Project-Based Learning and E-Portfolios for Preservice Teachers in Japanese Language Education

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Abstract
This study involved classroom action research that aimed to 1) develop the learning management competency for preservice teachers using the project-based learning approach and e-portfolios and 2) study the reflection of those preservice teachers in terms of learning management using the project-based learning approach and e-portfolios. The target groups for this research comprised 27 fourth-year students of the Teaching Japanese Language Program, Faculty of Education, Khon Kaen University. I divided the research tools into two categories: (a) tools for learning management (four learning management plans and teaching logs) and (b) tools for collecting research data (the portfolio assessment form and e-portfolios). The research results revealed the project-based learning approach and e-portfolios improved the Japanese language and culture learning management competency in each indicator at different levels; in addition, the results reflected the Japanese language and culture learning management focusing on learners and the use of learning materials stimulated learners’ interest and systematic working and helped them appreciate the efficiency of work and ability to work with others.

Keywords: project-based learning, electronic portfolio, Japanese language education

1. Introduction
At present, the production and development of teachers in Thailand are not keeping up with the rapid changes in the modern world, causing problems both in terms of teacher quantity and quality. Each year, the number of graduates from the teacher education programs is greater than the number of teacher fill rates. Moreover, in some fields, fewer candidates can pass the teacher recruitment exam. Although many projects are established to attract talented students to study to become teachers, the results of the Ordinary National Educational Test are still low. This is consistent with the results of international assessments such as PISA (Programme for International Student Assessment) or TIMSS (Trends in International Mathematics and Science Study), which have pointed out the problems of the quality of Thai education (ONEC, 2015). Thus, all teacher programs must review the structure of their curricula so that preservice teachers are developed in the right direction. The main duties of teacher education institutions are to consider academic proposals regarding teacher professional standards and teachers’ competency; to integrate them into the curriculum; and to educate teachers according to the context, focusing on classroom teaching practices and pedagogical content knowledge (PCK; ONEC, 2018).

Currently, learning management at tertiary education has been adapted to meet the needs of society in the 21st century, so the development of work-readiness skills, especially professional skills or competencies, must be strengthened and developed before graduation. For institutions that educate teachers, preparation for “learning management competency” is a core professional competency for student teachers; however, developing it within the real school context is complex. Teaching via the designed learning plan is not merely an experiment; students and teachers must contemplate the learned experience to reflect the perception and understanding of the classroom practice’s different dimensions and must be able to develop the perception of practicing and developing one’s personal skills in the future. Because of this complex process, one must rely on a systematic learning management process: project-based learning. This is one of several methods that are aligned to enhance and develop the learning management competency for student teachers because the project-based learning environment enables students to learn more about their future profession from synthetic thinking rather than simply analyzing (Frank et al., 2003). It also allows students to practice critical thinking and to learn to work
together in a systematic manner (Roessingh & Chambers, 2011), which are essential skills for the teaching profession. However, project-based learning differs from problem-based learning (PBL), which focuses solely on problem-solving and ends with solving the problem (Suzuki, 2013, p. 45). However, project-based learning is a learning process with goals, and it is a process for creating new knowledge that allows students to test and push their ideas as they want, which promotes competency in innovation (Guo et al., 2020). Guo et al. (2020) reviewed several studies and found most addressed affective outcomes, such as the perceptions and benefits of learning. Nevertheless, studies on the student engagement process and the performance of students’ final products are required because studying the performance of students’ final products will help them apply and build their knowledge. They will also discover and develop their professional skills, resulting in a commitment to their duties and responsibilities and the ability to work with others (Guo et al., 2020).

