Proactive Competency-Based Learning Management Model To Enhance The Teacher's Competencies In The Digital Age For Teacher Students

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Abstract: This research aimed to develop the proactive competency-based learning management model to enhance teacher's competencies in the digital age for professional teacher students using the research and development process. The research process is divided into 4 steps; 1) study of information, concepts, theories from papers and researches, 2) development of the proactive competency-based learning management model, 3) implementation of learning management model, and 4) assessment of the effectiveness of the learning management model. The sample consisted of 30 students in the 4th year of General Science program using the simple random sampling. The research tools were the digital age teacher competency appraisal forms and the questionnaires of students' opinion on learning management model. The data was analyzed using statistics, percentage, mean, standard deviation, t-test and content analysis. The research results revealed that 1) the proactive competency-based learning management model to enhance the teacher's competencies in the digital age of teacher students consisted of 5 components; principles, objectives, process of proactive competency-based learning management, implementation of model and the condition for the success. The 3 competencies which should be enhanced for being teachers in the digital age are being the teacher to guide and inspire, being the teacher to apply digital technology for learning management, and being the teacher with morality and ethics. 2) The results of experiment with students showed that after the experiment, the students had higher teachers' competencies than before the experiment with the statistical significance at level .05. 3) The students were satisfied with the overall proactive competency-based learning management model at a high level in all aspects.

Keywords: Learning management, Competency-Based Learning, digital age, teacher profession, Teacher student

1.   Introduction

The 21st Century is an era of social, economic and technological change that has an impact on the way of life and the way of work causing human resources to adapt and enhance their competencies to keep pace with the change as well as being a major force in driving towards 4.0 countries or developing the country to become the world country. The efficiency-driven economy is transformed into an innovation-driven economy. This is an important goal of national reform in order to strengthen the human capacity to support the 21st century world. The education is a mechanism used to improve the quality of life of members of society to enable everyone to live altogether happily and to be able to develop a stable and sustainable country according to the goals set by the United Nations in Goal 4, Quality Education. How high the education system is will depend on the quality of the teachers because the quality of teachers is the most important factor for the quality of a student's learning. The education system of high score countries is often a top priority for teachers. They choosing to use Qualified teachers. Teachers are the key people in the education reform process being an important outpost and mechanism for the development of learners and in a changing social environment (Office of the Education Council, 2017). Teaching and learning management of teachers is a critical factor for learners' learning. Teachers need to make adjustments and should be continuously developed. Their competencies must be developed in accordance with the changes to be able to practice or conduct activities in the teaching profession effectively (Dechakup & Kangkan, 2008). For the learning management in the 21st Century, it is an era in which people will encounter rapid, drastic, disruptive and unexpected changes in the world. The modern age therefore requires high skills to learn and adapt. The teachers are considered the persons who guide the way of thinking and are an important part of driving education responsible for learning management in order to develop quality learners to keep up with the changes of the country. Wichan Panich (2017) said that teachers have to change the learning goals of students from focusing on subjects to gain knowledge to developing the skills that are important for life in the modern age. The students must also have knowledge and ability, have competency in learning management, have knowledge of modern, extensive, knowledge of the world to keep pace with the advancement of science and technology and changes that occur all around.

Teacher production is likely to be the starting point to actively and continuously drive education for sustainable national development. If the graduates from the Faculty of Education become teachers in various roles and locations, they will have the potential and perspective of sustainable development. They will have the ability in education, management, and curriculum development. Learning management to develop the desirable

characteristics, media, measurement and evaluation can facilitate the development of learners to have the competencies necessary to develop the country. The teachers' production institutes should therefore strengthen the learning skills of the 21st century to prepare students for the increasingly complex world of work and life. Develop learning skills and innovation by integrating knowledge, specific skills, expertise, and know-how come altogether to achieve creativity and innovation. The students must have critical thinking with correct solution to the problem. There is creative communication and collaboration. In addition, in an era when information and communication technology has played an important role in all aspects of life, teachers have to change their way of thinking, adapt teaching methods to develop students to have sufficient skills to live in the era of facing with the change of things swiftly, stably and happily.

