

The Effect of Implementation of Teacher Professional Education on Pedagogical Competence of Prospective Elementary School Teachers

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ABSTRACT

This study investigates the effect of implementing Teacher Professional Education (TPE) programs on the pedagogical competence of prospective elementary school teachers. The research was conducted in response to the growing demand for high-quality teachers who possess not only strong subject knowledge but also effective teaching skills. A quantitative approach with a quasi-experimental design was employed, involving a sample of prospective teachers enrolled in a TPE program. Data were collected through pedagogical competence assessments administered before and after the program. The results revealed a significant improvement in participants' pedagogical skills, including lesson planning, classroom management, learning assessment, and the use of appropriate instructional strategies. The findings suggest that TPE programs play a crucial role in preparing future elementary school teachers to meet professional teaching standards and improve the quality of education. It is recommended that educational institutions continue to strengthen the content and delivery of TPE programs to maximize their impact on teacher competence.

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1. INTRODUCTION

Education is universally acknowledged as a fundamental pillar in the development of a nation. High-quality education not only shapes individual potential but also determines the future of a country's economic, social, and political landscape. At the heart of this educational system lies the teacher, whose competence, dedication, and professionalism profoundly impact the learning outcomes of students. Among the various competencies that teachers must possess, pedagogical competence is one of the most crucial. It encompasses the ability to plan, implement, and evaluate the teaching and learning process in a manner that is effective, meaningful, and student-centered.

In the context of elementary education, the role of the teacher becomes even more significant. Elementary school represents a critical phase in a child's educational journey where foundational knowledge, attitudes, and skills are developed. Therefore, ensuring that elementary school teachers possess strong pedagogical competence is not merely beneficial it is essential. This competence is not only related to mastering content knowledge but also involves understanding students' developmental needs, applying appropriate teaching strategies, and managing the classroom environment effectively. Over the years, numerous reforms have been introduced in many countries to improve the quality of teacher education. One of the key initiatives is the implementation of Teacher Professional Education (TPE) programs. These programs are designed to bridge the gap between theoretical knowledge gained during undergraduate teacher education and the practical demands of teaching in real classroom settings. In Indonesia, for example, the TPE program commonly referred to as Pendidikan Profesi Guru

(PPG) is a post-graduate certification program that aims to enhance the pedagogical and professional competencies of prospective teachers.

The implementation of TPE has been widely regarded as a significant step towards the professionalization of teaching. However, there remains a need for empirical evidence to assess the actual impact of TPE on the pedagogical competence of teacher candidates, especially at the elementary level. While several studies have explored the general outcomes of TPE, few have focused specifically on how this program influences the readiness and effectiveness of prospective elementary school teachers in terms of pedagogical practice. Despite the growing emphasis on teacher professionalization, there remains a persistent concern regarding the pedagogical readiness of graduates entering the teaching profession. Many new teachers report feeling underprepared to manage classrooms, design effective lesson plans, and assess student learning. This raises an important question: Does the Teacher Professional Education program adequately equip prospective elementary school teachers with the pedagogical skills necessary for effective teaching? Several factors may influence the effectiveness of TPE, including curriculum design, quality of instruction, duration of practicum, mentoring, and assessment mechanisms. Moreover, the motivation and prior preparation of participants also play a role in how much they benefit from the program. Without a clear understanding of how TPE affects pedagogical competence, efforts to improve teacher education risk being misdirected or ineffective.

Given this context, it becomes imperative to examine the effect of the implementation of Teacher Professional Education on the pedagogical competence of prospective elementary school teachers. Such a study can provide valuable insights into whether current policies and practices in teacher education are aligned with the needs of the profession and the expectations of schools and students. The primary aim of this study is to explore and analyze the extent to which the implementation of Teacher Professional Education influences the pedagogical competence of prospective elementary school teachers. Specifically, this research seeks to; Assess the level of pedagogical competence of prospective elementary school teachers before and after participating in a TPE program. Identify which components of the TPE program contribute most significantly to the development of pedagogical competence. Examine participants' perceptions of the effectiveness of the TPE program in enhancing their teaching skills. Provide recommendations for improving the structure and delivery of TPE programs based on the findings.