In this research, project-based learning was the approach for training the teaching skills of preservice teachers in the context of learners’ 21st-century education. The preservice teachers had to practice designing and organizing learning according to the active learning approach, which focuses on learners, task-based learning, project-based learning, and PBL. These approaches have received widespread interest in the study of the digital era. The same is true for the Japanese language teaching community. For example, in 2012–2013, the Japan Foundation, Bangkok, Thailand, in collaboration with the Kamenori Foundation, organized the Japanese Speakers Forum (JS-Forum) with the intent to exchange ideas about Japanese language learning in the 21st century. In 2016, the Japan Association for Language Teaching organized a seminar and mentioned active learning. In 2019, Yokomizo and Yamada (2019) released a book, Active Learning for Japanese Language Teachers. The first edition discussed active learning in the Japanese language with two main objectives: (a) to gradually change traditional Japanese language classes with new classroom activities and (b) to completely transform Japanese language classes with information technology. The aforementioned examples reflect the efforts of promoting active learning among those involved in Japanese language learning.

Preparing preservice teachers by changing the learning context is essential. Doing so not only provides Japanese language teachers with the characteristics that meet the needs of the modern Japanese language education context but also promotes opportunities for preservice teachers to absorb and build profound knowledge about the active learning process as learners. Therefore, in this research, the objective of using the project-based learning approach was to learn about Japanese language and culture learning management. The preservice teachers observed and analyzed the actual class to discover guidelines for designing suitable learning management; then, the goals were set. The data were collected, and the learning management was designed. Next, the learning management was implemented according to the set goals. However, project-based learning in a school context consists of the learning experience, which is a considerable amount of important learning information for reviewing oneself in the process of recognizing the goals to be achieved and proceeding as planned. For this reason, it is necessary to use an effective tool to manage learning information. This is consistent with Suzuki (2013), who mentioned that the “portfolio is a highly effective strategy connected to achieving goals. The portfolio is a student self-assessment tool for concrete examination and assessment, which is necessary for the development based on the modern education guidelines” (p. 24).

For the project-based learning in this study, the tool was also necessary to manage knowledge and to stimulate the exchange of knowledge among students to promote self-knowledge creation. Therefore, in this research, I used electronic portfolios (e-portfolios) to enable students to communicate with one another, actively cooperate in performing activities, and gain self-understanding through self-assessment. Managing information and knowledge resulting from systematic practice and self-reflection would help this project-based learning be effective. This is consistent with the research developing student teachers by using the portfolio as a tool for their reflection. A portfolio is an effective tool for teacher education courses. It is the foundation for creating knowledge from experience, devising meaning by the students themselves, and developing both expertise and commitment in the reflection process (Rahima & Donald, 1996). Using portfolios for reflection is different and complements other tools, such as diaries and small-group discussions. Using diaries allows students to reflect on what is happening daily, and using portfolios encourages students to obtain a broader perspective on their teaching experience or to review specific lessons for deeper understanding (Borko et al., 1997).

For the development of the learning management competency (the main goal of this research), I have defined its meaning as follows: “changes in knowledge, skills, and attitudes toward Japanese language and culture learning management for the better under the systematic implementation of the project-based learning approach to achieve the set goals, focusing on the learners and encouraging Japanese language learners (JLLs) to properly understand cultural differences by following the guidelines of active learning.” Based on the definition, I created a competency assessment form based on the guidelines for teacher competency assessment in teaching and
curriculum development in Thailand. This comprises five indicators: indicator 1, curriculum construction and development; indicator 2, learning management design competency; indicator 3, student-centered learning management; indicator 4, use and development of innovative materials and technology for learning management; and indicator 5, measurement and evaluation of learning management (Office of the Basic Education Commission, 2010). Using portfolios stimulates student teachers’ interest. However, the true purpose of project-based learning greatly affects students’ learning, especially in terms of helping student teachers discover their true potential and realize how to self-develop in the future. Therefore, the study of the ideas arising from reflection is important to confirm the performance development results of preservice teachers. It is also a serious challenge to study the efficiency of using project-based learning and e-portfolios, which will affect the development of the preservice teachers’ learning management competency.

1.1 Research Questions

1) How do preservice teachers develop their Japanese language and culture learning management competency using the project-based learning approach and e-portfolios?

2) How do preservice teachers reflect on their learning and practice using the project-based approach and e-portfolios?

