

# The Effects of Advisory Teaching and Learning Management Using the Sukhothai Thammathirat Open University Distance System for Science Teachers in Border Patrol Police Schools

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## Article Info:

Received: 31 Aug 2021; Revised: 09 Feb 2022; Accepted: 11 May 2022; Available Online: 11 May 2022

## Abstract

*The objectives of this research were to (1) compare the quality in teaching of science teachers in border patrol police schools before, during, and after receiving remote supervision through a distance education system; and (2) assess teacher satisfaction with the distance education system. The research sample comprised 30 science teachers in border patrol police schools purposively selected from 207 science teachers who previously participated in the Teacher Development Project of border patrol police schools and those in remote areas, organised by the School of Education Studies, Sukhothai Thammathirat Open University. The employed research instruments included (1) an evaluation form to assess the ability to design learning and teaching activities; (2) an evaluation form to assess the teachers' teaching behaviours; and (3) a scale to assess satisfaction with remote supervision. The data were analysed using the statistical measurements of mean and standard deviation. The research results revealed that (1) overall, the science teachers' ability to design learning and teaching activities improved with scores that increased from 7.03 to 8.91, and 14.14 with the standard deviation of 10.16, 9.96, and 7.90, respectively; (2) the quality of teachers' teaching behaviours decreased during the process of remote supervision but increased after the process of remote supervision with the average scores of 6.10, 5.69, and 20.54, and the standard deviation of 16.07, 13.25, and 10.42, respectively; and (3) moreover, the teachers gave a high rating of 4.36 for overall satisfaction when using remote supervision.*

**Keywords:** *Advisory teaching and learning management, learning, distance system, teaching behaviours, learning activities, science teacher, remote supervision*

## 1. Introduction

The School of Education Studies, Sukhothai Thammathirat Open University (STOU) has been aware of concerns regarding the situation in which many teachers in Thailand are assigned to teach a subject that is not related to their major subject. This situation occurs especially in border patrol police schools as the majority of teachers at border patrol police schools are police officers. They have no teaching degree, yet they are assigned to teach all school subjects, including science. Due to a lack in training, there is a great possibility that these teachers use improper teaching approaches, thus creating a poor learning environment that does not support learning processes. The most proper solution is to hire teachers with a degree in science to teach at those schools. Unfortunately, this is unlikely to happen in practice. The obvious solution is to then improve the scientific knowledge and skills of these teachers in border patrol

police schools through means that suit their resources. They should develop knowledge and understanding of the nature of science learning to enable them to manage their teaching, and ensure that this corresponds to principles of scientific teaching and learning. Proper training can help reduce problems in the quality of education among Thai children, who are the future of the country.

As a response to this, the School of Education Studies, STOU decided to initiate a project to help these teachers. The Teacher Development Project for teachers in border patrol police schools and those in remote areas was thus set up in 2017. The project was managed under an academic service project of the School of Education Studies. The programme involved two major training initiatives: first, self-learning training with self-study materials provided by the school, and second, activity-based training on teaching and learning issues. The relevant issues to be taught include curricular benchmarks, fundamental backgrounds of teaching models, important learning theories, and designing a learning-activity plan based on different instructional methods that are frequently applied in science and mathematics subjects. The latter training involved two sessions. In the first session, the activities explored the use of teaching materials and learning assessments. At the end of this session, activities that were held include designing an activity plan for learning and teaching, and lesson plans for the science and mathematics subjects that the teachers have been assigned to teach. The learning activities and lesson plans designed and constructed during the project were checked and corrected for future utilisation. In the second session, teachers who participated in the project were trained through remote supervision using a distance education system. The teachers were asked to record their teaching in the classroom on videotape. The recorded videos were then presented, and advisory feedback was given through remote supervision, which substituted fieldwork supervision at their schools. The activities in this session gained quite an interest from the teachers' participants, as they informed that these activities could be applied as guidelines for future use. As a continuous practice, this approach could enable teachers to practically improve the quality of teaching and learning management in science and mathematics at border patrol police schools.

