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Innovative Learning Design Development Training Based on Project Based Learning (PjBL) for Professional Teacher Education Program (PPG) Students Using the Zoom Platform

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Abstract

This community service program aimed to improve the competence of pre-service teachers in developing innovative Project Based Learning (PjBL)-based instructional designs through online training using the Zoom platform. The participants of this program were 18 students of the Teacher Professional Education (PPG) Program. The training was conducted through several stages, including preparation, delivery of PjBL concepts, instructional design workshops, discussion sessions, feedback, and evaluation. Data were collected through observation, participant responses, and assessment of the instructional design products developed during the training. The results showed that the training positively improved participants' understanding and skills in designing PjBL-based learning activities. Most participants demonstrated better ability to formulate learning objectives, develop project activities, design assessment instruments, and integrate technology into learning designs. The evaluation results indicated that 16 participants (88.89%) experienced significant improvement in their understanding and competence, while 2 participants (11.11%) still required further guidance, particularly in developing project assessment strategies. The use of the Zoom platform also supported effective interaction, collaboration, and knowledge sharing during the training process. It can be concluded that the implementation of online PjBL-based instructional design training effectively enhanced PPG students' pedagogical competence and prepared them to create innovative, contextual, and student-centered learning experiences.

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1. Introduction (12 pt)

The development of 21st-century education requires teachers to possess the ability to design innovative, creative, and student-centered learning experiences. Teachers are no longer expected only to transfer knowledge but also to act as facilitators who can create meaningful learning environments through appropriate instructional strategies and models. Therefore, one of the essential competencies that teachers need to develop is the ability to design learning activities that promote critical thinking, creativity, collaboration, communication, and problem-solving skills among students.

The Teacher Professional Education (PPG) Program is one of the strategic programs implemented to improve the professionalism and competence of future teachers. Through this program, pre-service teachers are prepared to acquire pedagogical, professional, social, and personal competencies required in modern educational contexts. As prospective educators, PPG

students are expected to be able to develop innovative instructional designs that are aligned with curriculum demands, technological developments, and students' learning needs. However, many pre-service teachers still experience challenges in designing learning activities that effectively integrate innovative learning models, particularly Project Based Learning (PjBL), into classroom practices.

Project Based Learning (PjBL) is considered one of the innovative instructional models that supports meaningful and contextual learning. PjBL emphasizes student-centered activities in which learners actively investigate problems, collaborate with others, create authentic products, and reflect on their learning experiences. Through project-based activities, students are encouraged to develop higher-order thinking skills and apply knowledge to real-world situations. Thomas (2000) stated that Project Based Learning provides opportunities for students to engage in meaningful tasks and construct knowledge through experience. Similarly, Bell (2010) highlighted that PjBL supports the development of 21st-century skills, including creativity, communication, collaboration, and critical thinking.

Although Project Based Learning offers various benefits, its successful implementation requires teachers to have adequate knowledge and skills in designing project-based learning activities. Teachers need to understand how to formulate learning objectives, develop project scenarios, organize learning steps, design assessment instruments, select appropriate learning resources, and integrate technology effectively. Therefore, providing training on PjBL-based instructional design is necessary to strengthen the pedagogical competence of PPG students as future professional teachers.

The integration of digital technology in teacher training has become increasingly important, particularly in supporting flexible and accessible professional development activities. The use of online platforms such as Zoom provides opportunities for conducting training programs without geographical limitations. Zoom offers various features, including video conferencing, screen sharing, discussion rooms, and interactive communication, which support collaborative learning and effective knowledge sharing among participants. Online training through Zoom can provide an alternative approach to improving teachers' competencies in developing innovative learning designs.

Based on these considerations, training on the development of innovative Project Based Learning-based instructional design for PPG students through the Zoom platform is essential to be implemented. This training aims to improve pre-service teachers' understanding and skills in designing PjBL-based learning activities that are innovative, contextual, and relevant to current educational needs. Through this program, PPG students are expected to be able to produce effective instructional designs and implement student-centered learning approaches when they become professional teachers.

This training activity is significant because the quality of education is strongly influenced by teachers' ability to design and implement meaningful learning processes. By strengthening PPG students' competence in developing Project Based Learning designs, this program contributes to preparing future teachers who are capable of creating innovative learning environments and responding to the challenges of 21st-century education.