2. Method

2.1 Research Design

This study involved a classroom action research that was conducted based on Plan Action Observation and Reflection (PAOR) or four steps (Kemmis & McTaggart, 1988). This research was conducted in three cycles, as presented in Figure 1.

![Diagram showing the classroom action research cycles](image)

Figure 1. A diagram showing the classroom action research cycles

Cycle 1: This is the preparation of learning management using the project-based learning approach and e-portfolios. It is a cycle for developing the learning management plan, e-portfolios, and research instruments. It can be outlined as follows.

Step 1) Plan: I began conducting research planning by collecting information on problems and learning conditions from notes and observations of the learning management. I analyzed the data. The learning management plan was designed, and the pilot study was conducted.

Step 2) Action: I analyzed the learning management using the project-based learning approach and e-portfolios. Next, the data were used to design the research, and the research outline was written. The research tools were constructed.

Step 3) Observation: The accuracy and completion of all planning and research tools were checked.

Step 4) Reflection: The feasibility of the actual use of the research tools was evaluated. The errors of the tools were fixed before using them in the next cycle.

Cycle 2: This involves learning management using the project-based learning approach and e-portfolios. It is a learning management development cycle according to the four designed learning management plans. It can be outlined as follows.

Step 1) Plan: The project-based learning was planned to implement in the target groups using four plan-do-check-act (PDCA) cycles.
Step 2) Action: The learning management plan was implemented for learning management. It was done in accordance with each phase of the project, per a cycle. The research data were collected in accordance with the eight phases of the project’s implementation, as presented in Figure 2.

![Diagram of learning management plan](image)

**Figure 2.** A diagram illustrating the learning management plan consistent with the project’s operational phases

Source: Suzuki, 2013, p. 173.

Step 3) Observation: This involves the results of learning management analysis by the learning objectives.

Step 4) Reflection: The reflections on the PDCA process of check (C) and act (A) were obtained using the Keep, Problem, Try (KPT) framework (Amano, 2013) to reflect thinking during the practice of each learning management plan, which helped set clear solutions for problem-solving and development in the next learning management plan.

Step 4) Reflection: The results of the learning management of all lesson plans and learners’ learning information in e-portfolios were summarized for reflecting the research results in the reflecting cycle. The process of cycle 2 is shown in Figure 3.

![Diagram of PDCA cycle](image)

**Figure 3.** A diagram of cycle 2, presenting the learning management using the project-based learning approach and e-portfolios
Cycle 3: This is the reflection of the learning management using the project-based learning approach and e-portfolios.

Step 1) Plan: I planned to analyze the collected data and set the schedule for data analysis.
Step 2) Action: I analyzed the collected data according to the determined methods from the assessment form to calculate the performance and to reflect the learning management of the teachers and e-portfolios.
Step 3) Observation: I examined the results of the data analysis by the research questions, especially the learners’ learning management competency assessment results.
Step 4) Reflection: The research results were reflected in the discussions, results, and conclusions. Finally, I wrote recommendations for future research.

2.2 Target Group

The target groups for the development were 27 fourth-year students aged 18 years and older in the Teaching Japanese Language Program, Faculty of Education, Khon Kaen University. This research is directly beneficial to the target group, who must prepare for learning management competency before teaching in the school as the Student Teaching Internship when they are in their fifth year. To encourage cooperation with the target groups, I took into account the ethical principles of research in all respects.

2.3 Research Tools

The research tools were divided into two categories: (a) tools for lesson plans, namely learning management plans and teaching logs, and (b) tools for collecting research data, including the portfolio assessment form and e-portfolios.

2.3.1 Four Learning Management Plans and Teaching Logs

I created the lesson plans. Then, three instructors in charge of the curriculum reviewed the learning management plans. Next, the learning management plans were revised and improved before applying them to the groups with qualifications similar to those of the target groups. Finally, the learning management plans were revised and corrected before using them with the real target groups.

