A Model of Teacher Leadership Development on Competency-Based Learning Management for Teachers in Science and Technology Department in Large-Sized Secondary Schools under the Office of the Basic Education Commission in the Northeast

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Abstract

The objectives of this Research and Development were to: Develop Competency-based learning management for Teachers of the science and technology Departments in large-sized secondary Schools under the office of the basic education commission in the northeast. The findings were as follows: I) There were five main components in Developing Teacher Leadership in Competency-based, namely 1) Process management as the basis for learning 2) Self-development and peer teachers 3) Development Course 4) Performance measurement and evaluation 5) Characterization as the teacher. II) The necessary needs of teacher leadership for competency-based learning management were as follows: 1) Performance measurement and evaluation PNI $_{Modified}$ = 0.842 and 2) Process management is the basis for learning PNI $_{Modified}$ = 0.297. III) A Model for Developing Teacher Leadership in Competency-based for use of the form, Origin, and significance of form, principle, purpose, The content of the format, The process of form supervision, and follow-up 4) Analysis of results. Pre-test and Post-test Score before training and after training difference are significant at.05.The results of the evaluation of the behavior and leadership of the teacher in the field of learning management and overall performance in the process of management and learning are very high ($\bar{x}$=4.026, S.D.=0.699) and In terms of performance measurement and evaluation, the average value is very high ($\bar{x}$=4.144, S.D.=0.710), statistically used by one sample t-test Compared with the average criterion of 3.51, it was found that the average score of teacher leadership behavior in the competency-based learning management was higher than the average of 3.51 with a statistical significance at .05.

Keywords: model of development, teacher leadership, competency-based, instructional

1. Introduction

Education management that does not meet the country's development goals, Educational quality, and the learning of Thai people is still at a relatively low level. The Basic National Education Test (O-NET) results found that the average was low in all subject groups. And scores on the Program for International Student Assessment (PISA) were lower than many other countries at a similar level of development. There are 46.75 percent of students with academic results, low and only 0.46% had a high academic performance (Education Council Secretariat, 2019). These problems are caused by curriculum and system limitations that emphasize teaching content and memorizing rather than developing skills and competencies. As a result, students lack creativity. Factors supporting learning management, Teaching quality, and teachers are not evenly distributed especially in remote areas (Office of the Education Council, 2017). And the problem of Thai students can be seen as a problem in terms of application because the school education system still adheres to traditional teaching methods. The learners are instilled with rote learning for exams rather than learning for critical thinking and synthesis, and aiming to create a body of knowledge to occur by oneself.

The problem of inferior quality of learners who are unable to apply the knowledge, understanding, skills, and characteristics they have learned to work and daily life. As a result, education needs to shift its focus from content base to performance-based (competency-based). Competency-based courses are different from the current curriculum. It exactly target and focus on the performance of the learners which is what the learners will be able to do. This is different from a standards-based curriculum that has many standards and indicators which emphasize what students need to know Competency-based courses focus on skills (Skill), while standard-based courses rather

focus on content. The competency-based curriculum, therefore, is a curriculum based on the ability that the learners should be able to perform to ensure that graduates at certain levels have the skills and competencies they need (Office of the Education Council, 2019). Teachers provide proactive learning for learners to learn from thinking, practicing, acting, receiving feedback, improving, developing, and being encouraged to apply the knowledge, skills, and traits learned to use in various situations until the performance level required by each student It may take time to learn differently (Office of the Education Council, 2019).

Therefore, teachers are considered as the most important people to change education in the 21st century. As a result of the current world, teachers must develop themselves and learn to adjust according to things and time which is fast changing. Preparing teachers as educational designers in the classroom to arrange to learn for students to be ready, it is very important to be aware of the trend of changes that occur, in the development of science teachers. future mathematics "To raise the level of education It is necessary to rely on teachers as the main force that is important in pushing forward and achieving results Institute for the Promotion of Teaching Science and Technology (IPST) has set development goals for teachers to be able to manage competency-based learning appropriately under the competency-based curriculum measurement and evaluation of learning that focuses on performance rather than cognitive memory (Limpichunnong, 2021).

2. Research Objective

The objectives of this Research and Development were to:

1) Determine components of teacher leadership in Competency-based instruction.

2) Study the need for developing a model of instructional leadership of teacher competency in learning management.

3) Develop a model of instructional leadership of teacher competency in learning management.

