

Competencies of New Teachers in Learning Management in Teacher Production for Local Development

Titivorada Polyiem^{1,*} & Prasart Nuangchalerm¹

¹Faculty of Education, Maharakham University, Maharakham 44000, Thailand

*Correspondence: Faculty of Education, Maharakham University, Maharakham 44000, Thailand. ORCID: <https://orcid.org/0000-0002-1203-3622>

Received: January 6, 2023

Accepted: February 28, 2023

Online Published: March 29, 2023

doi:10.5430/jct.v12n3p91

URL: <https://doi.org/10.5430/jct.v12n3p91>

Abstract

The goals of this study were twofold: 1) to enhance the learning management competence of novice teachers in the teacher production for local development; and 2) to investigate the opinions of novice teachers toward the learning management competence based on the teacher production for local development. The key informants consisted of 84 teachers from 12 different academic disciplines working in the network for Thailand's lower northeastern region. A questionnaire for interviews and a test of one's competence in learning management were used as study tools. Mean and standard deviation were the two types of statistics used in the examination of quantitative data. According to the findings, the total level of competence in learning management was already rather high after the first round, and it reached its highest possible level after the second round. New instructors increased their skills in learning management and were able to use their newly acquired knowledge when constructing learning activities depending on the learning goals, topics, and ages of their students. In addition to this, students were able to employ teaching and learning management abilities appropriate for the 21st century, which included educational quality enhancement.

Keyword: learning management, pedagogical understanding, teacher competency, teacher development, teacher production

1. Introduction

Teachers are the most important people in the process of improving education and ensuring that learning is effective. It will be difficult to reform education and make the learning process more effective if instructors do not alter the way in which they think about their pupils as well as the methods by which they teach and learn. To be effective in this new era, educators need to lay a focus not just on the rights and responsibilities of students, but also on instruction that is student-centered (Burstow, 2017; Jan, 2017; Nuangchalerm, 2020). Learning activities, the instructors' special hobbies, and a friendly atmosphere are all things that teachers should make available to their pupils and encourage them to participate in. It shouldn't come as much of a surprise that educators play an important part in the way that educational practices evolve through time. In addition, it is essential to strengthen the professional competencies of educators in light of the complicated worldwide shifts that are taking place in the realms of commerce, society, and information technology (Dostál et al., 2017; Sayaf et al., 2021).

As a direct result of this, academic institutions have developed training courses specifically geared toward the growth of teachers. However, as compared to the earlier research, the teacher development process has run into a great deal of difficulty. The Office of the Education Council (2013) asserts that there are several training courses that are offered annually for the instructors; however, it is not clear whether or not the teachers have been observed and assessed after receiving training. In addition, the instructors have attended the same training courses over and over again, which have been arranged by a variety of different organizations, but the professional growth of the teachers has not been sustained. As a direct consequence of this, the government has thrown away a significant amount of money by sponsoring training courses for the professional development of teachers. In addition, the training courses have not been planned to address the current issues that instructors are facing or the demands that they have. As a result, the vast majority of educators are unable to put their knowledge to use in ways that are both efficient and successful in the management of learning in their classrooms (Ouadoud et al., 2017; Ratheeswari, 2018).

Learning management development is an important process that teachers go through to improve their teaching methods by concentrating on thinking, doing, creating knowledge, and participating in the learning activities of their students (Jääskelä et al., 2017; Ariza & Poole, 2018; De Rossi & Trevisan, 2018; Nuangchalerm, 2020; Sosutha et al., 2021). One aspect of this process is encouraging students to retrieve knowledge from information technology. In the 21st century, educators need to be able to demonstrate to their students how they may put their knowledge into practice. The development of skills, as well as professional, moral, and ethical standards, has been a key focus for Thai educators in the 21st century (Prachagool & Nuangchalerm, 2021). As a result, Thai educators assume a variety of roles, including those of learner, leader, and innovator, to facilitate effective learning management. To put it another way, instructors are able to apply their expertise to the process of cultivating students' abilities as learners, leaders, and innovators (Wisetsat & Nuangchalerm, 2019; Peciuliauskiene & Kaminskiene, 2021).