2.3.2 Portfolio Assessment Form

I used the portfolio assessment form to assess the preservice teachers’ learning management competency. To assess their learning management competency, I defined and adapted the assessment rubric from the teacher competency assessment guidelines (Office of the Basic Education Commission, 2010). The quality of the tool was examined by three experts in learning management competency assessment to determine the criteria for each indicator level. The item-objective congruence (IOC) index was 0.83, where the acceptable value is 0.50 and above. The content validity index (CVI) was 1.00, where the acceptable value is not lower than 0.80. Then, the portfolio assessment form was tested with groups with qualifications similar to those of the target groups before using it with the real target groups.

2.3.3 E-Portfolios

I created and developed the structure of the portfolio by studying and adapting it from Suzuki (2013). Then, the portfolio was piloted twice in the groups with qualifications similar to those of the target groups before the research data collection commenced. Next, three instructors in charge of the curriculum reviewed and commented on the portfolio. Then, I improved the portfolio and its content before applying it to the target groups. Finally, I activated the portfolio as an e-portfolio on the LoiLoNote School application.

2.4 Data Collection

In this classroom action research, I collected data from the competency assessment and the reflection of the students using the following methods.

1) Assessing the learning management competency of the preservice teachers: I considered the information from each student’s e-portfolio, such as student’s work pieces, records of portfolio restructuring, self-reflection in each practice phase, goals and vision records, operation plan, and self-assessment form; these were assessed after completing the project. The assessor was the instructor.

2) Collecting the reflection on the preservice teachers’ learning: I compiled the information from the students’ reflections in the e-portfolios’ goals and vision records section; this was carried out after finishing the preparation of the portfolios in all components.
2.5 Data Analysis

I analyzed the data based on the research questions as follows.

1) First, I analyzed the development of the Japanese language and culture learning management competency from the portfolio assessment form. The percentages of the total number of the students were analyzed and presented in tables with descriptions. I determined the assessment criteria under the context and the practice of the target groups. The assessment was set in four levels based on an annotated approach: S = superior, which refers to a level higher than the set goals; A = excellent, which refers to a level that meets the set goals; B = good, which refers to a level that mostly meets the set goals; and C = satisfactory, which refers to a level that requires more effort to achieve the set goals. The assessment levels were determined according to the course objectives and the class direction. The results of these assessment levels were used as feedback for the preservice teachers. The preservice teachers also used these assessment levels to assess themselves in practice. Therefore, I used positive statements at all levels to encourage the preservice teachers to develop their learning management competency for better future practice.

2) Second, I analyzed the preservice teachers’ reflections. These were the secondary qualitative data. The researcher analyzed the data from the reflection record form (e-portfolios). The data were classified according to the KPT framework (Amano, 2013) after the students wrote them in the record. I used the domain analysis technique to define inductive coding to group the sets of words based on the relations of each word. The data were presented in descriptive form.

3. Results

The results of the development of the Japanese language and culture learning management competency of the preservice teachers were as follows.
3.1 The Assessment of the Japanese Language and Culture Learning Management Competency

Table 1. The percentages and the numbers of the preservice teachers, assessed according to five indicators in each assessment level by an instructor (N = 27)