4) Study effects of using a model of instructional leadership in Competency-based instruction for Teachers in the science and technology departments in large-sized secondary Schools secondary under the office of the basic education commission in the northeast.

3. Research Method

There are four steps in Research and Development, as follows:

Step 1: Study the components of teacher leadership in competency-based learning management for Teachers in the science and technology departments in large-sized secondary Schools secondary under the office of the basic education commission in the northeast. By collecting data from a group of informants who are experts

Step 2: Study the necessary needs for developing teacher leadership in competency-based learning management for Teachers in the science and technology department in large-sized secondary Schools under the office of the basic education commission in the northeast. The sample group consisted of 365 school administrators: science and technology teachers and in large-sized Secondary school Educational under The Office of the Basic Education Commission in the Northeast. The sample size was determined by applying Krejcie and Morgan table. The samples were selected through a multi-stage random sampling

Step 3: Develop a teacher leadership development model for competency-based learning management for Teachers in the science and technology department in large-sized secondary Schools secondary under the office of the basic education commission in the northeast. By collecting data from a group of informants who are experts

Step 4: To study the results of using the teacher-collecting leadership development model for competency-based learning management for Teachers in the science and technology department in large-sized secondary Schools secondary under the office of the basic education commission in the northeast. The experiment was conducted with 10 science teachers at That Phanom School, Nakhon Phanom, Thailand.

Details of the research method are shown in Figure 1.

Research phase	Action activities	Results
Step 1: Study the components of teacher leadership in competency-based learning management for teachers in science and technology learning groups large secondary school Under the Office of the Basic Education Commission in the Northeast.	Study of the components of teacher leadership in competency-based learning management from work document analysis of 15 related research papers and interview of 10 experts, divided into 5 qualified experts to determine the components and other 5 experts to confirmed the components	Components of teacher leadership in competency-based learning management for teachers in science and technology learning groups within large secondary school Under the Office of the Basic Education Commission in the Northeast
Step 2: Study of the necessary needs for developing teacher leadership in competency-based learning management for teachers in science and technology learning groups in large secondary schools Under the Office of the Basic Education Commission in the Northeast.	Study the current condition and should be condition of teacher leadership in competency-based learning management by using a questionnaire. The sample group consisted of 365 school administrators and academic teachers, divided into 73 administrators and 293 science teachers.	The hierarchy of needs is necessary to develop a teacher leadership development model on competency-based learning management for science and technology learning subject teachers within large secondary schools Under the Office of the Basic Education Commission in the Northeast
Step 3: Develop a teacher leadership development model for competency-based learning management for teachers in science and technology learning groups within large secondary school Under the Office of the Basic Education Commission in the Northeast.	Draft the model of teacher leadership in learning management competency. The consistency of the model was examined by 5 experts. The model was examined by focusing on the group method to consider the draft model of teacher leadership development in management learn competency base	Teacher Leadership Development Model for Competency-Based Learning Management for Teachers in the Science and Technology Learning Subject Group large within secondary schools Under the Office of the Basic Education Commission in the Northeast
Step 4: To study the results of using the teacher leadership development model for competency-based learning management for teachers in science and technology learning groups within large secondary schools Under the Office of the Basic Education Commission in the Northeast.	The study visits a pilot school for the use of a competency-based curriculum for 8 hours, an 8-hour training on teacher leadership in competency-based learning management, and a 15-hour practical/experimental model. Target groups Science teachers at That Phanom School, 10 people, the academic year 2021	Acknowledge the results of using the teacher leadership development model for competency-based learning management for teachers in the science and technology learning subject group within large secondary school Under the Office of the Basic Education Commission in the Northeast