From the experience of researcher who had collected research data and academic services for schools, it was found that teachers were the heart of improving learning skills in the 21st century for students to reduce inequality problems. This is consistent with the past research of the Thailand Development Research Institute (TDRI) pointing out that the goals of the reform of the Thai education system are (1) development of the teaching and learning system to fulfill the potential of the students with 21st century skills, (2) development of quality teacher systems, (3) creation of accountability in the education system, and (4) reduce inequality problems in the education system. Therefore, when teachers are the key mechanism for improving the quality of education, we have to return to the upstream which is the teacher production system especially the production of teacher graduates of the Faculty of Education, Rajabhat University, which is a university for local and community development. It has a role and duty in developing teacher students to have professional competencies responding to the needs of countries that are moving towards the 4.0 era. When students and teachers are graduated, they must be able to develop learners to have knowledge of 21st century learning attributes and skills.

The Faculty of Education is therefore essential to train and develop teacher students to have the potential to be teachers suitable for the digital age or 21st Century Teachers. Teachers in the digital age have to adapt to their learning which change all the time. They have to continue developing skills, roles, duties, standards of using teaching materials in order to be able to guide and encourage students to learn at their own pace at all times. The teaching management model must focus on learning in the new era of online classrooms to promote lifelong learning, managing collaborative learning and communication resources, sharing learning using social media such as Facebook, Google+, Twitter or line, and teaching model using Google App through an application developed by Google. Teachers have more time to prepare to teach more fully. Teaching will be easier. The teaching time can be safe with more teaching content and purpose. The new form of teaching is where technology is applied in teaching or course activities allowing students to participate in teaching and doing more activities altogether Therefore, the teacher production institute plays an important role in the development of teaching and learning management that enhances the teacher competency of the teacher students before they can go on to perform as a teacher in various schools. This is the development of oneself to step into the new world of learning, adjusting the teaching and learning process to be in line with the changing behavior of the learners. The application of modern technology as a tool can stimulate the learning of the learners. It is a great challenge for teachers. The new learning society focuses on students not only gaining knowledge but having to be innovative. It is an important turning point for teachers to develop their potential to pass from the education system of Education 3.0 to a new teaching and learning system also known as Education 4.0.

The competency-based learning management is a teaching and learning management that uses learning outcomes as the goal to focus on the outcome that will have on the learners including the learner's ability to apply knowledge, skills, attitudes and attributes holistically in practicing, problem solving and living. It is the teaching and learning that is linked to real life. This is learning to be practical in real life situations not only for taking advantage. From this reason, the proactive competency-based learning management is able to develop students, teachers, knowledge, attitudes, and skills about the use of information and communication technology as a learning management tool that allows learners to participate in the process. The students will be able to develop necessary skills such as thinking skills, creativity including measurement and evaluation of learning and creative use of social networks. This will provide students and teachers with competencies in learning management that will empower learners to acquire necessary skills in line with the context and needs of the digital society effectively.

Therefore, the researcher was interested in studying the research and development of a proactive competency-based learning management model in order to enhance the teacher competency in the digital age of teacher students to know the learning management process and to enhance the teacher competencies in the digital age of teacher students.

2. Research objectives

1) To develop the proactive competency-based learning management model to enhance teacher's competencies in the digital age for professional teacher students

2) To evaluate the effectiveness of proactive competency-based learning management model to enhance teacher's competencies in the digital age for professional teacher students

3) To study the satisfaction of students on the proactive competency-based learning management model to enhance teacher's competencies in the digital age for professional teacher students using the research and development process.

3.   Methodology

3.1 Research Methodology

This research is mixed research methods.The researcher conducted the research according to the research and development process which consisted of 4 phases as follows:

1st Phase:

The theoretical data was studied from the papers and researches by synthesizing the state of teacher's competencies in the digital age of students from the concept of teacher's competencies, concept of enhancing teacher's competencies, concept of proactive competency-based learning management, and information of the Faculty of Education with the analysis from documents, textbooks, and related researches domestically and internationally including the interviews with 10 professional teachers and lecturers in the field of study using simple random sampling and interview form. The data was analyzed with the content analysis.

