and teaching supervision	4.80	0.48	Highest
10) Supervision and being academic training	4.43	0.50	High
Overall	**4.68**	**0.35**	**Highest**

From Table 3, it was found that the teachers' satisfaction towards using the supervision training course on STEM Education learning activities private school teachers, in overall, was at the highest level ($\bar{\text{x}}$ = 4.68), in which the aspect of supervision and being an academic trainer, and joint planning in supervision to promote learning activities according to the STEM education were at the high level ($\bar{\text{x}}$ = 4.43 and 4.47, respectively), while the other aspects were at the highest level ($\bar{\text{x}}$ is between 4.67-4.80).

Conclusion and Discussion
1) The results of the development of the supervision training course on STEM Education learning activities for private school teachers found that the supervision training course is composed of 1.1) principles and rationale is the training course that focuses on participants to gain knowledge, understanding of supervision to promote STEM Education learning activities, and the ability to apply knowledge and understanding to create a community of

practitioners to develop STEM Education lessons together, also to take turns the supervision of STEM education learning activities that the participants would practice both outside and inside the schools, together use the assessment and evaluation procedure according to the actual conditions. 1.2) Objective of the course is to enhance knowledge and understanding of supervisor teachers and supervised teachers on the need for STEM Education learning activities, providing STEM Education learning activities, internal supervision and teaching supervision, supervision and the development of being a learning community in teaching profession, and examining STEM Education learning activities to strengthen teachers' skills in organizing learning activities and teaching supervision. 1.3) The structure of the course is comprised of 5 learning units, namely Necessity of STEM Education learning activities, Providing STEM Education learning activities, planning in supervision to promote the organization of STEM education activities, Supervision and learning practices to develop STEM education learning activities, and Supervision sharing to promote STEM Education learning activities, with a total of 40 hours. 1.4) Training process, consisting of training preparation, is divided into 3 stages, namely: Stage 1-Holding a workshop; Stage 2-Practice on STEM Education learning activities and internal supervision; and Stage 3-Organizing a workshop for sharing knowledge on STEM Education learning activities. 1.5) Training materials consist of videos and online documents related to STEM Education learning activities, handout, worksheet, equipment, and recording forms for practicing in each unit, and 1.6) assessment and evaluation use a practice assessment method during the training, a post-training test, and questionnaire for satisfaction after the training. The overall suitability of the supervision training course on STEM Education learning activities for private school teachers was at the highest level, which the aspect of training materials was at a high level , principles and rationale, objectives, structure, training activities, assessment and evaluation were at the highest level. Nevertheless, this may be because it has been developed through the process of studying, analyzing, creating and developing continuously and systematically by studying the principles, concepts and theories related to supervision and the development of being the learning community in teaching profession, STEM Education learning activities, the development of training course using research and development processes, and the context of private schools to design, draft, and improve the course, including being determined and examined with feedback and improved until the suitable training course is obtained, and can be used for training to develop the teachers to be able to organize STEM Education learning activities and to provide the supervision for each other. This affects the effectiveness assessment of the training course had E1/E2 of efficiency score as 86.38/84.83%, higher than the specified criteria of 80/80. Moreover, the training course is consistent with the context of the private schools on Strategy 1-the development of the curriculum, teaching activities, assessment and evaluation. The development model is to develop a learning management model that is essential for the learners in the 21st century, by adjusting learning process that encourages the learners to learn from practice and focusing on developing basic skills in sciences, technology, engineering, and mathematics; and Strategy 3 -the enhancement of the efficiency of education management of the private schools by helping teachers and educational personnel to develop professional standards and to be able to perform more efficiently, and to create an educational supervision system for the private schools by emphasizing internal supervision including effective monitoring and evaluation to ensure quality educational management on academic aspect of the private schools. It is responsible for the private school regulatory agency to direct, promote, support, supervise, monitor, and evaluate academic outcomes in order to improve the educational quality of private schools (Office of the Permanent Secretary, Ministry of Education, 2016), by practicing building a private school educational supervision system with an emphasis on internal supervision on teaching to improve the quality of education of private schools by coaching and being an

academic trainer of the supervisors. Related to Lao-riendee (2013), stated that the supervision to promote learning activities of teachers is an important process of the internal supervision since the internal supervision process is an activity or method by which the teachers cooperate in helping, promoting and supporting each other. It is a way to help in relationship building between fellow teachers and administrators. The supervision is the development of teachers' learning management affecting the development of learners' learning quality in order to achieve the defined objectives. This is also in accordance with Glickman, Stephen, & Jovita (2007), mentioned that the supervision process as important because it improves teaching quality of teachers that affects the quality of learners. So, the supervision is the development of the teachers to be well-prepared for changes. Furthermore, the supervision training course on STEM Education learning activities for private school teachers provides the teachers with practical training in learning activities and teaching supervision through group activities, with interaction between the supervisors and supervised teachers regarding the educational supervision process that aims to solve problems and develop teaching and learning systematically by the supervision techniques as the main factor based on the relationship of co-thinking, dependency, help, acceptance of each other, as well as respecting each other in order to jointly develop professional skills, which directly affect the development of the educational quality (Wehachat, 2014). That applies the development of Lesson Study, which is a process of profession development in the context of working in the classroom and school in the long term, with a continuous system and has a gradual operation. It aims the teachers to drive and adjust work processes by themselves, because the teachers are the ones who know and understand their own task best. The word "lesson" means lesson plans, providing learning activities as planned to include the use of teaching materials. Learning could be concepts, statements of knowledge, attitudes, and process skills. "Implementators" are those who initiated the process of developing lessons together and introduced to the teachers, and/or to be a facilitator and coordinator of the joint lesson development operations of each group of teachers, such as scholars and supervisors (Triwaranyoo, 2014), including the application of three guiding models, namely cognitive coaching, peer coaching, and reflective coaching (Beach and Reinhartz, 2000) by the process of building understanding and practicing in class. There has been suggestions for the supervisor teachers and supervised teachers in the learning community in teaching profession with friendship in order to develop learning management together, aiming at the participants gain awareness, define goals, plan, implement the supervision, reflect, and share knowledge under the processes of coaching and mentoring, also continuous supporting from the administrators in the development of learning management in order to focus on the learners' achievements. However, the participants are the supervisor teacher and supervised teachers, which are science teachers, math teachers and computer teachers, in primary level grouped together as a learning community to develop STEM Education lessons, to define the goals for supervision in order to promote the learning activities, also to analyze the course, create the integrated learning units regarding STEM Education, consider the lesson plans and create the supervision calendar, including supervision implementation by taking turns. As a result, the teachers would learn to continuously improve the quality of the learners. This affects the teachers' satisfaction in using the supervision training course on STEM Education learning activities for private school teachers at the highest level. This may be due to the supervision with guidance and academic mentorship with goodwill for the teachers to build the learning communities in profession in schools to jointly develop the lessons (Yankomut, 2015), which is an integrated profession development with working by sharing knowledge with each other and reflection. It is an important tool for profession development causing the teachers to develop professionally. Teaching supervision encourages the exchange of learning with fellow teachers along with practice including profession development for new teachers or

those who begin the teaching profession. The important factor of success in profession development is to provide support of the administrators. In addition, providing advice helps in profession development and individuals, which supports the teachers in accordance with counseling within the schools (Hudson and Hudson, 2010). This creates the profession learning community that affects school performance, with good communication and cooperation. It helps provide good advice to the teachers for better performance, as well as enabling the students to receive effective teaching and learning outcomes and resulting in better learning.

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