Figure 1. Research phase, action activities, and results

Table 1. Research plan

Research phase	Method	Information provider	Data analysis	Processing time	Results
Step 1: Study the components of teacher leadership in competency-based learning management	1. Analyze documents and research related to teacher leadership in competency-based learning management. 2. Interview experts to determine the composition. 3. Interview with experts to confirm the composition.	1. Related documents and research 2. Qualified person to find the composition of 5 people 3. Qualified person to confirm the composition of 5 people	1. Select 40 percent of the frequency component 2. Analyze Content 3. Confirm suitability and feasibility from experts, analysts, $\overline{X}$ and S.D.	December 2021 to March 2022	Components and conceptual framework of Research
Step 2: Study the necessary needs for developing teacher leadership in competency-based learning management.	The data in Phase 1 were used to construct a questionnaire on the real and expected conditions of teacher leadership development in competency-based learning management. Bypassing the quality inspection of tools from qualified people and advisors.	Administrators science and technology learning teachers 365 people	Modified Priority Index (PNI Modified) PNI Modified = (I-D)/D	April 2022 Until July 2022	The hierarchy of needs is necessary to develop a teacher leadership development model for competency-based learning management.
Step 3: Develop a teacher leadership development model for competency-based learning management	1. Draft a teacher leadership model for competency-based learning management. 2. Model consistency check by 5 experts 3. Check the format by the focus group method.	1. Conformity check 5 experts 2. Focus group method, 7 experts	Check for consistency, look for IOC values, and check content analysis patterns	August 2022 to September 2022	Teacher leadership model for competency-based learning Management
Step 4: To study the results of using the teacher leadership development model for competency-based learning management	1. study visit 2. workshop 3. Practical/Trial on the pattern	10 science teachers	statistics Wilcoxon Sign Rank Test, One Sample t-test analysis, and S.D.	October 2022 to November 2022	Acknowledged the results of using the teacher leadership model for competency-based learning management.

4. Results

I) The results of the study of the components of teacher leadership in competency-based learning management for teachers of science and technology learning subjects in large secondary schools Under the Office of the Basic Education Commission in the Northeast

The results of the synthesis of components of teacher leadership in competency-based learning management For teachers of science and technology learning subjects in large secondary schools Under the Office of the Basic Education Commission in the Northeast from 15 relevant documents and research sources, using the criterion of a frequency of 6 or more, which is equal to or more than 40% of the total frequency These were consistent with the results from the component studies and confirmed the following components: 1) Competency-Based Learning Management Process 2) Self-development and fellow teachers 3) Competency-Based Curriculum Development 4) Competency-Based Measurement and Evaluation and 5) Teacher Characteristics

II) The results of the study of the needs needed to develop a teacher leadership development model for competency-based learning management for teachers in science and technology learning groups in large secondary schools Under the Office of the Basic Education Commission in the Northeast. The result is shown in Table 2.

Table 2. The reality and the ideal condition of teacher leadership in management

Component	The condition should be (I)			The true condition (D)			PNI modified	Prioritize
	$\bar{x}$	S.D.	Interpret	$\bar{x}$	S.D.	Interpret		
1. Competency-Based Learning Management Process	4.525	0.611	highest	3.487	0.992	moderate	0.297	2
2. Self-development and fellow teachers	4.539	0.649	highest	4.410	0.786	high	0.029	4
3. Competency-Based Curriculum Development	4.432	0.724	high	4.266	0.820	high	0.038	3
4. Competency-Based Measurement and Evaluation	4.532	0.646	highest	3.690	0.723	high	0.842	1
5. Teacher Characteristics	4.556	0.633	highest	4.439	0.746	high	0.026	5
Total average	4.516	0.652	highest	3.738	0.813	high	0.245	

The expected state and actual state of teacher leadership in learning management as a whole were found that the expected state was at the highest level ($\bar{x}$= 4.516, S.D. = 0.652). That the aspect with the highest average value in ideal conditions was the teacher's attributes was at the highest level ($\bar{x}$ = 4.556, S.D. = 0.633). The overall actual situation was at a high level ($\bar{x}$= 3.738, S.D. = 0.813). The aspect with the highest real-world mean was teacher attributes. is at the highest level ($\bar{x}$ = 4.556, S.D. = 0.633)

When considering the needs index needed to develop teacher leadership in learning management as a composite average, it was found that the necessary needs index was PNI Modified = 0.245. The component with the highest necessary needs index was the measurement and evaluation of the performance base with the PNI Modified = 0.842, followed by the process. Management of competency-based learning with PNI Modified = 0.297. The competency curriculum development had PNI Modified = 0.038, PNI Modified = 0.029 for self-development and fellow teachers, and PNI Modified = 0.026 for teacher attributes, respectively. The average needs were 1) the measurement and evaluation of the competency base had a PNI Modified = 0.842 and 2) the learning management process had a PNI Modified = 0.297.

III) The results of the development of the teacher leadership development model for competency-based learning management. For teachers of science and technology learning subjects in large secondary schools Under the Office of the Basic Education Commission in the Northeast Details are shown in Table 3.