2nd Phase: **The development of proactive competency-based learning management model to enhance teacher's competencies in the digital age of professional teacher students consisted of**:

1st step: The model for enhancing teacher's competencies among students of the Faculty of Education, Rajapat University, was drafted. The researcher used the results from the synthesis of the teacher's competencies in the digital age of students from the synthesis of documents and interviews. The format consisted of principles, objectives, development process of patterns, application, and conditions for success.

2nd step: The Focus Group Discussion was conducted by 12 experts; 1) competent teaching experts, 2) competent teaching academicians, 3) lecturers of Faculty of Education. These were selected specifically from the criteria of selection. They were knowledgeable and worked on the teacher competencies of the students.

3rd step: The quality of the digital age teacher empowerment model of professional teacher students was examined through 5 experts to assess the suitability and consistency of the model to be modified before applying to the actual test with the Index of Item Objective Congruence (IOC) 0.60 - 1.00.

3rd Phase: **Application of the learning management model**

The researcher experimented the proactive competency-based learning management model to enhance teacher's competencies in the digital age of professional teacher students with the 4th year students in General Science, Faculty of Education, Suan Sunandha Rajabhat University, in the course of designing the science learning management, totaling 30 students using simple random sampling method for 8 weeks. The One Group Pretest - Posttest Design model was applied.

4th Phase: **Assessment of effectiveness of the learning management model and presentation of proactive competency-based learning management model to enhance teacher's competencies in the digital age of professional teacher students**

1st step: The researcher assessed the teacher's competencies of students before and after the experiment using the appraisal form of teacher's competencies in the digital age through 5 experts. The Index of Item Objective Congruence (IOC) was 0.60 – 1.00 and the Alpha's coefficients was totally 0.94. After that, the results were analyzed to find the mean ($\overline{\mathbf{X}}$), standard deviation (S.D.) and t-test for dependent Samples. The satisfaction of sample students on the proactive competency-based learning management model to enhance teacher's competencies in the digital age of professional teacher students was considered. The obtained data was analyzed using the basic statistics including mean ($\overline{\mathbf{X}}$) and standard deviation (S.D.).

2nd step: The model was examined by distributing the questionnaires 5-level rating scale based on the Likert Five Rating Scale to examine the "development of proactive competency-based learning management model to enhance the competencies of Thai teachers in the digital age of students of Faculty of Education, Rajabhat Universities" in accordance with the 4 audit standards. They were 1) Usefulness, 2) Feasibility, 3) Suitability, and 4) Accuracy conducted with 345 lecturers of the Faculty of Education of 38 Rajabhat Universities using Taro Yamane's table with the reliability of 95%. The multi-stage random sampling was conducted and the

questionnaires were returned from 345 persons or 100%. The questionnaires were analyzed with basic statistics such as mean ($\overline{\overline{X}}$) and standard deviation (S.D.).

3rd step: The proactive competency-based learning management model to enhance teacher's competencies in the digital age of professional teacher students was modified and presented.

3.2. Data Collection

The researcher collected the data as follows:

1. The researcher studied from relevant research papers to get the data about the development of a proactive competency-based learning management model to enhance the teacher's competencies in the digital age of professional teacher students both qualitative data and quantitative data.

2. The researcher conducted the Field Studies using questionnaires, interviewing, Focus Group Discussion, and experiment to collect the truthful data as much as possible.

3. The researcher collected the audit data on the development of proactive competency-based learning management model to enhance the teacher's competencies in the digital age of professional teacher students.

3.3. Data analysis

The researcher took the data obtained from the interview, focus group discussion, and questionnaires to be analyzed and to create new knowledge. The data was analyzed based on the following theoretical principles:

1. Qualitative Data Analysis included the results of studies from related documents and researches, interviews, and focus group discussion to be analyzed by using the method of Content Analysis.

2. Quantitative Data Analysis included the evaluation of the teacher's competencies in the digital age of students and the evaluation of student's satisfaction with the model. The model was verified to analyze the data with the descriptive statistics including frequency, percentage, mean, standard deviation and t-test for dependent samples.