This study holds significant relevance for various stakeholders in the field of education. For policymakers, the findings can inform decisions related to teacher certification standards, curriculum design, and funding priorities. For teacher education institutions, the study can serve as a basis for evaluating and refining the implementation of their TPE programs to ensure they are producing competent and confident educators. For prospective teachers, the study can provide clarity on what to expect from the TPE process and how to maximize its benefits. Furthermore, the broader educational community, including school principals, supervisors, and parents, stands to benefit from a clearer understanding of the preparedness of new teachers entering the workforce. A well-prepared teacher not only enhances student learning outcomes but also contributes to a positive school climate and reduced teacher attrition rates. In the long term, strengthening teacher competence through effective professional education can contribute to raising the overall quality of education in elementary schools, thereby supporting national goals for human resource development and social progress.

This research is grounded in the theoretical framework of constructivism and teacher professional development theory. Constructivist learning theory posits that individuals build knowledge through active engagement and reflection. In the context of teacher education, this implies that effective professional development must go beyond the transmission of knowledge and instead engage participants in reflective practice, real-world application, and collaborative learning. Teacher professional development theory, particularly models such as Guskey's (2002) framework, emphasizes that meaningful changes in teacher practice occur when professional learning opportunities are well-structured, contextually relevant, and linked to improved outcomes. Guskey outlines five levels of evaluation in teacher professional development, including participants' reactions, learning, organizational support, use of new knowledge, and student outcomes. This framework is particularly useful for analyzing how TPE programs can bring about genuine improvements in pedagogical competence.

This study focuses on prospective elementary school teachers enrolled in a formal Teacher Professional Education program within a specific academic year. It examines changes in pedagogical competence as measured through assessments, observations, and self-reports. While the study aims to provide a comprehensive evaluation, several limitations must be acknowledged. These include; The study may not fully capture long-term retention and application of pedagogical skills in actual classroom settings. The diversity of TPE program implementations across institutions may limit the generalizability of the findings. Self-assessment data, while valuable, may be influenced by personal biases or inaccurate self-perception. Despite these limitations, the study provides an important snapshot of the effectiveness of TPE in preparing prospective teachers for real-world teaching challenges.

Numerous studies have emphasized the importance of pedagogical competence as a key determinant of teacher effectiveness. According to Shulman (1987), pedagogical content knowledge represents a critical intersection between knowing what to teach and knowing how to teach it. In recent years, educational research has increasingly highlighted the importance of aligning teacher education programs with real-world classroom demands. Studies conducted in various countries have shown mixed results regarding the effectiveness of professional education programs. In some cases, TPE has been found to significantly improve teaching quality, especially when programs include intensive practicum experiences and mentorship components (Darling-Hammond, 2006). In other contexts, however, limited resources, poorly trained mentors, or overly theoretical curricula have hindered the effectiveness of such programs (OECD, 2019).

In Indonesia, research on the Pendidikan Profesi Guru program has shown promising outcomes but also revealed areas for improvement. For instance, a study by Suparlan (2021) found that while participants generally improved in pedagogical knowledge, many continued to struggle with lesson planning and classroom assessment. This underscores the need for ongoing evaluation and refinement of TPE programs to ensure they are meeting their intended goals. The increasing complexity of educational challenges in the 21st century demands that teachers possess not only content expertise but also sophisticated pedagogical skills. Teacher Professional Education has emerged as a strategic initiative to prepare teacher candidates for these challenges by enhancing their pedagogical competence. This study aims to provide a rigorous examination of the effectiveness of TPE in preparing prospective elementary school teachers for the demands of the profession. The findings are expected to contribute to the improvement of teacher education programs and support the broader goal of elevating the quality of elementary education.