2. Literature Review

2.1 Project Based Learning (PjBL) as an Innovative Learning Model

Project Based Learning (PjBL) is an instructional approach that emphasizes active, meaningful, and student-centered learning through the completion of authentic projects. In PjBL, students are engaged in investigating problems, designing solutions, creating products, and reflecting on their learning processes. This approach shifts the learning process from teacher-centered instruction toward learner-centered experiences where students actively construct knowledge.

Thomas (2000) explains that Project Based Learning involves complex tasks based on challenging questions or problems that require students to investigate, make decisions, and produce meaningful outcomes. The process of completing projects allows students to connect theoretical knowledge with real-life situations. Furthermore, Bell (2010) states that PjBL is an

effective model for developing 21st-century competencies, including critical thinking, creativity, communication, collaboration, and problem-solving skills.

The effectiveness of PjBL is also supported by constructivist learning theory, which views learning as an active process of constructing knowledge through experience and interaction. According to Krajcik and Blumenfeld (2006), Project Based Learning provides opportunities for learners to explore ideas, collaborate with others, and develop deeper understanding through authentic activities. Therefore, PjBL is considered appropriate for preparing students and teachers to face the demands of contemporary education.

2.2 Instructional Design Competence of Pre-Service Teachers

Instructional design competence is an essential component of teacher professionalism. Teachers are required not only to master subject knowledge but also to design effective learning experiences that meet students' needs and learning objectives. For pre-service teachers in the Teacher Professional Education (PPG) Program, the ability to develop instructional designs is a fundamental competency that determines their readiness to become professional educators.

According to Gagné et al. (2005), instructional design involves systematic processes for planning, developing, implementing, and evaluating learning experiences to achieve specific educational goals. A well-designed instructional plan should include clear learning objectives, appropriate teaching strategies, learning activities, assessment methods, and learning resources. Therefore, PPG students need continuous training and practical experiences to develop their ability to design innovative learning.

The integration of innovative learning models such as PjBL into instructional design requires teachers to understand the characteristics and procedures of the model. Teachers need to be able to design projects that are relevant to students' contexts, provide meaningful learning experiences, and develop appropriate assessment strategies. Without adequate understanding and training, teachers may experience difficulties in implementing PjBL effectively.

2.3 Teacher Professional Education (PPG) and Professional Competence Development

The Teacher Professional Education (PPG) Program plays an important role in preparing qualified teachers who possess pedagogical, professional, social, and personal competencies. Teacher education programs are designed to strengthen teachers' knowledge, skills, and professional identity through the integration of theoretical understanding and practical teaching experiences. In the context of 21st-century education, teacher preparation must emphasize not only mastery of subject knowledge but also the ability to design meaningful, innovative, and technology-supported learning experiences (Darling-Hammond, 2017; OECD, 2019).

One of the main focuses of PPG is improving pedagogical competence, particularly the ability to plan, implement, and evaluate effective learning processes. Pedagogical competence enables prospective teachers to understand students' characteristics, select appropriate instructional strategies, develop learning materials, and apply assessment methods effectively (König et al., 2020). According to Darling-Hammond (2020), effective teacher preparation programs should provide opportunities for prospective teachers to connect theoretical knowledge with authentic classroom practices through structured training and continuous reflection.

Professional development activities, including workshops, mentoring, and training programs, play an essential role in improving teachers' readiness to implement innovative teaching approaches. Recent studies emphasize that continuous professional learning helps teachers adapt to curriculum changes, integrate educational technology, and develop learner-centered instructional practices (Avalos, 2019; Trust et al., 2020). Furthermore, teacher professional development programs that include collaborative activities and practical experiences are more effective in improving teachers' instructional competence compared to programs focusing only on theoretical knowledge (Darling-Hammond et al., 2017).

For PPG students, training activities focusing on Project Based Learning (PjBL)-based instructional design are important because they provide opportunities to practice developing lesson plans, project scenarios, assessment instruments, and digital learning resources. Project Based Learning requires teachers to design authentic learning experiences that encourage

students' creativity, collaboration, critical thinking, and problem-solving abilities (Krajcik & Shin, 2014; Kokotsaki et al., 2016). Therefore, prospective teachers need practical guidance to understand how to integrate PjBL principles into instructional planning and classroom implementation.