4. Research results

4.1.The results of development of a proactive competency-based learning management model to enhance the teacher's competencies in the digital age of professional teacher students

The proactive competency-based learning management model to enhance the teacher's competencies in the digital age of professional teacher students consisted of 5 elements; principles, objectives, development process of proactive competency-based learning management model, model application, and conditions of model success. The teacher's competencies in the digital age which the students should be enhanced included being the teacher to guide and inspire, being the teacher to apply digital technology for learning management, and being the teacher with morality and ethics.

4.2. The results of assessment on the effectiveness of proactive competency-based learning management model to enhance the teacher's competencies in the digital age of professional teacher students could be shown in the following table.

Table 1: Mean and standard deviation of teacher's competencies in the digital age before

and after the experiment of using the proactive competency-based learning management model to enhance the teacher's competencies in the digital age of professional teacher students   (n= 30)

Experiment	$\overline{X}$	S.D.	t	P
Before using the model	10.85	1.59	32.54*	0.00
After using the model	18.23	1.75		

*With the statistical significance at the .05 level

From Table 1, it was found that after the experiment to use the proactive competency-based learning management model to enhance the teacher's competencies in the digital age, the students had the teacher's competencies in the digital age higher than before using the model with the statistical significance at the .05 level.

4.3. The results of assessment on the satisfaction of the students on the proactive competency-based learning management model to enhance the teacher's competencies in the digital age of professional teacher students

revealed that the satisfaction of the students on the proactive competency-based learning management model to enhance the teacher's competencies in the digital age was entirely at the high level ($\overline{X}$ =4.69, S.D. = 0.57).

4.4. For the results of verification and presentation of proactive competency-based learning management model to enhance the teacher's competencies in the digital age of professional teacher students, the researcher conducted the model verification in 4 aspects. The overall was at the high level. When considering each aspect, the aspects with the highest mean were Usefulness ($\overline{X}$ = 4.83, S.D. = 0.35), Accuracy ($\overline{X}$ = 4.74, S.D. = 0.18). The high level were Suitability ($\overline{X}$ = 4.46, S.D. = 0.27), Feasibility ($\overline{X}$ = 4.24, S.D. = 0.17), respectively. After that, the researcher took the model to improve, modify, and present the complete model as follows.

Part 1: Principles

The teacher's competencies in the digital age are essential to the teacher professional practice of students who have to change their thinking and teaching methods to develop learners to have sufficient skills to live in this rapidly changing age punctually and happily. The teacher's competencies in the digital age of teaching professional students are behavior in which students must demonstrate the application of knowledge, skills and attributes in learning management applied to information technology. The digital technology and communication provide learning management tools that allow learners to participate in the learning process and competencies in learning management that empower learners to acquire essential skills in line with the context and needs of the digital age society. Therefore, the teacher students need to nurture the competency of teachers in the digital age to become their own personality traits leading to self-practice and professional practice to improve the quality of the learners in the future.

Part 2: Objectives

The objectives of the proactive competency-based learning management model to enhance teacher's competencies in the digital age of professional teacher students are as follows:

1. To provide students with knowledge, abilities and skills in learning management as the guideline and inspiration to learners.

2. To enable students to manage learning and applying digital technology.

3. To cultivate students to follow the teacher professional ethics and to be a good role model.

Part 3: Model development process

The development process of proactive competency-based learning management model to enhance teacher's competencies in the digital age of professional teacher students consisted of 5 elements as follows:

1) The components of teacher competency in the digital age consisted of 3 main components as follows:

1st element: being the teacher to guide and inspire, 2nd element: being the teacher to apply digital technology for learning management, 3rd element: being the teacher with morality and ethics.

(1) Being the teacher to guide and inspire consisted of the indicators including acting as a coach teacher, getting inspiration from goals, getting inspiration from the prototype, getting inspiration from by motivating, and getting inspiration from by the driven force.

(2) Being the teacher to apply digital technology for learning management consisted of the indicators including skills of content integration with learning management, skills in applying technology to learning, and skills in using technology to measure and evaluate learners.

(3) Being the teacher with morality and ethics consisted of the indicators including acting as a good role model and acting according to the professional ethics of teachers.

2) Proactive competency-based learning management process

The process of proactive competency-based learning management model to enhance teacher's competencies in the digital age of professional teacher students consisted of:

(1) Planning and preparation stage is the process of studying and analyzing the fundamental data necessary for competency development goal setting, planning, meeting, coordination with stakeholders and publicizing.