It was found that one-time advisory feedback through remote supervision was not sufficient for effective and long-term development. Thus, a decision was made to provide them with more training so that they could gain enough knowledge and skills in developing their science teaching and learning management.

## 2. Literature Review

Science is considered an important subject to learn because it helps learners gain more knowledge and understanding of different natural phenomena. Having knowledge and skills in science can help learners improve the quality of their life and society. In learning science, learners construct their knowledge by integrating various skills to guide science inquiry. Learning science allows learners to develop thinking skills, such as analysing, synthesising, critical thinking, creative thinking, problem-solving, and productive thinking. Development of these skills is one of the main characteristics in shaping Thai citizenship under the concept of Thailand 4.0 Policy. However, according to Sinlarat (2015), science teaching and learning practices in the country is not in line with the expected characteristics. Based on relevant studies on tests of analytical thinking ability of Thai students, it was found that a number of Thai students received scores that were significantly below the standard criteria. According to the studies, one of the contributing factors was the fact that the education system does not promote experimental learning environment. Instead, students mostly learn scientific facts from ready-made learning activities and materials. This way of learning can clearly obstruct development of thinking skills (Bootcote, 2012). Undoubtedly, this situation reflects problems that exist in science learning and teaching management. Correspondingly, Arras (2014) suggests three factors that contribute to ineffective science learning and teaching, especially in small-size primary schools. The first factor is that a teacher usually adopts a teaching approach that does not meet students' learning processes, which is usually a lecture-based method focusing on only transmitting knowledge. Students, then, do not have the opportunity to experience hands-on activities. Many teachers choose a lecture-based method because they struggle with a workload that assigns them other tasks in addition to teaching. Several teachers are assigned to teach subjects that do not match their major/minor subjects and experiences. Secondly, students lose interest and enthusiasm in studying science as they do not see how scientific information can be relevant in their daily life. Also, they lack

critical thinking and collaborative skills. Finally, the curriculum and some aspects of the content being taught are too complicated to be understood. Meanwhile, teaching can also become ineffective because there are not enough teaching materials, or their designed teaching materials do not boost students' learning interest.

Studies conducted by Arras (2016) and Sungchai (2009) present a similar conclusion regarding the importance of developing teaching and learning instruction for science subjects. In their studies, one of the main problems found in teaching and learning is that teachers are unsuccessful in designing and developing appropriate teaching instruction to fit learning processes. Practical learning is important; hence, instruction with practical techniques that allow students to gain hands-on understanding should be developed. Therefore, it is important that teachers should improve their understanding in teaching and learning approaches. Developing appropriate teaching supervision and coaching skills can thus help teachers gain improved understanding and capacity in their science teaching and learning management.

The study conducted by Thewaplin (2005) discusses the results of peer-coaching as part of teaching and learning instruction for science subjects. The findings of the study indicate that most teacher participants showed a high level of satisfaction with peer-coaching supervision in science teaching and learning. The findings also show that student participants also reported a high level of satisfaction with their learning. Their learning outcomes after the instruction were better than what they were before receiving the instruction. Another relevant study was conducted by Nuayi et al. (2016). In this study, the implementation of teaching supervision involving class-visit supervision for teachers in the Indonesian school system was examined. A class visit was arranged to observe teaching processes and examine whether or not appropriate teaching instruction had been applied. Implementation of supervision by supervisors and headmasters were found to be effective. However, the frequency of the activity did not meet the requirements. The researchers recommended that supervision be performed more seriously and optimally. Interestingly, some teacher participants reported that they became confused with the curriculum that had been changed. The findings also suggest that confusion also occurred when the teacher participants found that supervision was done by teachers from other fields, and not specifically those with a science background.

In the proposed project, remote supervision was conducted through a distance education system. An orientation session was also provided. The instructional plans for science subjects designed by the teachers were checked and corrected. Three sessions of remote supervision were provided using a distance education system via an Internet network. Through remote supervision, the recorded videos of the teachers' teaching sessions based on the designed plans were presented for advisory feedback. Additionally, the teachers also had one group supervision session at their school for the purpose of organising the Professional Learning Community system (PLC). The activities included in the supervision processes explained above were beneficial to the teachers who had previously attended the teacher development project of border patrol police schools and those in remote areas. These activities helped them improve existing skills in managing their teaching and learning models for their students. In other words, it allowed them to extend, develop and add value to existing work that had already been designed based on the knowledge they had gained from the previous project.