Even in the 21st century, educators continue to be an important part of running an efficient educational administration. It is necessary for teachers to shift their roles from those of an instructor to those of a practitioner, a classroom manager, based on the current teaching environment, from memorization to practicing and doing, and from instruction that is centered on the teacher to instruction that is centered on the student. These shifts in roles are necessary because the current educational environment places increased emphasis on student-centered learning (Prachagool et al., 2016). In addition, educators at both the national and international levels need to be aware of the many different teaching styles that may have an impact on the successful learning management of desirable students or human resources for changing societies. This study had two main objectives: first, to investigate how novice teachers feel about learning management competence based on the teacher production for local development projects, and second, to improve novice teachers' learning management competence in the context of the teacher production for local development project.

2. Methods

2.1 Key Informants

They were 111 novice teachers appointed in 2019 in the lower northeastern region network (Yasothon, Mahasarakham and Kalasin Provinces) participating in the teacher production for local development project. They were from fifteen fields of study consisting of 1 chemistry teacher, 1 physics teacher, 2 biology teachers, 10 general science teachers, 11 mathematics teachers, 8 English teachers, 26 Thai teachers, 17 social studies teachers, 6 computer teachers, 15 early childhood teachers, 1 home economics teacher, 3 physical education teacher, 2 arts teachers, 4 Primary Education teachers, and 1 special education teacher.

2.2 Research Instruments

The instruments included an assessment form of learning management competence, test of learning management competence, and interviewing form. The procedure of constructing and developing research instrument can be provided.

1. An assessment form of learning management competence was constructed and developed as follows.
 - 1.1 Study of academic documents and research relating to construct an assessment form of the abilities in learning management.
 - 1.2 Determining scope and structure of contents of an assessment form of the abilities in learning management based on the definition of key words.
 - 1.3 Determining scope and structure of questions of an assessment form of the abilities in learning management based on the definition of key words.
 - 1.4 Constructing an assessment form of the abilities in learning management and proposing to five experts for assessing the content validity and appropriateness.
 - 1.5 Proposing the assessment form to the experts for assessing the index of item objective congruence between questions and definition of key words.
 - 1.6 Validating the assessment form to thirty teachers who got the financial support from the teacher production for local development project. They were not the research samples and they were selected by cluster random sampling. The discrimination indices of the assessment form of lesson design and planning were 0.36-0.72. The discrimination indices of the assessment form of lesson plan writing were .41-0.69. The discrimination indices of the assessment form of learning activity management were 0.36-0.64, and the discrimination indices of the assessment form of assessment and evaluation were 0.34-0.71.

- 1.7 Analyzing the reliability of the assessment form by Cronbach's reliability coefficient alpha, reliability index of the assessment form of lesson design and planning was 0.78. The reliability index of lesson plan writing was 0.73. The reliability index of the assessment form of learning activity management were 0.73, and the reliability index of the assessment form of assessment and evaluation was .40.
- 1.8 Improving the assessment form for the research samples.
2. A test of the abilities in learning management was constructed and developed as follows
 - 2.1 Study of academic documents and research relating to construct a test of the abilities in learning management based on the definition of key words.
 - 2.2 Study the methods for constructing a test of the abilities in learning management based on the contents and learning objectives and proposing to five experts for assessing the content validity and appropriateness.
 - 2.3 Making the timetable of the analysis of the relations among the test, number of the test and form of the test.
 - 2.4 Proposing the test to the experts for assessing the quality and errors and then improving the test.
 - 2.5 Analyzing the quality of the test, discrimination index of the item of the test by using B (B-Index) of Brennan. The criteria of discrimination indices ranged from 0.20-1.00. The finding indicated that the discrimination indices of the test ranged from 0.35-0.80.
 - 2.6 Selecting the test with the assigned discrimination indices and the reliability of the test was analyzed. The reliability index of the test was .89.
 - 2.7 Improving and preparing the test for the research samples
3. An interview form was constructed and developed as follows.
 - 3.1 Study of academic documents, concepts and methods for constructing an interview form and setting the objectives of the interview.
 - 3.2 Determining the definition of an interview form based on the research objectives and writing a draft of an interview form and then proposing to the experts for assessing the question validity of an interview form.
 - 3.3 Proposing an interview form to five experts for assessing the content validity based on the consistency of questions with contents and objectives.
 - 3.4 Selecting four items of an interview form with the four highest index of congruence was 0.80-1.00.
 - 3.5 Improving the interview form and collecting the data from fifteen teachers who were not the research samples of the teacher production project.
 - 3.6 Preparing the interview form for collecting data from the research samples.