(2) Evaluation of teacher's competencies in the digital age before development is the process of adopting the digital age Thai teacher's competency assessment form created to assess the digital age of Thai teacher's competency of students before learning management, proactive competency-based, and cultivating teachers to create goals for development and determine the level of teacher's competency in the digital age of students.

(3) Regarding the learning management process and cultivating teacher being through proactive competency-based learning management, the researcher applied the competency-based learning management model to develop the competency of Thissana Khaemmanee (2020: 23) and the learning management model according to the STEM educational approach. It is a process to define and implement learning and activities management to match the teacher competency in the digital age that has analyzed and assessed all 3 components consisting of 5 steps as follows:

1st stage: It is to arouse the interest and curiosity as an activity to prepare and stimulate curiosity and find answers through coaching and inspiration (Coaching Teacher).

2nd stage: The data was collected and the learning management was formulated in accordance with STEM education. It is an activity that allows students to search and collect information by using various technologies and use them to plan and manage their learning by applying digital technology to develop student's thinking skills (Ict Teacher).

3rd stage: The experiment was conducted with learning management based on STEM education. It is an activity that students learn according to STEM study as designed with students in educational institutes or simulations.

4th stage: The results were reflected and the learning was summarized. It is an activity that students have to reflect on their own learning management altogether with their peers and teachers both advantages and what should be improved (Good Teacher).

(4) Evaluation stage after the development and cultivation of teacher competencies

This is the process of implementing the digital age Thai teacher competency assessment form created to evaluate the digital age of Thai teachers of students after the proactive competency-based learning management and teacher development and cultivation activities.

(5) Stage to reflect learning to be a teacher in the digital age

It is a process where students use their own thinking processes to reflect on their learning and exchange views with fellow students, mentors and teachers on their own digital age. The teacher's competencies are indicative and non-existent according to indicators. These are analyzed to find conclusions and plan for the development of the digital age of Thai teachers in the future.

Part 4: **Model application consisted of the preparation, implementation, and assessment of results**.

Part 5: Conditions of the model success consisted of 1) the environment of each student, 2) the availability of facilities, media and equipment, 3) the support of the administrators of the university and the Faculty of Education, 4) the cooperation from the teachers, educational institutes, parents, and teachers in the educational institutes.

5.   Discussion

1. Results of development process of proactive competency-based learning management model to enhance teacher's competencies in the digital age of professional teacher students

According to the results of development process of proactive competency-based learning management model to enhance teacher's competencies in the digital age of professional teacher students, it was found that the developed model was appropriate and consistent with all elements. The results of expert assessment are appropriate to the greatest extent of all elements of the model. There are 5 elements of the model; principles, objectives, process of proactive learning management model development, application, and condition for success. These are linked to all elements and are in accordance with Lakkhana Chaiyarit (2019) studying the model for teaching skills development of teachers according to the Buddhist principles of education administration at Border Patrol Police School. It was found that there were four components of the model; 1) Principle 2) Objectives 3) Action Process 4) Success Conditions. This agrees with Wareerat Kaewurai (2011) studying and developing the learning management model to develop learner's quality to a society of morality, wisdom and learning. It was found that the developed model consisted of the concepts / theories based on development of the model principle, principle's objectives, content/essence of learning, learning management process according to the model or the process of organizing learning activities. Another important aspect of the model is the proactive competency-based learning management process that integrates STEM educational approach which consists of 1) components of teacher's competencies in the digital age, 2) proactive competency-based learning management process for the development of teacher's competencies in the digital age, 3) assessment on teacher's competencies in the digital age. This is correspondent with the direction of Na Khemmanee (2019) discussing the "Action-oriented" competency-based learning management principles with a set of contents, knowledge, skills, attitudes and characteristics necessary to lead to the desired competencies at the level that the students can actually perform. It

is a teaching and learning that integrates knowledge in various science related to the performance of particular job to be applied towards the success of operation.