| Assessment Levels                                                                 | Number | Percent |
|-----------------------------------------------------------------------------------|--------|---------|
| Indicator 1: Curriculum construction and development                               |        | N/A     |
| Level S: Being able to construct and evaluate the course syllabus of the Japanese language and culture course and present the newly developed course | N/A    | N/A     |
| Level A: Being able to construct and evaluate the course syllabus of the Japanese language and culture course and identify the improvement and development issues appropriately | 11     | 41      |
| Level B: Being able to construct and identify the disadvantages or the advantages of the course syllabus of the Japanese language and culture course | 16     | 59      |
| Level C: Having to put more effort into constructing and evaluating the course syllabus of the Japanese language and culture course | N/A    | N/A     |
| Indicator 2: Learning design competency                                           |        | N/A     |
| Level S: Being able to plan learning management systematically and predict the concepts and behaviors of learners in learning Japanese language and culture | 19     | 70      |
| Level A: Being able to plan learning management systematically by considering the thoughts and behaviors of learners in learning Japanese language and culture | N/A    | N/A     |
| Level B: Being able to plan learning management step by step but not considering the thoughts and behaviors of learners in learning Japanese language and culture | 7      | 26      |
| Level C: Having to put more effort into planning learning management systematically and considering the thoughts and behaviors of learners in learning Japanese language and culture | 1      | 4       |
| Indicator 3: Student-centered learning management                                   |        | N/A     |
| Level S: Being able to manage student-centered learning according to the learning management plan and deal with unexpected events in appropriate ways | 9      | 33      |
| Level A: Being able to manage student-centered learning according to the learning management plan | 16     | 59      |
| Level B: Being able to manage student-centered learning but not actually in accordance with the learning management plan | 2      | 7       |
| Level C: Having to put more effort into managing student-centered learning according to the learning management plan | N/A    | N/A     |
| Indicator 4: Use and development of innovative materials and technology for learning management |        | N/A     |
| Level S: Being able to use information technology to create learning materials to support learning management or learner education | 6      | 22      |
| Level A: Being able to use existing information technology to support learning management or learner education | 14     | 52      |
| Level B: Being able to apply existing information technology to the classroom       | 7      | 26      |
| Level C: Having to put more effort into applying existing information technology to the classroom | N/A    | N/A     |
| Indicator 5: Measurement and evaluation of learning management                       |        | N/A     |
| Level S: Being able to use measurement and evaluation methods and tools specific for the learner education | 8      | 30      |
| Level A: Being able to use measurement and evaluation methods and tools covering the learner education | 13     | 48      |
| Level B: Being able to use measurement and evaluation methods and tools but not covering the learner education | 6      | 22      |
| Level C: Having to put more effort into discovering measurement and evaluation methods and tools suitable for learner education | N/A    | N/A     |

Note. N/A means no students were assessed at that level.

From Table 1, it was found that the assessment results on the Japanese language and culture learning management competency of the preservice teachers were mostly at level A, namely indicators 3, 4, and 5 accounting for 59%, 52%, and 48% of the total number of learners, respectively. For indicator 1, the assessment results were mostly at level B, accounting for 59% of the total number of learners, whereas those for indicator 2 were mostly at level S, accounting for 70% of the total number of learners.

3.2 The Reflection of the Preservice Teachers on the Use of the Project-Based Learning Approach and E-Portfolios (KPT Framework)

The reflection of keep (K) was the reflection on what the preservice teachers did best through practice. The results of the reflection were classified into two groups. In group 1, learning management skills, the preservice teachers reflected that they could create interesting and innovative learning materials. They tried to use materials to help students learn and applied technology to their learning management, which can create a fun classroom...
The research results revealed that three indicators of the preservice teachers’ learning management competency development were on the same level (a) student-centered learning management (b) use and development of innovative materials and (c) technology for learning management, measurement, and evaluation. In addition, the learning management design competency indicator was higher than the other indicators. It was also found that the curriculum construction and development indicator was lower than the other indicators. Thus, the comparison of the development results between the two indicators with the highest and lowest assessment results
According to Table 1. According to the project-based learning process, the preservice teachers had to revise their learning management plans and receive multiple reviews from their peers of different groups and instructors until their learning management plans were complete. Therefore, the learning management design competency indicator was at a higher level than the other indicators; while performing repetitive thinking processes, the nervous system can transmit information more quickly. During practice, experiences and observed encountered stimuli will cause the brain to change, which will enhance the learners’ ability and intelligence (Tokuhama-Espinosa, 2010). Therefore, when the students and instructors created an iterative process for creating the learning management plan after hearing others’ criticism, it significantly increased the development of the learning management design competency indicator more so than any other area.