2.3 Procedure

The learning management competence consisted of four components: 1) lesson design and planning, 2) lesson plan writing, 3) learning activity management, and 4) assessment and evaluation. Action research was employed for studying the teacher development of the teacher production for local development project. The research methodology was divided into two rounds and each round consisted four steps: 1) planning, 2) action, 3) observation, and 4) reflection. The research was divided into three phases as follows.

Phase 1: Study of principles, theories, academic documents and research relating to

1. Study of principles, theories, academic documents and research relating to teacher development focusing on the abilities in learning management for research planning and design
2. Synthesizing the data for finding and creating strategies for teacher development focusing on the abilities in learning
3. Constructing research instrument based the synthesized data and assessing the quality and efficiency of the instrument by the experts before data collection

Phase 2 Operating teacher development focusing on the abilities in learning management

Work shop was employed for teacher development focusing on the abilities in learning management for local development consisting of two rounds.

The operating phase 1 and 2 consisted of:

1. Preparation

Guested speakers and teachers were invited to the meeting for discussing and identifying the importance of teacher development focusing on the abilities in learning management for local development. All research participants discussed and clarified the topics, process, method and assistance for teacher development, assessing issues, assessing instrument and self-assessment.

2. Two rounds of workshop

2.1 Planning: The author coordinated with the quested speakers for content planning, explaining data collection by three sets of research instrument from key informants, monitoring and evaluating the teachers participating in the teacher development project.

2.2 Action: Operational plan, informing date of the workshop on teacher development focusing on the abilities in learning management for local development. The workshop was organized twice: on 13-14 February 2021 and on 13-14 March 2021. The workshop focused on knowledge of various lesson designs and practicing before they applied their knowledge for the actual situation. Observation techniques was used to assess their performance during the workshop for useful suggestions of the quested speakers, including the trainees.

2.3 Observation: The authors collected the data by observing the performance of the teachers during the workshop. Additionally, the data was collected from fifteen key informants of each field of study were interviewed who participated in the teacher development project. Then an assessment form and a test on the abilities in learning management were used to collect the data from one hundred and eleven trainees. Lastly, the quested speakers gave the teachers useful suggestions for correct and efficient learning management.

2.4 Reflection: The data was analyzed and summarized for teacher development in the second round.

Phase 3: Evaluating the results of teacher development focusing on the abilities in learning management for local development.

The data obtained from the first round was used for organize the second round of the teacher development. The research instrument was an assessment form, a test on the abilities in learning management and an interview form.

2.4 Data Collection

The data was collected as follows:

1. The author monitored and supervised fifteen teachers who participated in the teacher production project after the workshop. They were selected by purposive sampling. The data was collected by and observation form and an interview form.

2. The data was analyzed for evaluating the of teacher development focusing on the abilities in learning management for local development.

3. The author used an assessment form and a test on the abilities in learning management for data collection from the trainees.

2.5 Data Analysis

1. The learning management competence was assessed using the following criteria: The score was ranged from 5-1, with 5 defined as highest competence, 4 defined as high competence, 3 defined as moderate competence, 2 defined as low competence, and 1 defined as lowest competence. The learning management competence was analyzed using a statistical procedure: mean and standard deviation. The results were analyzed to determine the mean score and compared with the following criteria (Table 1).

Table 1. Mean Score and Interpretation

Scoring criteria	Learning management competence
4.51 – 5.00	Highest level
3.51 – 4.50	High level
2.51 – 3.50	Moderate level
1.51 – 2.50	Low level
1.00 – 1.50	Lowest level

2. The opinions and suggestions were analyzed by content analysis and the results were summarized regarding the assigned issues.
3. The score of learning management competence assessed by the assessment form, and the percentage was used to present the results.
4. The data of learning management competence collected by the observation form and the interview form was analyzed by content analysis.

3. Results and Discussion

3.1 Learning Management Competence

Learning management competence can be explained, Tables 2 and 3 display the novice teachers' mean scores for each round, which may be used to get an idea of their level of expertise in learning management. They have the potential to enhance learning management, which is something that the teaching profession in the 21st century needs to have. In the first round, participants demonstrated a high level of competency, and in the second round, participants demonstrated an increased ability to design and manage classrooms in a variety of school settings. The following paragraphs will provide a description of the specifics of each round.

