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Assessing Pedagogical Competence Among Prospective Primary School Teachers: A Case Study

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Abstract. *With an emphasis on their self-perceived strengths and shortcomings in a variety of areas, such as topic knowledge, teaching tactics, classroom management, and technology integration, this study evaluates the pedagogical competency of aspiring primary school teachers. Data were gathered from 150 participants in a teacher training program at a prestigious university using a quantitative survey approach. According to the results, although the participants demonstrated a solid command of the subject matter, they also had modest opinions of their own teaching methods and classroom management, as well as a marked lack of confidence when it came to incorporating technology into their lesson plans. These findings highlight the necessity for teacher training programs to better strike a balance between academic understanding and real-world application, especially when it comes to topics like digital tool use and classroom management. According to the study, increasing possibilities for practical learning and incorporating technology-focused training could greatly raise future teachers' pedagogical proficiency.*

Keywords: *Pedagogical Competence, Primary School Teachers, Teacher Preparation, Technology Integration*

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INTRODUCTION

Since it directly affects the caliber of instruction and student learning outcomes, developing pedagogical competency in aspiring primary school teachers is an essential component of teacher education (Herut & Setlhako, 2024). A teacher's capacity to develop, carry out, and evaluate efficient teaching methods that meet the demands of a wide range of students is referred to as pedagogical competence. The significance of providing pre-service teachers with strong pedagogical skills cannot be emphasized in the context of primary education, where basic skills are built (Nilsson, 2008).

Numerous strategies for improving pre-service teachers' pedagogical competency have been identified by recent studies (Tondeur et al., 2020). Microteaching, for example, has been found to be a useful tool in this context. According to Asregid et al. (2023), microteaching sessions help pre-service teachers enhance their pedagogical skills by enhancing lesson planning, providing them with real-world teaching experience, and encouraging them to participate in reflective practices. According to Harris & Hofer (2011), incorporating technology into lesson planning has also demonstrated promise in improving teachers' capacity to create successful teaching resources that integrate pedagogical, technical, and content knowledge (TPACK).

It has also been shown how educational competency is fostered by continuous professional development (CPD). Structured CPD programs greatly improve teacher abilities in the pedagogical, professional, social, and personal areas, as Abakah (2023) showed. These

initiatives give educators continual assistance and chances to improve their teaching methods, which enhances the educational experiences of students.

According to Ahmad (2024), another essential element in the development of pedagogical ability is reflective practice. Reflective practices enable pre-service instructors to evaluate their teaching strategies, comprehend the features of their students, and modify their instructional tactics accordingly, according to a study by Dumlao & Pinatacan (2019). For the effectiveness of instruction to continuously increase, this process of self-evaluation and adaptation is crucial (Glasman et al., 2022).

It has been demonstrated that lesson study, a cooperative professional development strategy, is successful in improving teaching abilities. According to Sikström et al. (2024), lesson study makes it easier to include character qualities into thematic instruction, which benefits primary school pupils' educational experiences. Teachers can monitor one another's teaching, exchange best practices, and improve their teaching strategies as a group when they collaborate (Andayani & Madani, 2023).

Align with research from Hasma (2017), a complex process, the development of pedagogical competence in aspiring primary school teachers is essential to guaranteeing that educators have the abilities and know-how to provide engaging and successful instruction. More than only subject-matter expertise, pedagogical competence encompasses the capacity to create, carry out, and evaluate instructional strategies that cater to the various requirements of students (Oviyanti, 2017). Current research highlights a number of strategies for improving pre-service teachers' pedagogical abilities.

Pre-service teachers can practice and improve their teaching methods in a controlled setting by using methods like microteaching. Elias (2018) claim that microteaching gives pre-service teachers a chance to think critically about their methods, get helpful criticism, and modify their strategies. Future educators can gain a greater comprehension of the pedagogical process by using this approach, which helps close the gap between theory and practice (Aisyah et al., 2024). Furthermore, it is now more crucial than ever to include technology into teacher education programs. According to Tondeur et al. (2020), pre-service teachers can better integrate technology into their classes by using the Technological Pedagogical Content Knowledge (TPACK) framework in their teacher preparation.

In addition to improving instruction, this equips aspiring teachers to handle the demands of contemporary classrooms, where technology plays a crucial role. Furthermore, it is impossible to undervalue the contribution that continuous professional development (CPD) makes to the development of pedagogical competence. According to Aris et al. (2022), professional development programs have a major impact on teachers' abilities in a variety of areas, such as pedagogy, professionalism, social skills, and personal qualities. According to Chastanti (2024) these programs give educators continual chances to improve their teaching methods and stay current with emerging trends in education.

Another important factor in this growth is reflective practice. According to Velasquez et al. (2023), pre-service teachers can evaluate their teaching strategies critically, pinpoint areas for development, and modify their tactics to better suit the needs of their students by practicing self-reflection. Furthermore, it has been discovered that cooperative methods like lesson study, in which educators collaborate to organize, monitor, and evaluate lessons, are successful in improving instructional strategies (Chong & Kong, 2012). According to Watts et al. (2021), lesson study creates a cooperative setting where educators can exchange ideas, improve their approaches, and incorporate character education into their instruction.

Finally, in order to prepare teachers to handle the changing educational landscape, 21st-century skills must be incorporated into teacher education programs. Zhao et al. (2024) emphasizes how crucial it is to give educators the tools they need to use technology efficiently and modify their teaching strategies to satisfy the needs of a world that is changing quickly.

