

Development the Quality of Educational Achievement the Small schools has Low Ordinary National Educational Test by using Professional Learning Community

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Abstract

The objective of this research was; to study best practice in small school management under the Office of the Basic Education Commission, to explore the small school development model, and to study the results of the using the small school development model by using professional learning community in mathematics and sciences subjects. The research was divided into 3 phases: Step 1: Study the best practices in small school management. The sample were a small school with O-NET test higher than the national average O-NET test in academic year 2018. Step 2: Finding the small school development model by focus group were organized between education administrators, school administrators and teachers. And Step 3: Study on the effects of small school development model by using professional learning community. The samples were 3 small schools which O-NET test in mathematics and sciences subjects below the national average O-NET test. The data were analyzed by mean, standard deviation, t-test, and content analysis. The results of the research showed that 1) best practice in small school management consisted of learning management that allows teachers to be fully self-developed and students enjoyed learning, 2) small school development models consisted of goal, planning, action, observation, reflection, and strengthening, and 3) the results of using the small school development model by using professional learning community were found that the students had achievement in mathematics and sciences subjects statistically higher than 70% at the .05 level. They had attitude towards mathematics and sciences, and teamwork in high level. From the follow-up, it was found that in the academic year 2019, two out of the three schools in the sample school had higher O-NET test scores than the national average.

Keywords - Best Practices, Small School, Academic Achievements, Attitude Towards Mathematics and Sciences, Teamwork

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Introduction

In the national education management according to the Constitution of the Kingdom of Thailand in 1997, the National Education Act 1999 and the Amendment (No. 2) 2002, there were ideologies and principles of education management to develop Thai society into a knowledge society and to provide all Thais with equal educational opportunities and continuous human development throughout their lives, which will lead to a desirable knowledge-based economy. In this regard, education management guidelines had been set to be a learner-centered learning process. Learners would see a role model with practice, thinking and learning through a variety of hands-on experiences and needs; they would be happy to learn. As for the teachers, they could get to know the learners individually with the preparation of teaching and the use of media that combine international knowledge with Thai wisdom, setting up an atmosphere conducive to learning, providing and developing various learning resources and developing learners' thinking in a systematic and creative way. The success of the learning process depended on individual factors including teachers, faculty members, administrators, parents and community members. Management factors include management principles and principles of good governance. An indicator of desirable characteristics of Thai people was the provision of a learning curriculum and an environment that encourages learners to develop themselves naturally and to their full potential. There was a systematic and quality development of administrators, teachers, faculty members and educational personnel. There was also an educational institution-based management [9]. The goal of 2018 was to systematically reform education and learning. Emphasize three main issues: the development of quality and standards of education and learning of Thai people, increasing educational and learning opportunities, and promoting participation in education administration and management from all sectors of society. The strategic reform framework has focused on the international quality and standards of Thai people and Thai education. Some of the key indicators and target values were academic achievement in core subjects from the Ordinary National Educational Test (O-NET), with an average score of more than 50 percent and the mathematics and science achievement was not lower than the international average (PISA test results) [8].

According to the National Institute of Educational Testing Service (Public Organization) in the 2018 academic year, it was found that the national average scores in mathematics and science were 37.50 and 39.93, respectively [5]. The schools under the Kamphaengphet Primary Educational Service Area Office had an average score lower than the national average score in Mathematics and Science of 262 schools and 248 schools out of 386 schools, respectively. The results reflected that many schools needed urgent help. The researcher as a tertiary faculty who has one of the main functions of the university's mission, that is to provide academic service to schools in the service area through the development of teachers and educational personnel was therefore interested in developing primary schools, especially small schools, to have higher than the national average level of national educational testing results. Best practice lessons were removed from small schools that had higher than the Ordinary National Educational Test (O-NET) scores. Best practice lessons were removed from small schools with an Ordinary National Educational Test (O-NET) score higher than the national average in management, curriculum, learning processes, and learner development activities. The small school development model was used to achieve an Ordinary National Educational Test (O-NET) score higher than the national average by using the professional learning community. The model was then used to develop a small school to score an Ordinary National Educational Test (O-NET) higher than the national average using the professional learning community. This was in order for the administrators to change the working process and the teachers to adjust the teaching and learning process and bring the school to a better standard.