The project provided clear benefits to schools and teachers in Thailand. A teacher supervision programme along with the PLC is important in improving the training educational module in this country. Research studies conducted by Ariffin and Abdullar (2015) and Masadeh (2015) support this idea. Findings from their studies show that supervision is essential for improving teachers' ongoing professional development. Based on the studies that have been reviewed in this paper, and the project in which the researcher has participated, it is obvious that teacher professional development is a current necessity. Supervision with relevant activities can help teachers improve their professional knowledge, skills and teaching effectiveness. Thus, this study is expected to provide more insight into the practice of supervision in teacher development in general.

The objectives of this study are to:

- i. Compare the quality of teaching among science teachers in border patrol police schools before, during, and after receiving remote supervision through a distance education system.
- ii. Describe teacher satisfaction with remote supervision through a distance education system.

### **3. Research Method**

In this study, the data were collected before, during, and after remote supervision. The study employed both qualitative and quantitative methods. The results of the project were subsequently summarised and presented to the School of Education Studies, STOU. The study is expected to contribute to advisory teaching and learning development as well as teacher professional development.

#### **3.1. Research Population and Sample**

The study involved 207 teachers in border patrol police schools who previously attended the teacher development project of border patrol police schools and those in remote areas organised by the School of Education Studies, STOU. The research sample comprised 30 science teachers in the northern region of Thailand.

#### **3.2. Research Instruments**

The research instruments employed in this study included the instruments for the experiments as well as data collection.

First, the research instruments for the experiments comprised the project plan for remote supervision for science teaching of the teachers using a distance education system. The instruments were as follows:

- i. A handbook of remote supervision. This handbook provided details on training and follow-up plans on teaching issues, including teaching quality of science teachers, designing an effective science teaching plan based on a nature of science, teaching techniques for science teaching and learning based on science teaching frameworks, building key performance indicators for the design of a science lesson plan, and effective science teaching techniques as guidelines for an evaluation of teaching and learning processes.
- ii. A project plan of remote supervision. The document included the training schedules, procedures for remote supervision using a distance education system via an Internet network, and procedures for group supervision at schools for the purpose of organising the PLC.

Second, the research instruments for the data collection consisted of:

- i. An evaluation form to assess the teachers' ability to design learning and teaching activities (See Appendix A). The form presented the KPIs and scoring criteria for assessing the quality of the designed activity plans in science teaching and learning.
- ii. An evaluation form to assess the teachers' teaching behaviours in applying teaching techniques in the classroom through recorded videos (See Appendix B). The form showed the KPIs and scoring criteria for assessing the teachers' teaching behaviours.
- iii. A scale to assess satisfaction with remote supervision. This form was designed to be a channel for the teachers to reflect on their feelings and report their opinions on the perceived advantages and disadvantages of remote supervision and also their satisfaction or dissatisfaction with any issues related to the remote supervision.

The instruments were reviewed and examined by three experts on science teaching and learning to ascertain their quality, reliability, and validity.

### 3.3. Data Collection

During data collection, both qualitative and quantitative research methods were used. The steps involved were as follows:

- i. Offices of the border patrol police bureau that worked with border patrol police schools were contacted to request for the research sample, which comprised 30 science teachers from five border patrol police schools in the northern region. Six teachers were selected from each school.
- ii. The selected teachers were individually contacted to organise an online networking group as a channel to send documents or materials and to make appointments. The activities during the remote supervision and project follow-ups included designing an activity plan in science teaching for one semester, three remote supervisions from recorded videos to see how the science teachers' teaching skills developed before and after receiving supervision, and one group supervision at the schools where the teachers are located for the purpose of organising the PLC.
- iii. The teachers in the sample group were contacted to report their satisfaction with the remote supervision.

### 3.4. Data Analysis

In analysing the collected data, both qualitative and quantitative approaches were applied. The data were quantitatively analysed using measurements in descriptive statistics, including percentage, mean, and standard deviation, while the qualitative data were analysed using content analysis and descriptive writing.