The integration of technology into teacher training also strengthens the effectiveness of professional development programs. Digital platforms enable flexible learning environments, collaborative interaction, and continuous access to professional resources (Bates, 2019; Trust & Whalen, 2020). Online training using platforms such as Zoom can support PPG students in developing digital pedagogical competence while practicing the design of innovative learning activities. Thus, PjBL-based instructional design training can serve as an important bridge between theoretical understanding and practical implementation of innovative learning models among future teachers.

2.4 Digital Technology and Online Training through Zoom Platform

The development of digital technology has transformed teacher professional development by providing flexible opportunities for online learning and training. Online platforms enable educators to participate in professional development activities regardless of geographical limitations. One widely used platform for online training is Zoom, which provides interactive features such as video conferencing, screen sharing, chat discussions, and collaborative communication.

According to Bates (2019), online learning technologies can support flexible, accessible, and interactive professional development when they are appropriately integrated into learning activities. Digital platforms allow participants to engage in discussions, share experiences, and collaborate during training sessions.

The use of Zoom in teacher training can provide an effective solution for developing professional competencies among PPG students. Through synchronous online sessions, trainers can deliver materials, demonstrate instructional design practices, provide feedback, and facilitate collaborative activities. Therefore, online training through Zoom can support the development of innovative teaching competencies in a flexible learning environment.

2.5 Previous Studies and Research Gap

Previous studies have shown that training and professional development activities can improve teachers' ability to implement innovative learning models. Research by Bell (2010) highlighted that PjBL supports meaningful learning and the development of essential skills required in modern education. Similarly, Krajcik and Blumenfeld (2006) emphasized that effective implementation of PjBL requires teachers who understand how to design and facilitate project-based learning experiences.

However, many previous studies have focused on the implementation of PjBL among students, while fewer studies have examined training programs specifically designed to improve pre-service teachers' competence in developing PjBL-based instructional designs. In addition, limited studies have explored the use of online platforms such as Zoom as a medium for conducting PjBL instructional design training for PPG students.

Therefore, this training program addresses the research gap by focusing on improving PPG students' competence in developing innovative Project Based Learning-based instructional designs through online training using the Zoom platform. This activity is expected to contribute to teacher professional development by preparing future teachers who are capable of designing meaningful, technology-supported, and student-centered learning experiences.

3. Method of Implementation

This training activity employed a participatory training method with a workshop approach to improve the competence of pre-service teachers in developing innovative Project Based Learning (PjBL)-based instructional designs. The implementation method was designed to provide

participants with theoretical understanding, practical experience, and direct guidance in developing PjBL-based learning designs through an online training platform.

The participants of this activity were pre-service teachers enrolled in the Teacher Professional Education (PPG) Program. The training was conducted online using the Zoom platform during the 2025–2026 academic year. Zoom was selected as the training medium because it supports interactive communication through video conferences, presentations, discussions, screen sharing, and collaborative activities between trainers and participants.

The implementation of the training consisted of several stages, including preparation, implementation, evaluation, and reflection.

a. Preparation Stage
   The preparation stage began with identifying participants' needs related to their understanding and skills in developing innovative instructional designs. The training team prepared learning materials, training schedules, presentation media, project-based learning examples, and evaluation instruments. The materials were developed based on the principles of Project Based Learning, instructional design development, and the needs of PPG students as prospective professional teachers.
b. Training Implementation Stage
   The training activities were carried out through interactive online sessions using Zoom. The implementation consisted of the following activities:
   (a) Introduction and Orientation
   The trainers introduced the objectives, benefits, and expected outcomes of the training. Participants were provided with an overview of the importance of innovative instructional design and the role of PjBL in developing student-centered learning.
   (b) Presentation of PjBL Concepts and Instructional Design
   Participants received explanations regarding the concepts, characteristics, principles, and stages of Project Based Learning. The trainers also explained how to integrate PjBL into lesson plans, learning activities, assessment strategies, and learning media.
   (c) Workshop and Practice Session
   Participants were guided to develop their own PjBL-based instructional designs. They practiced formulating learning objectives, designing project activities, preparing student worksheets, developing assessment instruments, and selecting appropriate digital learning resources.
   (d) Discussion and Feedback Session
   (e) Participants presented their instructional designs and received feedback from trainers and other participants. This activity encouraged collaboration, reflection, and improvement of the developed learning designs.
4. Evaluation Stage
   Evaluation was conducted to measure the effectiveness of the training program and participants' improvement in understanding PjBL-based instructional design. Data were collected through questionnaires, observations, participant responses, and assessment of the instructional design products developed during the training. The evaluation focused on participants' understanding of PjBL concepts, ability to design project-based learning activities, and readiness to implement the model in classroom practices.
5. Reflection Stage
   The reflection stage was conducted after the completion of the training activities. The training team analyzed participants' feedback, identified challenges encountered during the training, and evaluated the strengths and weaknesses of the implementation process. The results of reflection were used as recommendations for improving future training programs.