3.1.1 First Round

The finding showed that the average ability of the teachers participating in the teacher production for local development project in learning management is at a high level ($\bar{X} = 4.13$, S.D. =1.04). The four high rated items of the abilities are lesson plan writing ($\bar{X} = 4.19$, S.D. =1.78), learning activity management ($\bar{X} = 4.18$, S.D. = 0.82), lesson design and planning ($\bar{X} = 4.15$, S.D. = 0.73) and learning assessment ($\bar{X} = 4.00$ S.D. = 0.86) respectively. The average score of the teachers for the abilities in learning management after training is 23.86 points, S.D. = 1.80 and it can be calculated as 79.52%.

3.1.2 Second Round

The finding showed that the average ability of the teachers is at the highest level ($\bar{X} = 4.68$, S.D. =.46). The four high rated items of the abilities are learning activity management ($\bar{X} = 4.75$, S.D. = 0.43), lesson plan writing ($\bar{X} = 4.74$, S.D. =0.44), lesson design and planning ($\bar{X} = 4.64$, S.D. = 0.48), and learning assessment ($\bar{X} = 4.58$ S.D. = 0.49) respectively. The average score of the teachers for the abilities in learning management after training is 26.82 points, S.D. = 1.45 and it can be calculated 89.40%.

Table 2. Learning Management Competence of Novice Teachers

Competence	First round			Second round		
	\bar{X}	S.D.	Level of competence	\bar{X}	S.D.	Level of competence
Lesson plan writing	4.19	1.78	High	4.75	0.43	Highest
Learning activity management	4.18	0.82	High	4.74	0.44	Highest
Lesson design and planning	4.15	0.73	High	4.64	0.48	Highest
Learning assessment	4.00	0.86	High	4.45	0.49	High
Average	4.13	1.04	High	4.68	0.46	Highest

Table 3. Percentage of Abilities of the Teachers in Learning Management in Each Round

Round	\bar{X}	S.D.	Percentage
1 st	23.86	1.80	79.52
2 nd	26.82	1.45	89.40

Teacher in the program showed their learning management competence in each round in the positive way. The level was in the high for the first round, but the second round was at the highest, but their ability to assess learning was at high level.

3.2 Opinions of the Teachers Toward the Teacher Development Project

The outcomes of the study suggested that after participating in the training program, instructors who were a part of the teacher production for the local development project showed considerable improvements in their capabilities regarding learning management. The research results showed that the teacher development project was beneficial for the growth of the teaching profession. This was due to the fact that the development of teachers was a primary component in the development of countries. The instructors were able to put their expertise to use and construct a variety of effective educational activities for their students, taking into account the learning goals, the subject matter, and the ages of the students. In addition to this, they were able to apply their skills to the administration of teaching and learning in the 21st century, which included the enhancement of educational quality. In conclusion, the teacher production for the local development project is able to generate teachers with academic knowledge, expertise in the teaching profession, and teaching ideology. This is because the project focuses on developing local teachers.

The results may be caused by the fascinating project that encourages the good and intelligent students to further study in the education program. The teacher production process focuses on practicing and training which is consistent with the teacher production for local development project. The teacher production project is for all students throughout Thailand who are interested and qualified for the project. There are many teacher institutes where are excellent in teaching profession throughout Thailand participating in the project. The higher education institutes in Thailand provide the students of the education programs in many fields before they complete their degree of education. Additionally, the higher education institutes where participate in the project, should monitor and supervise the teachers in schools participating in the project.

The opinions of the teachers toward the ability improvement in learning management of the teacher production for local development project were summarized as follows.

1. What are your opinions toward the ability improvement in learning management of the teacher production for local development project?

“...because the teachers are a key person for student development, improving learning achievement. The teachers who participated in the ability improvement in learning management of the teacher production for local development project, are able to apply their knowledge and skills for efficient learning management...”

Teacher A

2. How can you apply your knowledge of the ability in learning management of the teacher production for local development project?

“...I am able to plan and design good and appropriate lessons based on the contents, learning objectives and desirable characteristics of the student, including effective teaching techniques and appropriate teaching materials for efficient learning management...”