## 4. Findings and Discussion

- i. The findings of the study showed that the ability of the teachers in designing an activity plan for science teaching subsequent to the project was at a higher level than before, during, and after receiving remote supervision. The average scores improved, reflected by lower standard deviation scores, respectively (See Table 1).

**Table 1.** Teachers' Qualities in Designing an Activity Plan for Science Teaching, before, during, and after receiving remote supervision

School Area	Qualities evaluated before receiving the supervision				Qualities evaluated during receiving the supervision				Qualities evaluated after receiving the supervision			
	Activity Plan		Teaching record		Activity Plan		Teaching record		Activity Plan		Teaching record	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Phayao	12.67	1.75	0.00	0.00	18.83	2.64	4.50	11.00	19.50	10.10	19.00	10.40
Chaing Rai	10.20	16.20	8.50	20.80	7.67	12.00	6.17	15.10	12.50	7.09	16.70	9.03
Chaing Mai	12.30	11.60	22.00	24.90	12.20	10.10	17.80	22.00	13.70	8.14	16.20	13.00
Tak	0.00	0.00	0.00	0.00	5.83	9.04	0.00	0.00	13.00	2.00	27.80	4.26
Phitsanulok	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.00	9.72	23.00	11.80
Overall	7.03	10.16	6.10	16.07	8.91	9.96	5.69	13.25	14.14	7.90	20.54	10.42

The findings show that the teachers experienced better outcomes because the remote supervision they had received was effective, and could be applied in their existing teaching tasks. They gave positive remarks about the remote supervision and their personal improvement that resulted from it:

Through the supervision, I was able to gain more knowledge that was relevant to science teaching and learning. I also became aware of practical instruction for science learning processes. Hereby, there is a need for instruction development. Developing instruction is quite difficult. However, I now understand how essential it is, so I think I will try my best to learn this skill. (Participant 1)

It is evident that the teachers' teaching materials and activities had improved. These became more interactive, and the plans were set in line with principles of science teaching and learning. Seeing their own teaching behaviours on the recorded videos also allowed them to identify strengths and weaknesses in their teaching approaches, which would enable them to improve. In addition, the group supervision session at their schools gave them a chance to view the videos as a group, thus giving them an opportunity to exchange points of view and knowledge with each other. Similarly, supervision done using the LINE instant messaging app allowed the teachers to see each other's tasks and advisory feedback. Thus, the teachers could use and apply all the given information in their teaching. Overall, the activities provided led to improvements in teaching ability among the teachers.

- ii. Based on the findings, the teacher participants gave high scores to reflect their overall satisfaction with remote supervision using the distance education system in all aspects and activities as shown in Table 2.

**Table 2.** Satisfaction with Remote Supervision through Distance Education

School Area	Satisfaction with learning supplemental documents		Satisfaction with the networking system for communication		Satisfaction with Supervision through LINE		Satisfaction with the overall system		Satisfaction with all aspects	
	M	S.D.	M	S.D.	M	S.D.	M	S.D.	M	S.D.
Phayao	3.70	0.50	3.90	0.60	4.20	0.30	4.10	0.30	4.00	0.40
Chaing Rai	4.30	0.60	4.30	0.60	4.40	0.70	4.20	0.40	4.30	0.60
Chaing Mai	4.00	0.30	4.80	0.30	4.96	0.10	4.70	0.20	4.60	0.20
Tak	4.00	0.30	4.50	0.30	4.60	0.40	4.20	0.40	4.30	0.30
Phitsanulok	4.50	0.40	4.60	0.40	4.80	0.30	4.60	0.40	4.60	0.20
Overall	4.10	0.50	4.42	0.50	4.60	0.50	4.36	0.40	4.36	0.40

Remote supervision via the LINE group was given the highest score, especially with regard to the strength of the unique way the application was used as a tool for training in a distance education system. Most of the participants provided useful and positive feedback regarding video records and remote supervision. They agreed that the supervision model was effective and convenient:

Video records of teaching behaviours with feedback are a very effective way to see how good our teaching is. It allows us to see what issues there are and what to improve because we can see our teaching and also get feedback for it. (Participant 2)

Remote supervision was very suitable for teachers who did not want to leave the class. It allowed them to learn while doing their job and being with their students. This way, they did not have to take leave to get training opportunities. (Participant 3)

The following details present reasons for the satisfaction scores given:

- The provided activities in the project used a student-centred approach, which gave the teachers an opportunity to freely select learning times at their convenience. This way, they could also choose their own learning approaches to study the self-learning materials, and they could work on more than one type of learning material at the same time. In other words, the training became more interesting in that the teachers could integrate the use of a computer-based electronic networking system to engage in distance learning. This allowed them to freely interact with their teachers and classmates.
- Remote supervision using a distance education system was supported by technology and instant communication. This facilitated a more convenient channel for remote supervision and allowed for quick responses and feedback. Evidently, the teachers were able to see what needed improving in their teaching through a variety of interactive audio-visual multimedia. They could also check overall activities anytime and anywhere at their convenience.

- Remote supervision using a distance education system could lead to the knowledge management of an organisation. When the teachers have gained knowledge and exchanged experiences through appropriate steps, it would also be possible to promote work engagement and unity. Thus, everyone would have the same work goal in building professional and organisational development.

Overall, research findings on the teachers' satisfaction with remote supervision agreed with findings in the study conducted by Tawaplin (2005), which showed that the teachers' satisfaction with peer-coaching supervision in science teaching and learning was similarly rated positively.

In addition to the main research findings, there were also other interesting issues that arose during the project. These can be addressed as recommendations as follows:

- i. In providing training on designing activity and lesson plans for teachers in border patrol police schools, the documents must be designed and prepared based on ready-made materials produced by border patrol police officers. Activities and content based on the materials should be adjusted and modified with more interactive experimental activities based on principles of science learning and teaching to be better applicable for the teachers.
- ii. In effectively coordinating with teachers and receiving assignments on time, there should be cooperation with educational supervisors of offices at the border patrol bureau who are in charge of supervising teaching staff in the corresponding border patrol police schools. Moreover, these officers should be invited to be part of a remote supervision team as this would help teachers to receive closer assistance even after the project has concluded. In a way, these officers could become part of the effort to develop the science teachers' teaching ability.
- iii. A face-to-face meeting for participating teachers should be held before the start of the project to properly introduce them to the project orientation and to each other. The meeting would help the teachers to finish all the assigned activities as expected. Subsequently, another meeting should be provided after the project has been completed so that their work summaries could be made more thorough and informative.
- iv. Based on the findings of this study, the Gurudhayadha teacher preparation project of border patrol police schools should be supported and continued. This project is very beneficial as it aims to promote the border patrol police schools' alumni to apply for teaching jobs at these schools. This can help the schools produce quality teachers who are enthusiastic and reliable. Although they are police officers who do not have an academic background in education, there are many ways to develop their abilities and skills to become great teachers. For example, the border patrol police school teachers could continue their education in a graduate diploma programme in the teaching profession through grants offered by STOU.

This project could help develop these police officers' teaching competencies and skills. The border patrol police bureau had selected teachers who were in the Gurudhayadha teacher preparation project of border patrol police schools to participate in this project. It was found that these teachers had the relevant potential, and they were very hardworking and responsible.

Clearly, the Gurudhayadha teacher preparation project of border patrol police schools should be continued. Teachers in this project are locals, so there would be no necessity for job transfers or relocations. Moreover, these teachers would be able to effectively coordinate with the school's local community, and as they come from a similar background, they are also likely to better connect with their students. While they work at border patrol police schools, they could perform their teaching jobs while also continuing in their duties to maintain national security. Undoubtedly, the Gurudhayadha teacher preparation project of border patrol police schools should not be terminated at this point.