By contrast, for the curriculum construction and development indicator, which allowed instructors to design and evaluate the course outline, it was found the majority of the students and instructors could identify and solve problems. However, the obtained information was not enough for improving and creating a new course outline. For this reason, the assessment results of this indicator were at the lowest level. Clearly, organizing learning management only once in this research did not lead to sufficient data collection to develop and improve the course outline. Therefore, I have realized that the project-based learning approach with a long period of practice is required to allow students to review the cycle of practice, improve, and solve various problems before developing the new course outline. This is consistent with Heckendorn (2002), who stated, “Anything in real life is naturally complex. So, it takes a long time to implement the project-based learning before it can be completed” (as cited in Gülbahar & Timmaz, 2006, p. 311).

From the reflection results, I found the preservice teachers had learned from the experience in project-based practice. It reflected the attitude change that the preservice teachers learned from solving problems in the project, both in learning management and in working. This is consistent with Roessingh and Chambers (2011), who posited project-based learning allows learners to practice critical thinking and learn to work together systematically. In addition, the project-based learning approach and e-portfolios helped the preservice teachers be aware of their own strengths; this allowed me to recognize the concept of the preservice teachers who were aware of their own strengths and values, which can encourage students not to give up in terms of improving themselves. This behavior can be explained by self-awareness theory, which involves having an independent self-concept that can direct one’s learning and being more motivated internally than learning externally (Duval & Wicklund, 1972, as cited in Merriam & Bierema, 2014). Thus, these are the learning outcomes from the practice and from strengthening the learning management competency to prepare the preservice teachers directly for their future work.

In this study, using e-portfolios made it easier to access the preservice teachers’ personal learning information. Moreover, the students and instructors could monitor and evaluate the performance effectively, resulting in an enthusiasm and a desire to make the next phase of the project better until the goal was achieved. In terms of the results of e-portfolio use, I found self-assessment and the recording of reflections during practice helped the preservice teachers be responsible and appreciate their opinions, resulting in self-esteem. This is consistent with Gülbahar and Timmaz (2006), who explained project-based learning helps learners take control of their learning and classroom activities. This is also in accordance with Suzuki (2013, p. 24), who stated the “portfolio is the best tool for concrete self-assessment and is required to develop modern education guidelines.” Therefore, this research’s learning environment and the use of e-portfolios allowed the preservice teachers to manage their practice, push themselves from the information recorded, and exchange that information with other members.

This study was conducted in a short period, so the preservice teachers experienced only one round of organizing learning management; this was not enough to develop a consistent performance level for all indicators. In addition, this study cannot fully conclude how the preservice teachers developed their Japanese language and culture learning management competency because the competency was not studied before using the project-based learning approach, and the research was conducted only after the content-based teaching of regular classroom courses.

5. Conclusion

In this research, the development of the preservice teachers’ learning management competency using the project-based approach and e-portfolios presented the concept for the learning management of the courses in the teacher production curriculum, focusing on allowing the preservice teachers to study content as well as study and understand the learners’ nature and learning process, consistent with the PCK concept and classroom teaching practice. The research results pointed out the thinking process toward the preservice teachers’ introspective practice. The results also showed using the project-based approach and e-portfolios not only developed the
teachers’ learning management competency but also helped them gain knowledge regarding systematic work, planning and time management, and teamwork, which are desirable attributes for preservice teachers.

6. Limitations of the Study

First, the duration of learning management using the project-based learning approach and e-portfolios should be longer, or students should be allowed to have repeated practice in the project-based learning process so that changes and developments that occur during the process can be seen clearly. The development of the preservice teachers’ learning management competency should be promoted to be consistent in all indicators.

Second, if a study of the results is conducted when the preservice teachers start working in school, then the effectiveness of developing the learning management competency (from the project-based learning approach and e-portfolios) can be seen concretely. A reflection on the improvement and development of this learning management approach should be conducted as well.

Third, to develop the teaching quality of preservice teachers, Japanese language proficiency and Japanese language learning management must be developed simultaneously. This research has proven using the project-based learning approach and e-portfolios allowed the preservice teachers to develop their learning management competency as well as work skills and teamwork. Therefore, if this learning management process is applied when developing preservice teachers’ Japanese language competency—Japanese skill that requires a period to be proficient—then the study results will be fascinating.

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