Teacher T

3. What are the benefits of the knowledge about the ability improvement in learning management of the teacher production for local development project?

“I am able to apply my knowledge for learning activity management based on the contents, learning objectives and the abilities of the students. I also organize various learning activities and integrate my knowledge with other subjects...”

Teacher X

4. Do you think the teacher production for local development project enable to improve academic knowledge, professional expertise and ideology of teaching profession?

“...the teacher production for local development project provides the financial support and guarantee a teaching position for the students after they complete the degree of education. Additionally, the higher education institutes where are excellent in teaching profession throughout Thailand participating in the project, the training courses on professional development for the students before they complete their degree of education...”

Teacher Y

During the first round of the evaluation, the study's results showed that, on average, instructors had a high level of skill in the area of learning management. In the second round, the instructors' abilities as a whole with regard to the administration of students' learning were at their greatest level. After taking part in the teacher production project, instructors received an average score of 89.40% for the development of their students' abilities as a result of their participation. After taking part in the second round of the teacher production project, instructors received an average score of 79.52% for the development of their students' abilities as a result of their participation. The provision of a workshop for the enhancement of the teachers' capabilities in learning management, in which specialists from a

variety of areas were asked to participate as guest speakers, may have contributed to the observed outcomes.

In addition, both the teachers and the trainers had the opportunity to share their own personal experiences in the classroom in terms of teaching and learning, and the teachers were able to solicit helpful recommendations from the trainers. After participating in the seminars, the educators were able to apply the information they gained to learning management in real-world settings (Ferrer & Poole, 2018). Furthermore, the workshop was organized twice, and the teachers could share their teaching experiences with other teachers and also ask for some useful suggestions on learning management from the trainers.

The National Education Act emphasizes the importance of teachers and improving the abilities of the teachers in their fields for effective and efficient learning and teaching management (Mathew et al., 2017; Kong et al., 2020). Therefore, teacher development is a major mission of the educational institutes throughout Thailand. The major aim of the institutes is to produce qualified teachers for primary and secondary schools. The 2nd National Education Act in 2002, Section 65 (Amended Act), has focused on upgrading the quality of the teachers, leading to great learning achievement for the students (Venter, 2017; Záhorec et al., 2019; Janpleng & Ruangmontri, 2021).

Additionally, teacher development has supported four main policies of the National Education Act: attraction and recruitment of good students, preparation of professional teachers, continuous learning, and retention. The major aim of the policies is to develop the desirable competencies of teachers in the 21st century (Nuangchalerm, 2017; Lam, 2019; Kurniati et al., 2020). There are many strategies for teacher development, such as workshops, seminars, and training. These activities aim to develop the knowledge, skills, and attitudes of the teachers. Teacher development in basic education is necessary for effective and efficient teaching and learning management.

According to the results, it was shown that the instructor's skills in the field of cooperative learning instruction were high after getting training (Mitchell et al., 2020). The findings of the research indicated that the teachers who participated in the teacher production for the local development project improved their abilities in learning management significantly after the training program (Rutter, 2017; Gocen et al., 2020; Omare et al., 2020). This was in relation to the opinions of the teachers toward the teacher development project. (Rutter, 2017; Gocen et al., 2020; Omare et al., 2020) The research results showed that the teacher development project was beneficial for the growth of the teaching profession. This was due to the fact that the development of teachers was a primary component in the development of countries. The teachers were able to put their expertise to use and construct a variety of effective educational activities for the students, taking it into account the learning goals, the subject matter, and the ages of the students (Munby, 2020).

Moreover, they were able to use their competencies for the 21st century teaching and learning management, including educational quality improvement. In conclusion, the teacher production for local development project is able to produce the teachers with academic knowledge, expertise in teaching profession and teaching ideology. The results may be caused by the fascinating project that encourages the good and intelligent students to further study in the education program. The teacher production process focuses on practicing and training which is consistent with the teacher production for local development project (Kham, 2022).

