Strategies for the Improvement of Teachers' Information and Digital Technology Competencies of Opportunity Expansion Schools in Northeastern Region

Rujira Laorith[1]
and Sasirada Pangthai[2]
Northeastern University, Khon Kaen, Thailand
[1]rujira7217@gmail.com

Abstract - The objectives of this research were to investigate the elements and indicators, to study the current situation and the desirable condition of the teachers' information and digital technology competencies, and to develop strategies for improving the teachers' competencies of Opportunity Expansion Schools in Northeastern Region. This research was conducted through mixed-methods research and divided into 3 phases. As for the samples, there were 456 of school administrators and teachers by using multistage sampling method. The research instrument was 5−level rating scale questionnaire with value of Index of Item-Objective Congruence (IOC) between 0.80-1.00 and reliability at 0.91. The statistics used for data analysis were frequency, mean, standard deviation and need priority index ($PNI_{modified}$).

The results are as follows: 1) The components of teachers' information and digital technology competencies of Opportunity Expansion Schools in Northeastern Region consist of three primary elements, namely: (1) knowledge; (2) skills; and (3) attitudes, 2) As for the current situation and desirable conditions of teachers' information and digital technology competencies of the above-stated schools, the mean score is at moderate level and the desirable condition is at the highest level, and 3) Regarding the strategies for the improvement of teachers' information and digital technology competencies of the afore-mentioned schools, there are 3 strategies with 17 measures and 27 indicators. Those strategies are: 1) improving knowledge of information and digital technology, 2) promoting a positive attitude towards information technology and digital, and 3) enhancing skills in using information and digital technology.

Keywords - Strategy; Teachers' Competencies; Information and Digital Technology

I. INTRODUCTION

Information technological and digital advancement are important factors for social and economy improvement of the country. Those who access to information technology inefficiently have become disadvantages. Especially, when a great number of media and information have arrived but citizens had not been prepared or educated to approach information efficiently. This led to worse moral, ethnic, and social values decline, especially, children and teenagers who lack of discretion or adaptation ability. Therefore, the Twelfth Plans and Strategies of National Economic and Social Development focus on production and improvement of teachers with competencies who are able to adapt learning process which encourage learners to learn practically. The Plans and Strategies also emphasize science and technology skills in

order to make learners' qualities such as skills, knowledge, ability, and competency, ready for labor market.

The policies of every government always aims at information technology for education, or provides media and information technology training for teachers, especially, the current government. General Prayut Chan-o-cha declared to National Legislative Assembly on September 12, 2014 that the government policies focused on teacher production and improvement system, in order to create professional teachers with qualifications. The teachers must teach the subjects according to their educational background and use information technology for their teaching or personal learning, including competence evaluation system that mainly reflects class management and learner improvement efficiency.

Nevertheless, the Thailand teacher production and improvement report showed that most of the teachers teach without teaching media because of many reasons such as the lack of media, media usage neglect and attachment to old fashioned teaching styles. The teachers did not use any media for teaching or class activities, so the teacher trainings became inefficient.

As a result of many research results pointed out, the same old problem about basic education is that the teachers did not use information technology in teaching and learning because they lack of knowledge and had not been trained to use information technology efficiently. Aforementioned, when they use information technology, they only used it for presentation. They did not integrate information technology for variety of teaching and learning, so the learners only learn about subject matters. However, information technology nowadays also plays important roles in learners all rounded skills development such as critical thinking skill, communication skill, and team working skill, which are essential for learners course of life and working in the 21st century.

The overall country teacher improvement reports showed that every government paid attention to teacher improvement policy but they found that those improvement lack of consistency especially on "competency" improvement. Moreover, teacher improvement also lacks of planning, direction, and systematically improvement information overview. So the training courses are overlapping, inconsistent, lack improvement subject to real situations, and defeated the purpose of teacher training and improvement. Therefore, the teacher improvement lack of freedom to manage the training according to the different purposes of each region. So, the teachers were not developed both knowledge and class management for improving learners' qualities.

The problems and crisis mentioned above need to be analyzed about northeastern region opportunity expansion school teachers' information and digital technology competencies in order to receive important basic information about teacher production and improvement. The information will be used to produce and develop teachers who are able to use nowadays technology properly, correspond with government's national economic and social development plan and national education plan.

II. OBJECTIVES

1) To study elements and indicators of northeastern region opportunity expansion school teacher information and digital technology competencies.

2) To study current condition and ideal condition of northeastern region opportunity expansion school teacher information and digital technology competencies.

3) To improve strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region.

III. RESEARCH METHODOLOGY

To do strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region research, researchers had done in 3 phases as following.

Phase 1: Study elements and indicators of northeastern region opportunity expansion school teacher information and digital technology competencies.