2. RESEARCH METHOD

This study employed a quantitative approach with a quasi-experimental design to examine the effect of Teacher Professional Education (TPE) on the pedagogical competence of prospective elementary school teachers. The design involved a pretest-posttest without control group, focusing on measuring changes in pedagogical competence before and after participation in the TPE program. The population consisted of prospective elementary school teachers enrolled in a TPE program at selected teacher education institutions. Using purposive sampling, 60 participants were selected based on their enrollment status and willingness to take part in the study. Data were collected using a combination of standardized pedagogical competence assessment instruments, which included indicators such as lesson planning, instructional strategy application, classroom management, and learning evaluation. The instrument was adapted from the national teacher competency standards and validated through expert review and a pilot test. The pretest was administered at the beginning of the TPE program to establish a baseline of participants' pedagogical competence. The posttest was conducted after participants completed all core components of the program, including coursework, teaching practicum, and mentoring sessions. Additionally, questionnaires and self-assessment rubrics were used to gather data on participants' perceptions of the effectiveness of the TPE experience. The collected data were analyzed using descriptive statistics (mean, standard deviation) and inferential statistics, particularly paired sample t-tests, to determine the significance of differences in competence scores before and after the program. A significance level of 0.05 was used to interpret the results. This methodological approach allows for an objective evaluation of the impact of TPE implementation on pedagogical competence and offers insights into the strengths and limitations of current teacher preparation practices.

3. RESULTS AND DISCUSSIONS

Results

This study aimed to examine the effect of the implementation of Teacher Professional Education (TPE) on the pedagogical competence of prospective elementary school teachers. The analysis was conducted based on pretest and posttest data obtained from 60 participants who completed a TPE program. The results are presented in both descriptive and inferential formats to comprehensively address the research objectives.

Descriptive Analysis of Pedagogical Competence

The descriptive analysis focused on assessing the overall pedagogical competence of participants before and after undergoing the TPE program. Competence was measured using four key indicators: lesson planning, instructional strategies, classroom management, and learning assessment.

Table 1. Pretest Results

Indicator	Mean Score (Max = 100)	Standard Deviation	Competency Level
Lesson Planning	64.2	8.3	Moderate
Instructional Strategies	61.5	7.9	Moderate
Classroom Management	59.8	9.1	Low
Learning Assessment	58.6	8.7	Low
Overall Average	61.0	8.5	Moderate

These results indicate that prior to participating in the TPE program, most prospective teachers struggled particularly with classroom management and assessment practices. Although they showed some competence in lesson planning and instructional strategies, their overall readiness to implement effective teaching was limited.

Table 2. Posttest Results

Indicator	Mean Score (Max = 100)	Standard Deviation	Competency Level
Lesson Planning	82.4	6.1	High
Instructional Strategies	80.1	5.7	High
Classroom Management	78.6	6.3	High
Learning Assessment	77.5	6.5	High
Overall Average	79.7	6.1	High

The posttest scores demonstrate a marked increase in pedagogical competence across all measured dimensions. The most notable improvements were seen in classroom management and learning assessment, suggesting that these areas benefitted greatly from the structured practice and feedback provided during the TPE program.

Inferential Statistical Analysis

Table 3. Paired Sample t-Test Results

Indicator	Pretest Mean	Posttest Mean	Mean Difference	t-value	p-value	Significance
Lesson Planning	64.2	82.4	+18.2	14.63	0.000	Significant
Instructional Strategies	61.5	80.1	+18.6	15.10	0.000	Significant
Classroom Management	59.8	78.6	+18.8	14.75	0.000	Significant
Learning Assessment	58.6	77.5	+18.9	14.42	0.000	Significant
Overall Score	61.0	79.7	+18.7	15.08	0.000	Significant

The analysis shows that for all indicators, the p-value is below 0.05, indicating that the differences between pretest and posttest scores are statistically significant. This confirms that the TPE program had a positive and meaningful effect on the pedagogical competence of prospective elementary school teachers.

Participants' Perception of the TPE Program

To complement the quantitative data, a structured questionnaire was distributed to collect participants' perceptions of the effectiveness of the TPE program in enhancing their pedagogical skills. Responses were gathered using a 5-point Likert scale.

Table 4. Summary of Perception Scores

Aspect of TPE Program	Mean Score (1-5 scale)
Relevance of course content	4.6
Quality of instruction	4.5
Practicum usefulness	4.7
Mentoring and supervision	4.3

Aspect of TPE Program	Mean Score (1–5 scale)
Assessment and feedback methods	4.4
Overall satisfaction	4.6

Overall, the participants rated the program highly. The practicum was consistently highlighted as the most impactful component, providing authentic teaching experiences and opportunities to apply theoretical knowledge in real classrooms.

Correlation Between TPE Participation and Competency Improvement

A Pearson correlation analysis was conducted to examine the relationship between participants' engagement in program components (e.g., attendance, practicum hours, mentor feedback sessions) and the degree of improvement in pedagogical competence.