The student production project is open to any and all students in Thailand who are interested in participating and meet the requirements for the project. A large number of teacher institutions from all over Thailand that are well-known in the teaching field are taking part in the initiative. Students in universities and other places of higher education in Thailand can choose from a wide range of academic programs as they work toward getting their degrees. In addition, the higher education institutions that are a part of the project should be responsible for monitoring and supervising the instructors who are a part of the schools that are a part of the project. Teachers should change their methods of teaching because each student is different, taking it into account their skills and the environment in which they were educated. This should also include evaluating the results of students' educational efforts with the goal of making them better (Nuangchalerm & El Islami, 2018; El Islami et al., 2018; Chu et al., 2021).

4. Conclusion

The teacher production for the local development project developed novice teachers to improve their competency in learning management and employ their knowledge for designing learning activities based on learning objectives, contents, and the age of learners. However, there should be various strategies for teacher development in all subjects based on their problems and needs. Teachers must be aware of their roles and abilities in teaching and learning management. Teachers' professional paradigms must be shifted in order for them to advance. Training courses should be organized to improve the abilities and skills of the teachers based on their needs and subjects. There should be a

school development plan for teacher development focusing on a self-development plan. As with psychological outcomes, the teacher development plan should be evaluated for further development and rewarding teachers.

Acknowledgement

This research project was financially supported by Mahasarakham University Research Support and Development Fund.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

- Burstow, B. (2017). *Effective teacher development: theory and practice in professional learning*. Bloomsbury Publishing.
- Chu, S. K. W., Reynolds, R. B., Tavares, N. J., Notari, M., & Lee, C. W. Y. (2021). *21st century skills development through inquiry-based learning from theory to practice*. Springer International Publishing.
- De Rossi, M., & Trevisan, O. (2018). Technological Pedagogical Content Knowledge in the literature: how TPACK is defined and implemented in initial teacher education. *Italian Journal of Educational Technology*, 26(1), 7-23. <https://doi.org/10.17471/2499-4324/988>
- Dostál, J., Wang, X., Steingartner, W., & Nuangchalerm, P. (2017). Digital intelligence-new concept in context of future school of education. In *Proceedings of ICERI2017 Conference 16th-18th November 2017*.
- El Islami, R. A. Z., Nuangchalerm, P., & Sjaifuddin, S. (2018). Science process of environmental conservation: Cross national study of Thai and Indonesian pre-service science teachers. *Journal for the Education of Gifted Young Scientists*, 6(4), 72-80. <http://dx.doi.org/10.17478/JEGYS.2018.84>
- Ferrer A. E., & Poole, P. M. (2018). Creating a teacher development program linked to curriculum renewal. *Profile Issues in Teachers Professional Development*, 20(2), 249-266. <https://doi.org/10.15446/profile.v20n2.67937>
- Göçen, A., Eral, S. H., & Bücü, M. H. (2020). Teacher perceptions of a 21st century classroom. *International Journal of Contemporary Educational Research*, 7(1), 85-98.
- Jääskelä, P., Häkkinen, P., & Rasku-Puttonen, H. (2017). Teacher beliefs regarding learning, pedagogy, and the use of technology in higher education. *Journal of Research on Technology in Education*, 49(3-4), 198-211. <https://doi.org/10.1080/15391523.2017.1343691>
- Jan, H. (2017). Teacher of 21st century: Characteristics and development. *Research on Humanities and Social sciences*, 7(9), 50-54.
- Janpleng, J., & Ruangmontri, K. (2021). Elements of the teacher development system in learning management according to the concept of Education 4.0. *Journal of Green learning*, 1(2), 22-27. <https://doi.org/10.53889/jgl.v1i1.30>
- Kham, B. (2022). International practicum: What students gain and are challenged. *Journal of Green Learning*, 2(1), 45-52. <https://doi.org/10.53889/jgl.v2i1.104>
- Kong, S. C., Lai, M., & Sun, D. (2020). Teacher development in computational thinking: Design and learning outcomes of programming concepts, practices and pedagogy. *Computers & Education*, 151, 103872. <https://doi.org/10.1016/j.compedu.2020.103872>
- Kurniati, K., Nurdin, N., & Nurasmawati, N. (2020). Improving students' cognitive and affective domains students through fostering teacher development. *International Journal of Contemporary Islamic Education*, 2(2), 56-70.
- Lam, B. H. (2019). *Social support, well-being, and teacher development*. Singapore: Springer.
- Mathew, P., Mathew, P., & Peechattu, P. J. (2017). Reflective practices: A means to teacher development. *Asia Pacific Journal of Contemporary Education and Communication Technology*, 3(1), 126-131.
- Mitchell, D. E., Kwok, A., & Huston, D. (2020). Induction program structures as mediating factors for coach influence on novice teacher development. *Professional Development in Education*, 46(5), 812-832.