Table 3. The results of checking the consistency of the teacher leadership development model in terms of competency-based learning management

Assessment Items	Consistency	Interpret
1. Guidelines for using patterns	1.000	appropriate
2. The origin and importance of the pattern	1.000	appropriate
3. Principles	0.800	appropriate
4. Purpose	0.800	appropriate
5. contents of patterns	1.000	appropriate
6. Methods for development	1.000	appropriate
7. supervision and monitoring	0.800	appropriate
Total average	0.914	appropriate

Table 3 shows the result of checking the consistency of the teacher leadership development model in the competency-based learning management for teachers in the science and technology learning subject group of large secondary schools under the Office of the Basic Education Commission. in the Northeast By 5 experts, it was found that the concordance assessment was between 0.800-1.000 and the overall mean was 0.914 Therefore, the teacher leadership development model for competency-based learning management for teachers in the science and technology learning subject group of large secondary schools under the Office of the Basic Education Commission in the Northeast be consistent and appropriate The pattern consists of Guidelines for using patterns, origins and importance of patterns, principles, purposes, contents of patterns. Methods for Development and Supervision and Monitoring The development process is shown in Figure 2 and the

composition of the model is shown in Figure 3.

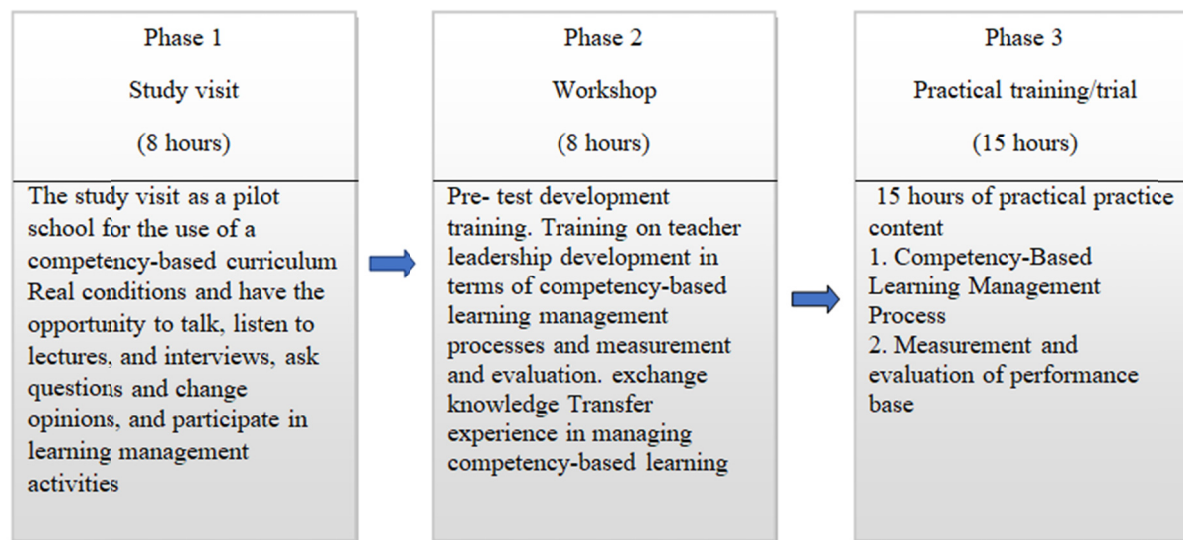| Phase 1 Study visit (8 hours)		Phase 2 Workshop (8 hours)		Phase 3 Practical training/trial (15 hours)
The study visit as a pilot school for the use of a competency-based curriculum Real conditions and have the opportunity to talk, listen to lectures, and interviews, ask questions and change opinions, and participate in learning management activities	→	Pre- test development training. Training on teacher leadership development in terms of competency-based learning management processes and measurement and evaluation. exchange knowledge Transfer experience in managing competency-based learning	→	15 hours of practical practice content 1. Competency-Based Learning Management Process 2. Measurement and evaluation of performance base