The data obtained from the training activities were analyzed descriptively. Quantitative data from questionnaires were analyzed by calculating response percentages, while qualitative data from observations and participant feedback were analyzed to identify changes in participants' knowledge, skills, and experiences during the training.

Through this implementation method, the training was expected to improve PPG students' competence in developing innovative Project Based Learning-based instructional designs and prepare them to implement meaningful, creative, and student-centered learning in their future teaching practices.

6. Results

The implementation of the training on the development of innovative Project Based Learning (PjBL)-based instructional design for pre-service teachers of the Teacher Professional Education (PPG) Program showed positive results in improving participants' understanding and skills in designing project-based learning activities. The training was attended by 18 PPG students who actively participated in all stages of the program through the Zoom platform.

The results were obtained through observations, participant responses, and evaluation of the instructional design products developed during the training. Before the training was conducted, participants showed varied levels of understanding regarding the concept and implementation of Project Based Learning. Most participants understood PjBL only as a learning activity involving projects but had limited understanding of how to systematically design project-based learning, including determining project objectives, designing learning activities, developing assessment instruments, and integrating technology into learning.

During the training process, participants demonstrated increased engagement through discussions, question-and-answer sessions, and collaborative activities. The presentation of PjBL concepts and examples of innovative instructional designs helped participants understand the characteristics, principles, and implementation stages of Project Based Learning. Participants were able to identify the differences between conventional learning designs and student-centered learning designs based on PjBL.

The workshop activities showed that participants were able to develop PjBL-based instructional designs based on their respective teaching subjects. They successfully formulated learning objectives, designed authentic project activities, prepared learning steps, selected appropriate learning resources, and developed assessment instruments. The guidance and feedback provided by trainers helped participants improve the quality of their instructional designs.

The evaluation results indicated an improvement in participants' competence after participating in the training. Based on the questionnaire results, 16 participants (88.89%) stated that the training significantly improved their understanding of Project Based Learning concepts and their ability to design innovative learning activities. Meanwhile, 2 participants (11.11%) stated that they experienced some difficulties, particularly in designing project assessment instruments and managing project time allocation.

The evaluation of participants' instructional design products also showed positive results. Before the training, most participants' designs did not clearly include essential components of PjBL, such as driving questions, project planning, student collaboration activities, product development, and reflection stages. After the training, the instructional designs developed by participants demonstrated better alignment with PjBL principles.

The improvement of participants' competence can be seen in the following table:

Aspect Evaluated	Before Training	After Training
Understanding of PjBL concepts	Limited understanding; participants recognized projects but did not fully understand PjBL principles	Participants understood the characteristics, stages, and benefits of PjBL
Ability to design PjBL learning activities	Learning activities were mostly teacher-centered	Participants developed student-centered project activities

Development of assessment instruments	Assessment focused mainly on final products	Participants developed process and product-based assessments
Integration of technology in learning	Limited use of digital learning resources	Participants integrated digital tools to support project activities

The observation results also indicated positive changes in participants' learning attitudes. Participants became more confident in presenting their instructional designs, actively exchanged ideas with other participants, and provided constructive feedback during discussion sessions. The collaborative atmosphere during Zoom sessions supported knowledge sharing and professional learning among PPG students.

Overall, the results demonstrate that the implementation of online training through the Zoom platform effectively improved PPG students' competence in developing innovative Project Based Learning-based instructional designs. The training not only increased participants' theoretical understanding of PjBL but also strengthened their practical skills in designing meaningful, creative, and student-centered learning experiences.

7. Discussion

The results of this community service program demonstrate that the training on the development of innovative Project Based Learning (PjBL)-based instructional design successfully improved the competence of pre-service teachers in the Teacher Professional Education (PPG) Program. The improvement was reflected in participants' increased understanding of PjBL concepts, ability to design project-based learning activities, and capability to develop instructional designs that are more student-centered and contextual.