<https://doi.org/10.1080/19415257.2019.1643394>

- Munby, S. (2020). The development of school leadership practices for 21st century schools. *European Journal of Education, 55*(2), 146-150. <https://doi.org/10.1111/ejed.12394>
- Nuangchalerm, P. (2017). Preservice teachers' twenty first century learning skills: Three different majors of study. *International Journal of Advanced and Applied Sciences, 4*(7), 124-128. <https://doi.org/10.21833/ijaas.2017.07.018>
- Nuangchalerm, P. (2020). TPACK in ASEAN perspectives: Case study on Thai pre-service teacher. *International Journal of Evaluation and Research in Education, 9*(4), 993-999. <https://doi.org/10.11591/ijere.v9i4.20700>
- Nuangchalerm, P., & El Islami, R. A. Z. (2018). Comparative study between Indonesian and Thai novice science teacher students in content of science. *Journal for the Education of Gifted Young Scientists, 6*(2), 23-29. <http://dx.doi.org/10.17478/JEGYS.2018.75>
- Office of the Education Council. *System analysis and suggestions of teacher development*, Prigwan Graphic, 2013.
- Omare, E., Imonjeb, R. K., & Nyagah, G. (2020). Teacher qualification, experience, capability beliefs and professional development: Do they predict teacher adoption of 21st century pedagogies?. *International Journal of Curriculum and Instruction, 12*(2), 639-670.
- Ouadoud, M., Nejjar, A., Chkouri, M. Y., & El-Kadiri, K. E. (2017, October). Learning management system and the underlying learning theories. In *Proceedings of the Mediterranean Symposium on Smart City Applications* (pp. 732-744). Springer.
- Peciuliauskiene, P., & Kaminskiene, L. (2021). Innovative work activity of science teachers: The pathway from new ideas generating to sharing. *European Journal of Contemporary Education, 10*(1), 187-201. <https://doi.org/10.13187/ejced.2021.1.187>
- Prachagool, V., & Nuangchalerm, P. (2021). Perspectives of Thai educators toward 21st century instruction. *Journal of Education and Learning (EduLearn), 15*(3), 432-437. <https://doi.org/10.11591/edulearn.v15i3.20281>
- Prachagool, V., Nuangchalerm, P., Subramaniam, G., & Dostal, J. (2016). Pedagogical decision making through the lens of teacher preparation program. *Journal for the Education of Gifted Young Scientists, 4*(1), 41-52. <http://dx.doi.org/10.17478/JEGYS.2016116351>
- Ratheeswari, K. (2018). Information communication technology in education. *Journal of Applied and Advanced Research, 3*(1), 45-47. <https://dx.doi.org/10.21839/jaar.2018.v3S1.169>
- Rutter, A. (2017). Teacher choices: Teacher development. *Teachers College Record, 119*(14), 1-32. <https://doi.org/10.1177/016146811711901409>
- Sayaf, A. M., Alamri, M. M., Alqahtani, M. A., & Al-Rahmi, W. M. (2021). Information and communications technology used in higher education: An empirical study on digital learning as sustainability. *Sustainability, 13*(13), 7074. <https://doi.org/10.3390/su13137074>
- Sosutha, C., Wijakkanalan, S., & Nuangchalerm, P. (2021). Exploring possibility of flexible learning management for teacher preparation program. *Solid State Technology, 64*(2), 2270-2276.
- Venter, E. (2017). Good teacher education—an exploratory study. *The Independent Journal of Teaching and Learning, 12*(1), 63-73.
- Wisetsat, C., & Nuangchalerm, P. (2019). Enhancing innovative thinking of Thai pre-service teachers through multi-educational innovations. *Journal for the Education of Gifted Young Scientists, 7*(3), 409-419. <http://dx.doi.org/10.17478/jegys.570748>
- Záhorec, J., Hašková, A., & Munk, M. (2019). Teachers' professional digital literacy skills and their upgrade. *European Journal of Contemporary Education, 8*(2), 378-393. <https://doi.org/10.13187/ejced.2019.2.378>

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).