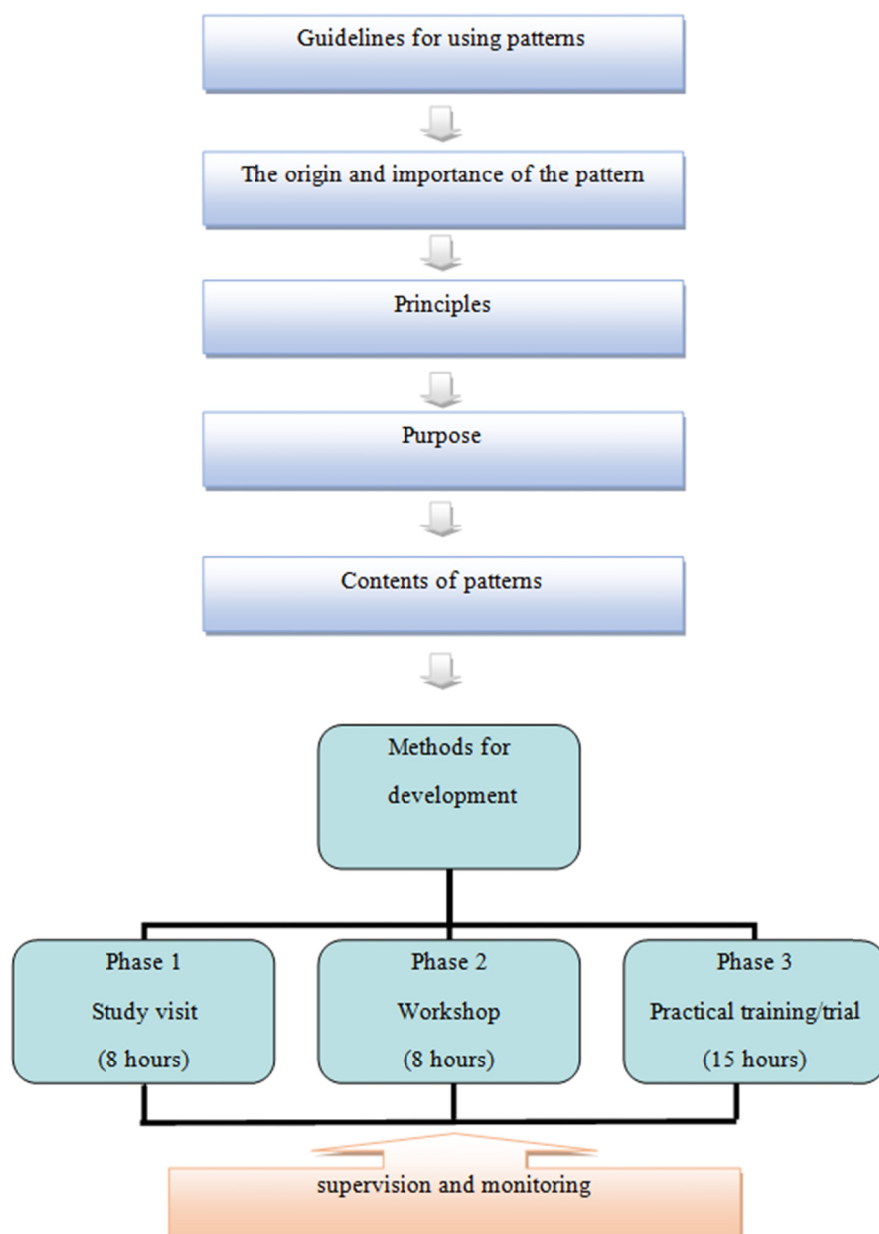Figure 2. Teacher leadership development model process competency-based learning management

Figure 3. Teacher leadership development model process competency-based learning management

IV) The results of using the teacher leadership development model for competency-based learning management for teachers of science and technology learning subjects in large secondary schools Under the Office of the Basic Education Commission in the Northeast Are shown in Table 4.

Table 4. The results of the analysis compare the scores before the training and after the workshop (Pre-test and post-test)

test	sample (n)	$\bar{x}$	S.D.	Mean Rank	Sum of Ranks	P
Score before the workshop (Pre-test)	10	12.100	2.330	0.000	0.000	0.005
Score after the workshop (Post-test)	10	23.500	3.689	5.500	55.000	

Note. Statistical significance .05.

From Table 4, the results of the analysis compare the scores before the training and after the workshop. A sample

of 10 people was analyzed by statistics Wilcoxon signed rank test found that the pre-test score was 12.100, the standard deviation (S.D.) was 2.330, and the post-test score was 23.500, The standard deviation (S.D.) was 3.689, the size of the difference in each group (Mean Rank), the score after the workshop (Post-test) was greater than 5.500, and the overall difference (Sum of Ranks) found that the score after the workshop (Post-test) was more than 55.000. The score before the training and after the workshop was significantly different at .05, with the score after the workshop being higher than the score before the workshop.