Before participating in the training, most participants had a general understanding of Project Based Learning but had not fully mastered the procedures for implementing PjBL in instructional design. Some participants understood PjBL only as a learning activity involving assignments or products, while they had limited understanding of essential components, such as determining driving questions, designing project processes, developing assessment instruments, and facilitating student reflection. This finding indicates that theoretical knowledge alone is not sufficient; pre-service teachers require practical training experiences to translate innovative learning concepts into classroom implementation.

The improvement after the training occurred because the program combined theoretical explanations with practical workshops. Participants were not only introduced to the concepts and characteristics of PjBL but were also guided to develop their own project-based instructional designs. This approach is consistent with the principle of experiential learning, which emphasizes that knowledge becomes more meaningful when learners actively engage in applying concepts to real situations. According to Kolb (1984), learning through experience enables individuals to construct knowledge through concrete experiences, reflection, conceptual understanding, and active experimentation.

The results support the findings of Thomas (2000), who stated that Project Based Learning requires careful planning and instructional design to ensure that learning activities involve authentic problems, investigation, collaboration, and meaningful products. Therefore, teacher competence in designing PjBL activities is a crucial factor in determining the success of its implementation. Through this training, PPG students gained practical experience in developing learning scenarios that align with PjBL principles.

Furthermore, the improvement in participants' instructional design skills reflects the importance of professional development programs for prospective teachers. Darling-Hammond (2006) emphasized that effective teacher preparation should provide opportunities for future teachers to connect theoretical knowledge with practical teaching skills. The training provided participants with opportunities to practice designing learning objectives, developing project

activities, selecting learning resources, and preparing assessment strategies. These activities contributed to strengthening their pedagogical competence as future professional teachers.

The use of the Zoom platform also contributed positively to the effectiveness of the training. Although conducted online, participants remained actively involved through discussions, presentations, feedback sessions, and collaborative activities. The availability of interactive features such as screen sharing, virtual presentations, and real-time discussions supported effective communication between trainers and participants. This finding is consistent with Bates (2019), who stated that digital learning environments can support professional development by providing flexible access, interaction, and collaboration opportunities.

The training also encouraged collaboration among participants. During the workshop sessions, PPG students exchanged ideas, discussed challenges, and provided feedback on each other's instructional designs. This collaborative process helped participants develop broader perspectives regarding the implementation of innovative learning models. According to Johnson and Johnson (2009), collaborative learning environments promote knowledge construction through interaction, shared responsibility, and mutual support.

The positive responses from participants indicate that the training model was relevant to their needs as prospective teachers. The majority of participants reported that the training helped them understand how to transform conventional lesson plans into innovative instructional designs based on PjBL. This result supports Bell (2010), who highlighted that PjBL enables teachers and learners to develop creativity, critical thinking, communication, and collaboration skills required in 21st-century education.

However, several challenges were identified during the implementation of the program. Some participants experienced difficulties in designing appropriate project assessment instruments and determining realistic project timelines. These challenges indicate that designing PjBL-based learning requires continuous practice and mentoring. Future training programs should provide more opportunities for participants to develop assessment strategies and simulate the implementation of PjBL in authentic classroom settings.

Overall, this community service program demonstrates that training through the Zoom platform can be an effective strategy for improving PPG students' competence in developing innovative Project Based Learning-based instructional designs. The program not only increased participants' conceptual understanding but also enhanced their practical skills in creating meaningful, technology-supported, and student-centered learning designs. Therefore, similar training programs are recommended to be implemented continuously as part of professional development efforts for future teachers.

6. Conclusion

The training on the development of innovative Project Based Learning (PjBL)-based instructional designs successfully enhanced the pedagogical competence of PPG students. Through online training using the Zoom platform, participants improved their understanding of PjBL concepts and developed practical skills in designing student-centered, creative, and contextual learning activities. The training activities, including presentations, workshops, discussions, and feedback sessions, encouraged participants to collaborate and produce better instructional designs. The results indicate that online professional development programs can effectively support pre-service teachers in preparing innovative learning strategies. Therefore, similar training programs are recommended to strengthen teachers' readiness for 21st-century education.

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(PjBL)-based instructional design development. Finally, the authors hope that this program can provide meaningful contributions to improving the pedagogical competence of prospective teachers and supporting the development of innovative learning practices in education.

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