Step 1, Study about concepts, theory, and related research in order to get all elements to improve strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region. Specified research framework by 1) Study concepts, theory, and related researches about strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region and 2) Investigated and evaluated the information, then specified research framework.

Step 2, Investigated and evaluated strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region elements. The informants about northeastern region opportunity expansion school teacher information and digital technology competencies are experts, school directors, teachers, school administrators, and 5 Doctor of Philosophy Program in Educational Administration lecturers who are experts of teacher's information technology competencies. The Doctor of Philosophy Program in Educational Administration lecturers analyzed, evaluated, and gave some advices about research elements. Researchers use purposive sampling. Evaluation instruments are instruments researchers created for evaluating strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region elements.

There are two parts: Part 1 is experts' information and Part 2 are opinions about northeastern region opportunity expansion school teacher information competencies elements and suggestions, data collection. Researchers informed invitation letters to collect research elements evaluation data from 5 Northeastern University Faculty of Education instructors. After that, researchers appointed and cooperated with experts to send and receive research elements evaluation. For the data analysis, researchers brought research elements evaluation results from the surveys to analyze by percentage and frequency distribution methods. Opinions and suggestions were also used for content analysis.

Phase 2: Study northeastern region opportunity expansion school teacher information and digital technology competencies current condition and ideal condition. It is the quantitative study of current condition and ideal condition of strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region. Researchers study northeastern region opportunity expansion school teacher information and digital technology competencies current condition and ideal condition from 456 research samples by using Krejcie and Morgan Formula. Researchers hand in surveys to expert instructors to analyze and evaluate to find content validity. Item Objective Congruence value (IOC) is between 0.80 to 1.00, tested the quality of whole surveys by trying out to 30 random participants in opportunity expansion schools in Chaiyaphum Primary Educational Service Area who are not already in the samples group. Find the reliability of the survey by using Alpha Coefficient Cornbrash and got 0.91 reliability number. Moreover, researchers also analyzed by descriptive statistics, frequency, percentage, average, standard deviation, and $PNI_{modified}$.

Phase 3: Improvement strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region: 1) Analyze the necessity of teachers' information

and digital technology competencies improvement, 2) Improve the blueprint of teachers' information and digital technology competencies, 3) Examine and confirm teachers' information and digital technology competencies improvement strategies by holding Focus Group Discussion by 13 experts, and 4) Evaluate the aptitude and the possibility of teachers' information and digital technology competencies improvement strategies in 30 people.

IV. CONCLUSION

1) Research result of Strategies for the Improvement of Teachers' Information and Digital Technology Competencies of Opportunity Expansion Schools in Northeastern Region, there are 3 fields of the result which are: (1) Knowledge competencies; (2) Skills competencies; and (3) Attitudes competencies.

2) Research result of current condition and ideal condition of northeastern region opportunity expansion school teachers' information and digital technology competencies.

2.1 The current strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region condition at the moderate level. After considered in each field separately, we have found that the practical level is medium in all aspects. The average score in descending order are knowledge competencies, attitude competencies, and skills competencies respectively.

2.2 Ideal strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region condition at the highest level. After considered in each field separately, we have found that ideal conditions in these field in descending order are knowledge competencies, attitude competencies, and skills competencies respectively.

3) Improvement strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region, 3

strategies, 17 measures, 27 indicators. Strategies arranged by PNI$_{modified}$ order are as followings.

First Strategy; Improve information and digital technology knowledge.

Purpose: Teachers understand how to use information and digital technology, lead to teacher efficiency which affects learners' success.

Measures: (1) Enhance information and digital technology usage knowledge; (2) Enhance knowledge and comprehension of how information and digital technology works, how to solve the problems and the digital technology maintenance; and (3) Enhance applications comprehension and knowledge (Facebook, Google app., YouTube, Kahoot, Coding, and 4G/5G technology).

Success Indicators: (1) Percentage of teachers who know how to use information and digital technology; (2) Percentage of teachers who acquire information technology literacy with learners' education; (3) Percentage of teachers who know about basic digital technology problem solving; (4) Percentage of the teachers with digital technology maintenance skills; (5) Percentage of the teachers who know how digital technology and other digital medias work; (6) Percentage of the teachers who evaluate learning result by using information technology; (7) Percentage of the teachers who have moral knowledge, information technology and digital medias law knowledge; and (8) Percentage of teachers who understand applications (Facebook, Google app., YouTube, Kahoot, Coding, and 4G/5G technology).

Second Strategy; Create good attitudes towards Information technology and digital.

Purpose: Teachers have good attitudes towards Information technology and digital.

Measures: (1) Create technology and digital benefits awareness; (2) Create fair and legal digital technology awareness; (3) Create good attitudes toward research and innovation participation; (4) Create coordination in using technology for education; and (5) Create

understanding about information literacy and digital usage rules.