## 5. Conclusion

The study aims to investigate the effectiveness of remote supervision by examining the qualities of instructional plans designed by science teachers in border patrol police schools before, during, and after

obtaining remote supervision through a distance education system, along with their satisfaction with the given supervision. In examining the effectiveness, qualities of instructional plans designed by the participants before and after the training were compared. The levels of satisfaction with the remote training were also investigated. For data collection, a questionnaire design and qualitative approach to gather data were combined. The collected data were analysed using the statistical measures of percentage, mean and standard deviation to identify levels of the teachers' ability to design instructional activities and satisfaction with remote supervision. Content analysis and descriptive writing were also included in qualitative data analysis to obtain insight into their teaching behaviours and experiences as well as their opinions and satisfaction with remote supervision. According to the findings, the overall ability of the participants in designing an activity plan improved, indicated by the decreased values of the standard deviation. The overall satisfaction with remote supervision through a distance education system was rated highly in all aspects. The teachers were mostly satisfied with remote supervision via the LINE application. The supervision activity that the teachers were least satisfied with was a self-learning activity using self-study materials. From the study, difficulties related to science instructional management among non-science majors found in this study enable the researcher to know what aspects should be focused more in developing a remote supervision model for them. This development can help non-science major teachers obtain more appropriate training that can help to reduce issues with quality of instruction. Overall, the study can benefit science teaching and learning development. Organisations and teachers can use the training and supervision model described in this study to suit individual school contexts.

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**Acknowledgement:** The author would like to extend her gratitude to ASEAN Journal of Open and Distance Learning Limited for considering this research paper for publication. The author also appreciates the valuable comments and guidance of the reviewers on her paper.

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**Appendix A**

**An evaluation form to assess the ability to design learning and teaching activities**

Teacher's name .....Class.....  
School.....District.....Province.....  
Date of Evaluation.....

Instruction: please respond to the following statement by placing a check mark (✓) in the answer box.

No.	Statements	Levels				
		5	4	3	2	1
1	Elements of instructional plans are included.					
2	Learning objectives are clearly identified.					
3	Main points and details in accordance with learning objectives are established.					
4	The design of learning activities in an engagement phase is interesting and clear.					
5	The design of learning activities in an exploration phase is in accordance with relevant points in an engagement phase.					
6	The design of learning activities in an explanation and summarization phase leads students to find a conclusion of their study.					
7	The design of learning activities in an elaboration phase connects to knowledge gained from an explanation and summarization phase.					
8	The design of learning activities in an evaluation phase allows students to have self-evaluation.					
9	Instructional Media and sources are appropriate to the lessons designed.					
10	An evaluation scheme is in accordance with learning objects					

Additional suggestions

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Sign .....Nuanjid Chaowakeratipong..... Supervisor

**Appendix B**

**An evaluation form to assess the teachers' teaching behaviours in applying teaching techniques in the classroom from the recorded videos**

Teacher.....Class.....  
 School.....District.....Province.....  
 Evaluation.....Date ..... Semester.....  
 Topic.....Time .....

Instruction: please respond to the following statement by placing a check mark (✓) in the answer box.

No.	Statements	Levels				
		5	4	3	5	1
1	The classroom is appropriately arranged and ready for students					
2	The environment and atmosphere help create learning interest					
3	Attention is given to all students in the class.					
4	Confidence in teaching and giving knowledge to students is presented.					
5	An interaction with students is regularly established.					
6	Reinforcement is given to students appropriately.					
7	Activities for promoting interest and questions in an engagement phase is effective.					
8	Activities in an exploration phase can lead students to find answers that they are looking for.					
9	Activities in an explanation and summarization phase help students create a complete explanation.					
10	Activities in an elaboration phase help students build on their existing knowledge.					
11	Activities in an evaluation phase allows students to make a decision and have a review of what they have learned.					
12	An ability to use a questioning strategy in connecting knowledges and enhance students' thinking skills are illustrated.					
13	An ability to effectively use instructional media is illustrated.					
14	An ability to conduct an effective evaluation covering all learning objectives is illustrated.					
15	The class is managed in accordance with the instructional plan.					

Additional suggestions

1. The teacher's strength

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 .....

2. Distinct characteristics and qualities regarding teaching

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 .....

3. Issues to be improved

.....  
 .....

Sign..... Nuanjid Chaowakeratipong..... Supervisor