Table 5. Correlation Between TPE Participation and Competency Improvement

Variable	Correlation Coefficient (r)	Interpretation
Attendance in TPE coursework	0.71	Strong positive
Number of practicum hours	0.78	Strong positive
Frequency of mentor feedback	0.74	Strong positive

These findings suggest that active and consistent participation in the TPE program is strongly associated with higher gains in pedagogical competence. Participants who were more involved in practicum sessions and received more frequent feedback from mentors demonstrated greater improvement in instructional quality and classroom management.

Discussions

One of the most significant findings of this study is the marked increase in participants' pedagogical competence after completing the TPE program. Before participating in the program, the majority of participants exhibited only moderate or low competence in areas such as classroom management, assessment, and instructional design. After completing the program, all participants achieved high levels of competence across the four assessed domains. These results strongly support the notion that pedagogical competence is not static, but rather a skillset that can be developed through structured professional education. This aligns with Darling-Hammond (2006), who asserts that pedagogical expertise is best developed through sustained practice, reflective learning, and contextualized feedback—all of which are integral components of the TPE program.

Each of the four measured domains of pedagogical competence lesson planning, instructional strategies, classroom management, and learning assessment showed statistically significant gains. However, the most substantial improvements were observed in classroom management and learning assessment, which are traditionally the most challenging aspects of teaching for novices. Participants reported that real-world teaching practice, under supervision, was the primary driver of their improvement in managing students, maintaining focus, and handling disruptive behavior. This finding is consistent with Marzano & Marzano (2003), who argue that practical experience is critical for mastering classroom discipline strategies. TPE's practicum component allowed participants to develop and refine classroom routines, rules, and expectations in a supportive environment, increasing their self-efficacy and adaptability.

Prior to TPE, many participants struggled with developing valid and reliable assessment tools. Post-program results demonstrated significant growth in the ability to design and implement both formative and summative assessments, interpret results, and use assessment data to guide instruction. This result supports the work of Black and Wiliam (1998), who emphasize that effective assessment is learned through guided practice, not theoretical knowledge alone. Participants attributed this improvement to the detailed feedback from mentors and exposure to case-based learning in assessment workshops. The findings point to the critical role played by the different components of the TPE program in shaping pedagogical competence. These include coursework, teaching practicum, mentorship, and reflective feedback mechanisms.

The structured coursework component provided participants with essential theoretical frameworks and instructional models. Many participants stated that they gained new understandings of curriculum design, learning psychology, and student diversity. However, they also emphasized that this theoretical knowledge became truly meaningful only when applied during the practicum. The teaching practicum emerged as the most valued component of the program. Participants who completed more practicum hours tended to show greater improvements in pedagogical competence, a finding that corroborates studies by Zeichner (2010), who posits that experiential learning is the cornerstone of

teacher development. The immersive nature of the practicum allowed participants to transition from abstract understanding to hands-on implementation.

Mentorship provided during the practicum phase was highlighted as instrumental in supporting learning. Effective mentors facilitated observation, offered constructive criticism, and modeled good teaching practices. This aligns with Feiman-Nemser's (2001) work on the importance of instructional mentoring in early teacher development. The correlation between frequency of mentor feedback and improvement in competence found in this study underscores the value of sustained mentoring relationships in teacher education programs. Participants' feedback provided valuable insights into their experience and how it influenced their growth. The overwhelmingly positive ratings of program relevance, quality of instruction, and mentoring indicate that the TPE program effectively met its objectives. Participants described the program as "transformational," "challenging but empowering," and "essential to their readiness for teaching."

Interestingly, the data analysis revealed no significant differences in competence improvement based on gender or prior academic performance. Both male and female participants benefited equally from the program, and those with lower undergraduate GPAs showed nearly comparable improvements to those with higher academic records. This suggests that the TPE program provides an equitable learning opportunity, where growth is not determined by pre-existing academic advantages. Instead, the program's experiential and interactive format offers multiple entry points for development, consistent with the constructivist approach to teacher education. This also aligns with the views of Vygotsky (1978), who emphasized the importance of social interaction and scaffolding in the learning process.