2.The results of assessment on development process of proactive competency-based learning management model to enhance teacher's competencies in the digital age of professional teacher students revealed that after the experiment, students had higher teacher competencies in the digital age than before the experiment. This is because the development process of teacher competency enhancement in this time integrates the proactive competency-based learning management according to the STEM educational learning model into the activities for students to develop the competency as teachers, to be guided and inspired. The learning management skills applied digital technology and make them a good teacher according to professional ethics. This is in accordance with Raimon Efendi*, Jalius Jama, and Asmar Yulastri (2019) researching the Development of Competency Based Learning Model in Learning Computer Networks. It was found that the developed competency-based learning model could facilitate the learner's enthusiasm, creativity and the ability to improve learners' knowledge of computer networks. It agrees with Krittiya Ariya (2016) studying the learning and teaching model based on the concept of teaching and learning that emphasized individuality to promote the ability to design 21st century learning management for Rajabhat teacher students. This is based on the important concept of education management following the 3 aspects of differences between individuals; readiness for learning, attention and learning style of the learners. The concepts and principles of presentation of the teaching style of Joyce and Weil (2009) were applied. This is correspondence with the Pariwat Kheuankaew (2016) explaining the learning management model focusing on the students as the persons who study and research by themselves through technology provided by the instructors, discussing, and exchanging ideas with classmates and teachers. This can promote the statistical thinking of learners. Learning management in case studies allows learners to think, analyze and provide opportunities for learners to discuss in small groups altogether among learners and teachers and among students. This is in line with Sommai Pavaboot (2020) studying the contemplative education activities to strengthen the spirituality of Thai teachers 4.0. of the first year students in Faculty of Education, Suan Sunandha Rajabhat University. Experimental results of trying out contemplative education activities indicated after the first year students have attended contemplative education activities, they have shown higher the spirituality of Thai teachers 4.0 of statistical significance at the level of .05..

6. Conclusion

The researcher therefore proposed a new body of knowledge from research results in the proactive competency-based learning management process in order to enhance the teacher competencies in the digital age of teacher professional students. It is the Semantic Model as shown in the figure.
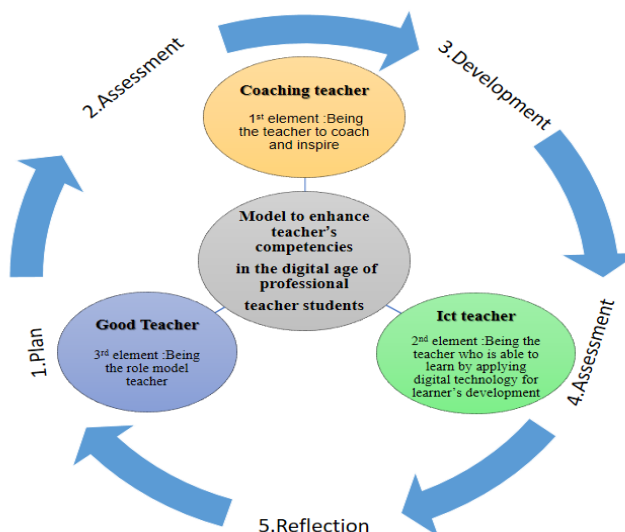

Figure 1 Process of proactive competency-based learning management model to enhance teacher's competencies in the digital age of professional teacher students

The Model is show in the figure1 to proactive competency-based learning management model to enhance the teacher's competencies in the digital age of teacher students consisted of 3 competencies which should be enhanced for being teachers in the digital age are being the teacher to guide and inspire, being the teacher to apply digital technology for learning management, and being the teacher with morality and ethics.

It Suggestsfor applying the research results that:1)Institute of teacher production and those involved should study and understand the proactive competency-based learning management model to enhance the teacher's competencies in the digital age that has been developed and adapted to suit the context of each institution.2) The proactive competency-based learning management process should be studied before using it and be able to adjust the activities as appropriate.

The Suggestion for futher research that:1) A qualitative research should be conducted to monitor and assess the persistence of the teacher's competencies in the digital age of students of the Faculty of Education, Rajabhat Universities through proactive competency-based learning management. 2) There should be research to expand the results of the proactive competency-based learning management model developed by the researcher to students in other fields or other teacher-producing institutes which may produce a design that is different from the one developed by the researcher.

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