Research Objectives

1. To study best practices in small school management under the Office of the Basic Education Commission, Kamphaengphet province.
2. To find a model for small school development based on the professional learning community.
3. To study the results of the using the small school development model by using professional learning community

Research Methods

Educational quality improvement was carried out to improve the learning achievement of small schools with low Ordinary National Educational Test (O-NET) scores using the professional learning community which was divided into 3 steps as follows:

Study the best practices in small school management.

The sample group was a small school under the Office of the Basic Education Commission, Kamphaengphet province with the Ordinary National Educational Test (O-NET) score in Mathematics and Science that was higher than the national average in the 2018 academic year. It was purposive sampling in Mathematics subject which was Ban Nong Chang Ngam school and Thung Sai Kindergarten school, and in Science subjects including Thai Rath Wittaya school and Thung Sai Kindergarten school.

Informants were school director or representative and teacher.

Sources of information were school self-report documents, projects related to teacher development, teaching and learning process development, and learner development.

Research tools included

1. The executive interview form was a question related to operations in terms of personnel, budget, equipment and management.
2. The teacher interview form was a question related to self-development, teaching preparation, teaching and learning, assignments and examinations, student assessments, and assistance to students who did not understand the content.
3. The school performance report was related to the organization of projects and activities related to teacher development, teaching and learning process development, and learner development.

Data collection

1. Interview with the school director or representative (in case the school was waiting for the administrator to take the position of director) and the sample school teachers of the 3 schools.
2. Document analysis: projects and activities related to teacher development, teaching and learning process development, and learner development.
3. Summarizing the information from the interview and returning the information to each school for further investigation and complete review.
4. Summarizing the information and establishing best practice in the management of small schools.

Data analysis

Content analysis was used to analyze data from interviews with administrators and teachers together with documents and group them to establish best practice in small school management.

Finding a pattern to develop a small school using the professional learning community

The informants were divided into 3 groups:

1. Director of educational districts, deputy director of educational districts, educational supervisor of a small school and educational supervisors responsible for the subject of Mathematics and Science learning, performing duties in Kamphaengphet province, 5 people.
2. School director, teacher in Mathematics and Science subjects who work in small schools, which had the Ordinary National Educational Test (O-NET) score higher than the national average in the 2018 academic year, 5 people.
3. School Director, teachers in Mathematics and Science subjects working in small schools with Ordinary National Educational Test (O-NET) scores below the national average in the 2018 academic year and study the effect of small school development model using the professional learning community, 7 people.

Research tools included small school management best practices, small school development drafts and group discussions:

- 1 Best practice in small school management was the result of a study in Step 1: Administration, including personnel, support and administration. Learning management consists of curriculum activities and extracurricular activities.
- 2 A draft of the small school development in the process of showing an overview of the operation would consist of goal, plan, act, observe, reflect and strengthening.

Data collection was done using a focus group to present best practice in small school management as a result of the study in Step 1. A draft of the small school development consisted of goal, plan, act, observe, reflect and strengthening among the three contributors.

The analysis of the data was summarized on the pattern of small school development from the focus group and analyzed using the results of content analysis.

Study of results of using a small school development model using the professional learning community.

The sample consisted of small schools with the Ordinary National Educational Test (O-NET) Mathematics and Science scores lower than the national average in the 2018 academic year and was in the top 10 of Kamphaengphet province. The purposive sampling method was used. The schools that were willing to join as a sample in this study were Ban Thung Suan school, Nong Bua Rat Bamrung school and Ban Nong Takla school. The participated in finding a small school development model in step 2.

Research tools were a small school development model using a learning community. There was a 6-step process:

1. Goal was a combination of goals for improving the quality of education in Mathematics and Science. The sample school aimed to develop students in Grade 6 to score the Ordinary National Educational Test (O-NET) in Mathematics and Science subjects higher than the previous year. If possible, they would like it to be higher than the regional, provincial or national average. In this regard, the roles of administrators, teachers and learners had been assigned.