Table 5. Analysis results of the teacher leadership behavior assessment form on competency-based learning management for teachers of science and technology learning subjects in large secondary schools Under the Office of the Basic Education Commission in the Northeast

No. Behavior	$\bar{x}$	S.D.	Interpret
1. Competency-Based Learning Management Process	4.026	0.699	high
1.1 learner analysis	4.080	0.603	high
1.2 The learning management design is suitable for the learners.	3.920	0.746	high
1.3 cognitive skills	4.233	0.750	high
1.4 learner development	4.133	0.754	high
1.5 Use of Media and learning resources	3.750	0.668	high
1.6 follow-up	4.040	0.678	high
2. Performance-Based Measurement and Evaluation	4.144	0.710	high
2.1 learning assessment planning	4.166	0.680	high
2.2 Authentic assessment	4.100	0.610	high
2.3 Creating and finding quality tools	4.047	0.946	high
2.4 Learning Appraisal Enhancement	4.266	0.606	high

Table 5, the analysis results of the teacher leadership behavior assessment form on the competency-based learning management for teachers of science and technology learning subjects in large secondary schools under the Office of the Basic Education Commission in the northeastern region, as a whole, the average of the competency-based learning management process was at a high level ($\bar{x}$=4.026, S.D.=0.699). The mean was at a high level ($\bar{x}$=4.144, S.D.=0.710).

Table 6. Results of the analysis of teacher leadership behavior on competency-based learning management using statistics One sample t-test (Test Value = 3.51).

Variable	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Average rating	12.845	9	.000	.800	.659	.941

Note. Statistical significance .05.

Table 6, the analysis results of the teacher leadership behavior assessment form on the competency-based learning management for teachers in science and technology learning groups in large secondary schools Under the Office of the Basic Education Commission in the Northeast using one sample t-test compared to the mean criterion of 3.51, it was found that the mean score of teacher leadership behavior on competency-based learning management was higher than the mean of 3.51, at a statistically significant level of .05.

5. Discussion

From the research results, it was found that the components of teacher leadership in the competency-based learning management for teachers in science and technology learning groups large in secondary school Under the Office of the Basic Education Commission in the northeastern region, there are 5 components as follows: 1) competency-based learning management process, 2) self-development and fellow teachers, 3) competency-based curriculum development, 4) competency-based measurement and evaluation, and 5) teacher characteristics from the research results, there are issues that are discussed as follows:

I) The results of the component analysis of teacher leadership in competency-based learning management for teachers in science and technology learning groups in large secondary schools under the Office of the Basic Education Commission in the Northeast found that the performance-based learning management process had the

highest frequency. The total frequency was 13, representing 86.67 percent, indicating that it was the most important component of teacher leadership in competency-based learning management. This is because the learning management process is important. Teachers must understand the algorithm learner analysis learning management design and Guidelines for developing students which correspond to the Ministry of Education (2008) stated that learning management is an important process in implementing a curriculum to provide learners with knowledge and competency according to learning standards/indicators. Key competencies of learners and desirable characteristics as defined in the Basic Education Core Curriculum, 2008, based on the principle that learners are the most important. The learning management process must encourage learners to develop naturally and to their full potential.

Components of self-development and fellow teachers, with a frequency of 10, representing 66.67 percent. From the synthesis of the components, it was found that there is another component that the researcher can take as a sub-component whose frequency is less than 40%. The researcher did not cut it out but considered it in the component of self-development and fellow teachers, namely: Transformational leadership consists of a commitment to self-improvement acting as a role model, being a leader in the development of fellow teachers and fellow professionals a person of learning, and leadership in change This is because of the current state of teaching and learning management during the epidemic situation of the coronavirus 2019. Modified to suit the situation teachers need to continuously improve themselves. Transformational leadership is therefore essential for today's teaching and learning management which corresponds to Ratanit (2013) and Office of Teacher Development and Educational Personnel (2010) have said Leadership self-development must adhere to the principles of leadership development by Starting from voluntary and willing develop yourself with Determined to operate with clear goals able to control and modify internal factors related to the environment and is a continuous learning process. It is also a study and research follow-up and exchange of new academic and professional knowledge.