Success Indicators: (1) Percentage of the teachers who values technology and digital benefits; (2) Percentage of the teachers who fairly and legally use digital technology; (3) Percentage of the teachers who have good attitudes toward research and innovation participation; (4) Percentage of the teachers who participate information technology improvement for education; (5) Percentage of the teachers who understand and accept the information technology and digital usage rules and regulations; (6) Percentage of the teachers who ethically follow information technology rules and regulations; and (7) Percentage of the teachers who use information technology and digital medias to communicate with the others ethically.

Third Strategy; Enhance Information and digital technology usage.

Purpose: Teachers efficiently use information and digital technology to improve learners.

Measures: (1) Enhance various technology usage ability to support interactions with learners; (2) Improve various digital medias for innovations; (3) Improve learning and teaching output evaluation by information technology and digital; (4) Increase software, network, and applications (Facebook, Google app., YouTube, Kahoot, Coding, and 4G/5G technology) usage levels; (5) Increase the level of learners' creative thinking and critical thinking by using applied technology; (6) Improve teaching and learning class designed by information technology; and (7) Enhance organizations' data saving by digital technology.

Success Indicators: (1) Percentage of the teachers who use variable technology; (2) Percentage of the teachers who support interaction with learners by information technology; (3) Percentage of the teachers who use various technology in making innovations; (4) Percentage of the teachers who have innovations created by digital medias; (5) Percentage of the teachers who

evaluate teaching and learning by technology and digital; (6) Percentage of the teachers who use software, networks, and applications (Facebook, Google app., YouTube, Kahoot, Coding, and 4G/5G technology); (7) Percentage of the teachers who improve learners by using technology; (8) Percentage of the teachers who generate critical thinking and creative thinking for learners; (9) Percentage of the teachers who have creative output from technology; (10) Percentage of the teachers who design teaching and learning by technology; (11) Percentage of the teachers who use digital medias to save information data; and (12) Percentage of the teachers who satisfied with using information technology by digital media.

V. DISCUSSION

The research of Strategies for the Improvement of Teachers' Information and Digital Technology Competencies of Opportunity Expansion Schools in Northeastern Region would be discussed as followed:

1) Strategies for the Improvement of Teachers' Information and Digital Technology Competencies of Opportunity Expansion Schools in Northeastern Region is composition of 3 fields which are: (1) Knowledge competencies; (2) Skills competencies; and (3) Attitude competencies. This means any schools operate by these 3 compositions will be able to improve teachers' information and digital competencies, and become benefits to learners' efficiency. These elements conform with Scott Parry concepts based on David C. McClelland concept by defined competency as a cluster of knowledge, skills and attitude that affects a major part of one's job to achieve their goals. Therefore, information technology and communication competencies are not only understanding about information technology and communication, but they are applying information technology and communication knowledge in order to access management, integration, evaluation, information creation, and communication for efficient class management. Therefore, information technology competencies and communication attitude are not only having good attitude towards

information technology and communication but they are information technology demand and value appreciation communication. This encourage and support properly and legally use of information technology and communication along with law ethical and tradition social by divided 21st century Thai teachers' information technology and communication competencies into 3 fields. This correspond with United Nations Educational, Scientific and Cultural Organization (UNESCO, 2011). The research result showed that: (1) Attitudes directly influence information technology related professions and teachers' information acceptation; (2) Attitudes towards teachers' indirectly use of information technology; (3) Teachers' information technology skills both directly and indirectly influence knowledge management to information technology in teaching variables; and (4) Attitude positively related with information technology skill. Therefore, 3 fields of competencies are important to the improvement of teachers' information technology competencies, in order to efficiently encourage and improve information and digital technology teachers' professions.

2) The research on current condition and ideal condition for strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region in 3 fields of study found that current condition in all fields are at moderate level which could be ordered from the highest value to lowest value as follows; the highest value is knowledge competencies, skills competencies, and attitude competencies respectively. After study the ideal condition of strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region in 3 aspects, we have found that they are all at the highest level and could be ordered from the highest to the lowest as follows; knowledge competencies, attitude competencies, and skills competencies respectively. Researchers analyzed these statistics, using Matrix Analysis between current condition and ideal condition by considered at the 3.5 point of intersection (from 5 levels system). The

analyzing result shows that all 3 aspects are still not acceptable and need to be improved. And the result of PNI$_{Modified}$ in northeastern opportunity expansion school teachers' information and digital technology competencies analyzing found that requirements include knowledge competencies, skills competencies, and attitude competencies as disadvantages. In consequence, researchers rearrange the result of the study according to the need as follows; knowledge competencies, attitude competencies, and skills competencies, respectively. For the purpose that if teachers are skillful at information and digital technology, good attitudes will be created, and will also affect well trained skills, satisfy with National Education Act B.E. 2542 section 22 (Ministry of Education, 2545 B.E.) definitions. According to the Act, learning process must be able to improve learners naturally and thoroughly, and the learners are the most important. Therefore, 21st century teachers must know how to apply ICT with learners and also be able to design and apply ICT to lead learners to 21st century class management (James & Ron, 2011). Essential skills learners nowadays need are Learning and Innovation Skills include Information, Media, and Technology Skills. So, 21st century teachers need to have knowledge competencies for planning efficient teaching plans by ICT, and have skills competencies to apply ICT with learners creative thinking and critical thinking. The teachers also need to be flexible in order to create information technology learning environment and to create learner interaction, including evaluate learning and teaching process to design and improve class activities.