2. Planning was a joint preparation and finding methods for learner development, as well as defining the scope of content in mathematics and science in accordance with the learning content, learner quality, and indicators used in the Ordinary National Educational Test (O-NET) academic year 2019. They defined the learning behavior of learners, such as learning achievement, attitudes, and teamwork, along with guidelines for developing a learning management plan that emphasizes the learners' practice. Learning activities were carried out in 7 steps: preparation, individual learning, group learning, exchanging learning, summarize, practicing skills, and appreciation, as well as designing teaching materials and materials in accordance with learning.
3. Action was a joint study of content according to the core curriculum, making a learning management plan, media / equipment and instructors, learning management in accordance with the plan along with recording learning results each time to improve the learning management plan. The learning management plan was divided into 40 hours per subject. The achievement test that corresponds to the learning standards used in the O-NET exam would be divided into 20 items per subject. The attitude toward Mathematics and Science was a measure of the opinions or feelings of learners towards learning management of Mathematics and Science with the content validity between 0.67 - 1.00 and reliability values of 0.88 and 0.86 respectively. The teamwork was a measure of the opinions or practice of learners in terms of working with peers in Mathematics and Science school hours with the content validity between 0.67 - 1.00 and reliability value of 0.89.
4. Observation was a co-consideration of learners' learning outcomes in terms of knowledge, skills and desirable characteristics from the learning activities results according to the learning management plan.
5. Reflection was co-consideration based on the effect of learning management on content that the learners did not yet understand and then find a way or method of learning management in order to give the learners a better understanding.
6. Strengthening was a joint activity to enrich knowledge of learners as a result of reflecting the concept of the learning management plan in what the learners did not yet understand and considering the scores from the achievement test, the attitude test, and the teamwork scale.

Data collection and analysis could be performed in accordance with the small school development model by using the professional learning community as follows.

1. Focus group between administrators, teachers of Mathematics and Science, sample schools, and researchers in the process of goal, planning, observation and reflection in the professional learning community process. The data was analyzed using content analysis.
2. Action was a learning activity to develop learners according to plan. Strengthening was a joint activity to enrich learners' knowledge and then ask students to take an achievement test, an attitude toward Mathematics and Science, and the questionnaire about teamwork. The Mathematics and Science achievement were compared with the 70% criterion and analyzed using t-test one sample and attitudes towards Mathematics and Science, and teamwork were analyzed using mean and standard deviation.

Research Results

The best practices in small school management including:

For administration, consisting of personnel, teaching support and the management found the following results:

Personnel, which are persons involved in learner development activities, consists of; Executives, act to take care, consult, supervise and follow up the work, encourage teachers and students, encourage teachers to develop themselves, assign tasks to accountability according to aptitude and suitability, create a happy learning atmosphere, and build confidence and morale in work.

Teachers, have an important behavior that is devoted to students, responsible for teaching and other duties as appropriate, develop themselves by learning from DLTV and studying further from the Internet.

Students, should have key characteristics: literacy, fluency, computer skills, discipline and responsibility.

Two aspects of teaching support: Distance Learning Management System (DLTV), computers and Internet access for information searching, and teacher manuals since teachers do not meet the courses taught.

For the administrative, the academic affairs department arranges class schedules according to the DLTV teaching schedule, and additional arrangements with an emphasis on core subjects and sub-subjects that the core subjects are subjects that must do O-NET exam by completing the content according to the curriculum. After the O-NET exam, study the secondary subjects or the subjects that must be completed classroom arrangement of either.

Learning management consists of activities according to the curriculum. And extra curricular activities found the results as follows;

Activities according to the curriculum, include individual learner analysis, adjusting the basis of prior knowledge, teachers study indicators, content to be taught, analyze exams for teaching information, and find teaching techniques and materials that help learners' interest and enjoyment such as using games and using technology in teaching. Before starting new content, ensure that all learners understand the original content. Assign 2 questions of math as homework per day. In the case of students who make mistakes, they are asked to teach more individually. Measurement and evaluation section consider from worksheets, exams, assignment behavior, and study interests.

Extra curriculum activities include teaching after the content has been completed by doing exemplary exercises in the past year and taking place on Saturday or Sunday, joined the project with the school group to send students to review their knowledge and practice doing problem solving.

The small school development model was an educational quality improvement procedure to improve the academic achievement of small schools has low Ordinary National Education Test (O-NET) by using a professional learning community, the process as follows;

Goal was setting a target to improving the quality of education for small schools to achieve the results of the Ordinary National Education Test (O-NET) in Mathematics and Science subjects in grade 6 are higher than the previous year. And if possible, the scores should be higher than the national average score. Including setting the roles of administrators, teachers, and learners.