II) The results of the study of the needs needed to develop a teacher leadership development model for competency-based learning management. For teachers of science and technology learning subjects in large secondary schools Under the Office of the Basic Education Commission in the Northeast, The aspects that are more necessary than the overall mean are 1) Measurement and evaluation of competency-based results and 2) Competency-based learning management process. The researcher, therefore, took 2 components that were the most necessary and more than the overall average to develop a model. This is in line with Thaicharoen (2018) emphasize the importance of measuring and evaluating performance-based results. According to the study of the development of indicators for science teachers in the 21st century, Component 5, Measurement and Evaluation. Demonstrate that science teachers understand the principles and methods of measurement and evaluation, and are constantly monitoring and evaluating learners' learning using a variety of tools.

III) The results of the development of a teacher leadership development model for competency-based learning management for teachers in science and technology learning groups in large secondary schools under the Office of the Basic Education Commission in the Northeast The researcher drafted the model and checked for consistency. 7 experts were considered by focus group discussion. The format was adjusted according to the experts' suggestions. The elements of the pattern include guidelines for using patterns, The origin and importance of the pattern, Principles, contents of patterns, Methods for development and supervision and monitoring which is consistent with the elements of the style of Kunlasant (2014), Promsom (2016), and Akarachan (2017) found the constituents of the model were studied in summary, consisting of 1) the principles of the model, 2) the purpose of the model, 3) the contents of the model, 4) the development process, and 5) measurement and evaluation. The model created and further developed by the researcher in terms of the components of the teacher leadership development model on competency-based learning management is a recommendation for the use of the model and the importance of the model. Because before using it, teachers must know the instructions for using the model and know the origin and importance of the model to apply the guidelines to meet the objectives, which is in line with the recommendations of experts from consideration by Focus Group Discussion.

IV) The results of the analysis of the comparison of scores before the training and after the workshop revealed that the score after the workshop (Post-test) was more than 55.000. The scores before and after the workshop were significantly different at .05, with the score after the workshop than before the workshop and the assessment of teacher leadership behavior in terms of competency-based learning management for teachers in science and technology learning groups in large secondary schools under the Office of the Basic Education Commission in the Northeast. Overall, the average performance-based learning management process was at a high level ($\bar{x}$=4.026, S.D.=0.699) in measurement and evaluation of performance bases The mean was at a high level ($\bar{x}$=4.144, S.D.=0.710) Because, during the workshop, the speakers emphasized on the real practice. Use the way to exchange knowledge, and let the teacher participate in the activity to give teachers more knowledge and experience,

including the characteristics of willing science teachers. Likes to study, research, and try new things. This is in line with the behavior and characteristics of teachers as mentioned, such as Direk (2015) have studied the component analysis of the competency of science teachers at the secondary level under the Office of Secondary Education Service Areas 39, 41 and 42 found 4 elements, namely the characteristics of being a teacher scientific attitude, knowledge, and teaching practice

6. Recommendations

6.1 Suggestions for Use

From the research, it was found that the components of teacher leadership in competency-based learning management consisted of 5 elements as follows: 1) Competency-based learning management process 2) Competency-based curriculum development 3)Self-development and fellow teachers 4) Measurement and evaluation performance-based results 5) Teacher characteristics Relevant agencies should implement the following: Teachers and administrators should use the research results from the synthesis of teacher leadership components for competency-based learning management. For teachers in science and technology learning groups to be used as a framework for formulating teacher development policies in terms of learning management or other aspects to achieve effective administration in the context of large secondary schools.

The results of considering the needs index for teacher leadership development in terms of learning management as competencies found that the elements that were most needed were considered to be greater than the overall average namely 1) measurement and evaluation of competency-based results and 2) competency-based learning management process. Therefore, the development of teacher leadership in the aforementioned components should be accelerated, and educational institute administrators should promote learning management by appointing a steering committee with an emphasis on supervision, follow-up, and advice on learning management also good friends with a supervision network at the school level and the agency.

6.2 Suggestions for Further Research

The components of teacher leadership in competency-based learning management should be studied at other educational levels, e.g. early childhood education, Vocational and higher education.

The model obtained from this research should be applied to small and medium schools according to the school context under the Office of the Basic Education Commission in the Northeast to consider the effect that the developed model enhances the development of teacher leadership in competency-based learning management.

Study the approach by studying the components of leadership, morality, Media, and innovation or other aspects because in addition to teacher leadership in competency-based learning management. Other elements are necessary to develop teachers to become professional teachers as well.

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