3) Improvement of strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region consist of 3 strategies, 17 measures, and 27 success indicators. Interesting strategies will be discussed as follows;

3.1 Assessment result of strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region.

Assessment result of strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region shows that the highest suitability average strategy is the First strategy, Information and digital technology knowledge improvement. The lowest suitability average strategy is the second strategy, making good attitude towards information and digital technology. As mentioned, Information and digital technology knowledge improvement could be considered as the most suitable for the practice because knowledge is the basic of good attitude and skills improvement satisfy with the research of Natterat, P. (2561 B.E.). There searcher had studied competencies frame programming, and presented guideline for 21st century teachers' information technology and digital competencies improvement. The most important strategy for learner improvement is information technology improvement for enhancing education level, and it also satisfy with Parichat, P. (2558 B.E.) who did research on the improvement of leader teachers' information and digital technology competencies for 21st century classroom activities. The researcher found that information and communication technology competencies is learners' success key. Information and digital technology competencies is teachers' improvement which is the benefits to higher learners output and achievements. For the good attitude towards information and digital technology creation which has the lowest suitability, it is possible that teachers think it is not difficult to create because everyone had already had good attitude towards information and digital technology.

3.2 The possibility of strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region research result. The possibility of strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region assessment result showed that the highest possibility average is the second strategy; creating good attitude towards information

and digital technology. The lowest possibility average is the third strategy; enhance information and digital technology using level. This research result means administrators and teachers value the importance of creating good attitude towards information and digital technology, satisfy with the research of Parichat, P. (2558 B.E.) that studied about information and communication technology competency of leader teacher that affects learning management efficiency. The important factor affects learning management efficiency is creating good attitude towards information and digital technology. On the other hand, enhancing information and digital technology using level is considered as the lowest possibility is because it has the lowest possibility compared with other issues.

3.3 The benefit of strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region strategies assessment result. The benefit of strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region that has the highest benefit average is the first strategy; improve information and digital technology knowledge. strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region that has the lowest benefit average is the second strategy; create good attitude towards information and digital technology. It is able to assume that information and digital technology knowledge improvement has the highest possibility because there are many computing science classes which focus on improving critical thinking and analyzing of Thai students, and make them ready for 21st century. This also satisfy with the research of Chawalee, S. (2558 B.E.) which studied about information and communication technology integration and studied communication and primary school education management. On the opposite way, creating good attitude towards information and digital technology have the lowest benefit average because it is not as

important as other aspects.

VI. SUGGESTIONS

A. Policy Recommendation for the Use of Strategies

1) Strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region had been created from opportunity expansion school data assessment. Therefore, the strategies are only suitable for improvement or problem solving of opportunity expansion schools. Other schools that interested in applying the strategies for the use need to adapt or modified the strategies for the best effectiveness satisfy with different context.

2) Strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region has 3 fields of aspects. Before applying mentioned strategy with schools, the schools need to study about purposes, measures and success indicators thoroughly for the best satisfy.

3) To use strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region, school officers need to be aware of importance of the strategy, because they are key person who will improve these strategies in the future.

B. Suggestion for Further Study

1) Researchers should study the practice of strategies for the improvement of teachers' information and digital technology competencies of opportunity expansion schools in northeastern region, and study how the strategy affects teachers and learner qualities in opportunity expansion schools.

2) Researchers should do the research on professional community, in order to improve teachers' information and digital technology competencies consistently and effectively in the future.

3) Researchers should do the research about teachers' information and digital technology competencies on other different school types.

REFERENCES

(Arranged in the order of citation in the same fashion as the case of Footnotes.)

[1] James, B. & Ron, B. (2011). 21st Century Skills: Rethinking How Student Learn. Bloomington, IN: USA.

[2] California Emerging Technology Fund. (2011). California ICT Digital Literacy Assessments and Curriculum Framework. Retrieved from <http://www.ictliteracy.info/rf.pdf/>. Accessed 27 February 2016.

[3] Suwanrassamee, C. The influence of factors affecting teaching methods using information technology. Journal of Education, 20(3): 79-92.

[4] UNESCO. (2011). Information and Communication Tools Competency Framework for Teachers (ICT CFT). Published in 2011 by the United Nations Educational, Scientifics and Cultural Organization.