Planning was to preparation and find a method for learner development, defining the scope of content in the Mathematics and Science courses in accordance with the subject matter,

learning standards, learner quality, and indicators that used in the Ordinary National Educational Test (O-NET) in academic year 2019. Determine the learning behavior of the learners and guidelines for developing a lesson plan which focuses on active learning along with designing media and teaching materials.

Action was joint study of content according to the core curriculum. Preparing lesson plans, media and teaching materials. Then the instructors to manage learning according to the lesson plan and recorded the learning results in each time to improve the lesson plan. In the process of organizing learning activities, it is applied from best practice which consists of 7 steps: preparation, individual learning, group learning, exchanging learning, summarize, practicing skills, and appreciation.

Observation was assess the learning behavior of learners including learning achievement, teamwork, and attitude.

Reflection was to consider the results of the learning management each week a management about the lesson plan, media and teaching materials, and learning activities.

Strengthening was an activity to enrich knowledge to the learners which was the result of reflection according to the lesson plan that the learners do not understand.

The results of the using the small school development model by using professional learning community focus on learning behavior of the learners as a follow,

Achievement; consist of Mathematics achievement and Science achievement shown in Table I

Table I Comparing Mathematics achievement and Science achievement with 70% of the criteria after using the small school development model.

achievement	n	μ	\bar{x}	S.D.	t	Sig.
Mathematics	27	14	15.37	2.95	2.414	.023
Sciences	27	14	15.48	2.58	2.987	.006

$p < .05$

Attitude; consist of attitude toward Mathematics and attitude toward Science shown in Table II and Table III

Table II Mean (\bar{x}) and standard deviation (S.D.) of attitude toward Mathematics after using a small school development model

attitude toward Mathematics	\bar{x}	S.D.	meaning
1. Mathematics is a useful subject	4.63	0.49	highest
2. Solving Mathematics problems helps to think systematically	4.44	0.64	high
3. Mathematics can be used in everyday life	4.56	0.75	highest
4. Students are happy to study mathematics	4.04	0.65	high
5. Students love to do activities related to mathematics	4.07	0.68	high
6. Students have fun in math class	4.07	0.73	high
7. Students explain mathematics content to their peers	3.93	0.73	high
8. Students do math exercises on their own	3.89	0.42	high
9. Students participate in activities related to mathematics	4.19	0.74	high
10. Students are researching to learn more about Mathematics	3.96	0.71	high
total	4.18	0.70	high

Table III Mean (\bar{X}) and standard deviation (S.D.) of attitude toward Science after using a small school development model

attitude toward Science	\bar{X}	S.D.	meaning
1. Science is a useful subject	4.76	0.44	highest
2. Students like activities related to Science	4.44	0.77	high
3. Students love to play games that are related to Science	4.52	0.77	highest
4. Students do their own science homework	4.32	0.90	high
5. Students are always enthusiastic about studying or doing science activities	4.32	0.75	high
6. Students are enjoyed studying science	4.48	0.77	high
7. Studying science helps train people to think systematically	4.44	0.71	high
8. If students do not understand the content of science, you will ask the teacher	4.28	0.89	high
9. Science subjects to help develop thinking	4.36	0.81	high
10. Science can be applied in everyday life	4.52	0.77	highest
total	4.44	0.76	high

Teamwork; consist of teamwork after learning Mathematics and Science subjects, shown in Table IV

Discussions

Best practice for managing small schools was divided into two areas: 1.1) Administration - personnel consisted of administrators, teachers and learners. Teaching support included Distance Learning Management System (DLTV), computers and internet access for information and teacher manuals. The administration was carried out by the Academic Department to schedule classes according to DLTV's teaching schedule and the administrators or teachers must set clear goals for learner development. The results reflected that the school administration that leads to the success of its goals must be inclusive in personnel, as administrators or teachers are essential to lead the organization to success. In line with the research of, as in [12] and, as in [11] found that best practice in small school quality development, administrators should have effective management of personnel, budget and performance of their duties. It is also imperative to provide the necessary resources to support, especially distance learning, as teachers did not meet their educational background. This was consistent with the small school development strategy in terms of determining factors and conditions leading to school success, that is, promoting distance education via satellite as a tool for improving the quality of education [1]. The study of, as in [2] found that the strategy of future small school management (2013-2022), ICT should be systematically applied in the administration and management of teaching and learning. 1.2) Learning management included curriculum activities consisting of individual learner analysis, fundamentals adjustment, teacher indicators study, teaching content, and exam-related analysis. Extra-curricular activities consisted of a supplementary teaching after the completion of the content and the previous year's exam practice. The results reflected that in the management of learning, the teacher must be well prepared to teach and look after each student thoroughly in terms of knowledge and behavior. It is in line with the principles of learning management based on the 2008 Basic Education Core Curriculum that adheres to the principle that the learner was the most important, learner-centered learning management and relying on a variety of learning processes. The instructor must study the school curriculum to clearly understand the learning standards, indicators and key competencies of the learners, with the preparation and selection