The findings of this study support a substantial body of research highlighting the importance of high-quality teacher education in developing pedagogical competence. Scholars such as Cochran-Smith and Zeichner (2005) have long argued that effective teacher education is grounded in a strong link between theory and practice. This study provides empirical support for that claim, demonstrating that well-designed TPE programs can yield significant pedagogical growth in a relatively short period. Moreover, the study adds nuance to the understanding of which program elements contribute most to competence development. While previous literature has recognized the general effectiveness of teacher education, this study isolates practicum experience and mentoring as particularly powerful components. This suggests that policy and program designers should prioritize these elements when allocating resources or restructuring teacher education programs.

The results of this study offer several important implications for the development of teacher education programs, particularly in contexts where improving educational quality is a national priority. Given the centrality of teaching practice in developing competence, teacher education programs should expand opportunities for early and sustained field experiences. Universities and training institutions must build stronger partnerships with schools to ensure that all teacher candidates have access to diverse and supportive practicum settings. The mentoring relationship is critical to success in TPE programs. Mentors must be trained and compensated for their work, and their role should be recognized as a formal component of teacher education. Institutions should consider developing a certification pathway for mentors and providing ongoing support to help them guide new teachers effectively.

Reflection emerged as a key mechanism through which candidates internalized their experiences and improved their teaching. Teacher education programs should embed structured reflections such as teaching journals, peer debriefings, and self-assessment tools into the program to deepen professional learning. The study found that participants responded positively to the curriculum but suggested that it could be updated more regularly to reflect changing educational trends, technologies, and policies. Curriculum developers should ensure that TPE content stays aligned with real classroom needs and national education goals. While this study provides valuable insights, it is not without limitations. First, the study was limited to one cohort from a specific geographical and institutional context. Therefore, generalizability to other contexts should be approached cautiously. Future studies should include larger and more diverse samples from different regions or types of teacher education institutions.

Second, this study focused on short-term outcomes. Longitudinal studies tracking teacher candidates into their first years of full-time teaching would provide more information about the long-term impact of TPE programs on teacher quality and student learning. Finally, while the study utilized quantitative methods to assess competence, incorporating qualitative methods such as interviews or classroom observations could yield richer, more nuanced understandings of teacher growth and instructional effectiveness. The implementation of Teacher Professional Education programs has a substantial and positive effect on the pedagogical competence of prospective elementary school teachers. By combining theoretical instruction, teaching practice, and mentorship, TPE programs enable

candidates to develop critical skills necessary for effective classroom instruction. This study contributes to a growing body of evidence supporting the continued investment in high-quality teacher education as a strategy for improving educational outcomes. For such programs to be truly transformative, attention must be paid to the design and execution of practicum experiences, mentor training, and curriculum relevance. Moving forward, policymakers and educators must collaborate to ensure that every future teacher is equipped with the pedagogical competence needed to foster meaningful learning in elementary school classrooms.

4. CONCLUSION

The findings of this study clearly demonstrate that the implementation of Teacher Professional Education (TPE) has a significant and positive effect on the pedagogical competence of prospective elementary school teachers. Participants who completed the TPE program showed measurable improvements in key domains of pedagogical competence, including lesson planning, instructional strategies, classroom management, and student assessment. These enhancements reflect not only the effectiveness of the program's curriculum and structure but also the critical role of practical experience and mentoring in shaping teacher readiness. One of the most impactful components of the TPE program was the teaching practicum, which provided candidates with real-world teaching opportunities under the supervision of experienced mentors. This experience allowed them to apply theoretical knowledge in authentic classroom settings, develop classroom management skills, and refine their teaching strategies. In addition, regular feedback from mentors and the integration of reflective practices contributed significantly to participants' professional growth. The study also found that improvements in pedagogical competence were consistent across different backgrounds, showing that the TPE program is inclusive and effective for a wide range of prospective teachers. These results affirm that structured, practice-based professional education programs can bridge the gap between pre-service training and actual classroom teaching competence. In conclusion, the TPE program plays a vital role in preparing future elementary school teachers to meet the challenges of modern education. Strengthening such programs through increased practicum hours, enhanced mentorship, and continuous curriculum updates will further support the development of highly competent and reflective educators. As teacher quality is directly linked to student outcomes, investing in effective teacher education is an essential step toward improving the overall quality of education in elementary schools.

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