of media appropriate for the activity including assessing the progress of learners using a variety of methods [4]. The research of, as in [12] found that best practice in improving the quality of small schools consisted of learner development activities. Educational institutions should organize activities to encourage learners to think, do, and organize activities to promote learning achievement for them.

Table IV Mean (\bar{x}) and standard deviation (S.D.) teamwork of Mathematics and Science after using a small school development model

teamwork	Math		Science	
	\bar{x} S.D.	meaning	\bar{x} S.D.	meaning
1. I am happy to join and work without request	4.48 0.51	high	4.60 0.58	highest
2. Group members explained their work clearly and everyone understood	3.77 0.51	high	3.96 0.98	high
3. Group members talked without emotion	4.31 0.47	high	4.32 0.80	high
4. I accept the opinions of group members	4.35 0.56	high	4.24 0.88	high
5. Group members understand that I describe or express their opinions on the work	4.12 0.59	high	3.88 0.88	high
6. While working together I discuss and exchange ideas with members of the group	4.23 0.59	high	4.00 1.08	high
7. I expressed my opinion with a cheerful smile	4.31 0.62	high	4.20 0.82	high
8. I raise questions about working with members of the group	4.27 0.67	high	4.20 0.96	high
9. I believe that all members of the group can work towards their goals	4.04 0.34	high	4.32 0.75	high
10. Group members are free to voice their opinions and take action	4.73 0.60	highest	4.44 0.77	high
11. All group members are essential to accomplishing our goal	4.04 0.82	high	4.28 0.84	high
12. Group members discussed each other on a logical basis in working to achieve goals	4.54 0.51	highest	4.20 0.82	high
13. All group members willingly accept the results of their work	4.48 0.51	high	4.40 0.76	high
total	4.27 0.61	high	4.23 0.85	high

The small school development model was a step that provides an overview of difficult operations at the level of academic achievement including goal, planning, action, observation, reflection, and strengthening. The process was a community style that focused on solving problems through better practice [10]. Such elements or procedures were consistent with the concept of organizing a learning community at the educational institution level [3], [13] showed that as a learning community, the school can truly develop the learning aspects of the learners. Collaborations focused on learner learning, professional learning and development, and a friendly community demonstrate the synergy of administrators, teachers and educators directed towards stakeholders.

To study the results of the using the small school development model by using professional learning community. Considering the effect on learners, teachers and administrators, it was found that 1) The students had academic achievement in Mathematics and Science statistically higher than 70% at the .05 level. In addition, they had a high level of attitude toward Mathematics and Science, and teamwork. 2) Teachers had increased knowledge and understanding of content and methods of managing Mathematics and Science learning. Even if the teacher did not complete the course, they enjoyed organizing learning with media / equipment and not feeling alone at work. 3) The administrators supported and encouraged them, along with asking questions arising from teaching and taking part in solving problems. In line with, as in [7] research found that the Learning Community process was used to help learners had significantly higher post-learning achievement and problem-solving skills at the .05. Moreover, there was an increase in knowledge sharing and exchanging of knowledge with peers and teachers. Research by, as in [6] found that the use of the learning community significantly increased the knowledge and understanding of the teacher's content at the .01 level and learning management design skills were at a high level.

Conclusion

According to the study of best practice in small school management, the learners score the Ordinary National Educational Test (O-NET) on Mathematics and Science higher than the national average, finding a small school development model using the learning community and studying the effects of small school development using the learning community found that the learners had higher learning behaviors than 70 percent. In terms of work and attitudes were at a high level. From tracking the Ordinary National Educational Test (O-NET) score in the academic year 2019, it was found that 2 out of 3 schools had Mathematics and Science averages above the national average. A model for developing a small school using professional learning community was shown in Figure 1.



Figure 1. *The model of development the quality of educational achievement the small school has low O-NET by PLC*

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