Nevertheless, difficulties still exist in spite of these developments. According to Li et al. (2023), pre-service teachers frequently have difficulty understanding complicated learning theories, even while they acquire great skills in understanding curriculum design and student characteristics. This disparity necessitates a more thorough and equitable method of teacher preparation that blends academic understanding with real-world experience (Safran et al., 2024).

Even with these developments, there are still obstacles to overcome in order to guarantee that every pre-service teacher reaches the required degree of pedagogical proficiency. According to Tanase & Dinsmore (2023), pre-service teachers made good growth in their comprehension of curriculum development and student characteristics, but they made less progress in their understanding of learning theories and principles. This disparity highlights the need for a more thorough method of teacher preparation that strikes a balance between theoretical understanding and real-world application.

METHODS

The quantitative survey research approach was used to evaluate how prospective primary school teachers perceived their competencies as educators. The research examined four major areas which make up pedagogical competence including content knowledge and teaching strategies together with classroom management and technology integration. The domains of content knowledge and teaching strategies emerged from Shulman's (1986) work on pedagogical content knowledge while the Technological Pedagogical Content Knowledge (TPACK) framework brought forth by Mishra and Koehler (2006) also informed the selection process. The questionnaire instrument for the survey used a structured format that originated from literature research along with validated scales of teacher competencies. The survey questionnaire transformed existing items into relevant content that mirrored actual conditions within Indonesian teacher education. The instrument employed closed-ended items together with Likert-scale statements that allowed respondents to indicate their self-confidence levels according to a scale of 1 (strongly disagree) to 5 (strongly agree) through each domain. Professional input from a total of 3 teacher education experts validated the instrument before researchers conducted a pilot study using a sample of 20 pre-service teachers who were different from the main research participants. Multiple instrument items received revisions to improve their cultural appropriateness alongside clarity enhancement. The research scale achieved reliability validation during a pilot study that yielded a Cronbach's alpha measurement of 0.87 indicating strong internal reliability.

The research selected participants through a purposive sampling technique. A total of 150 future primary school teachers from different Indonesian universities pursuing teacher education programs formed the participant sample. The study included participants throughout different years of their educational program to conduct meaningful comparisons between their development stages. The study collected demographic information about participant gender together with academic year level and teaching experience for the purposes of subgroup competence analysis. The study implemented all necessary ethical research requirements. The study participants joined voluntarily with their consent informed before research started. The study protected participants with confidentiality terms and anonymous identification and implemented ethical board clearance from the institution. The research collected data through an online survey platform that provided a wide selection of participants alongside survey convenience. Analysis focused on the 150 valid responses after removing any data affected by cleaning and completion screening. Self-reported competence levels from participants received summary processing through descriptive statistics which used mean scores and standard deviations. The research applied one-way ANOVA and independent-samples t-tests for inferential analysis to find statistically meaningful variations of competence between demographic score groups (such as study year, gender, teaching experience). A paired-samples t-test served to evaluate the participants' technology integration competence changes from before attending pedagogical workshops until after their participation.

RESULTS AND DISCUSSION

Table 1. General Pedagogical Competence Levels (Self-Reported)

Pedagogical Competence Area	Mean Score (1-5 scale)	Standard Deviation
Content Knowledge	4.2	0.5
Teaching Strategies	3.8	0.6
Classroom Management	3.6	0.7
Technology Integration	3.2	0.8

According to the findings, aspiring educators feel quite confident in their topic knowledge (mean = 4.2), indicating that they are adequately prepared to teach the subjects they are expected to teach. Nonetheless, there is a discernible drop in confidence in other areas, like technology integration (mean = 3.2) and classroom management (mean = 3.6), suggesting that these areas may require more attention in teacher preparation programs. There is significant variation in how prepared aspiring teachers feel to incorporate technology into their lessons, as indicated by the comparatively large standard deviation in the technology integration category (SD = 0.8).

Table 2. Pedagogical Competence by Year of Study

Year of Study	Content Knowledge	Teaching Strategies	Classroom Management	Technology Integration
Year 1	3.9	3.5	3.1	2.8
Year 2	4.0	3.7	3.3	3.0
Year 3	4.4	4.1	3.6	3.4
Year 4	4.6	4.2	4.0	3.7

Interpretation:

As students advance through their teacher preparation programs, the evidence demonstrates a positive trend in pedagogical ability. With every year of study, content knowledge increases gradually, peaking in Year 4 (mean = 4.6). Similar gains are seen in teaching methods and classroom management abilities, especially by Year 4, when mean scores indicate that students are more comfortable in these domains. Though there has been some development over the years, technology integration continues to be the sector with the lowest level of confidence. This implies that although teacher preparation programs may be improving classroom management and instructional practices over time, they may need to give technology integration in the classroom more attention.

Table 3. Technology Integration Competence by Previous Experience

Previous Teaching Experience	Mean Technology Integration Score (1-5 scale)	Standard Deviation
No prior teaching experience	3.0	0.9
1-2 years of teaching experience	3.4	0.7
3-5 years of teaching experience	3.8	0.6
More than 5 years of teaching experience	4.1	0.5

The effect of previous teaching experience on technology integration abilities is highlighted in the table. It should come as no surprise that those who have taught before have greater confidence while utilizing technology in the classroom. A teacher's capacity to successfully integrate technology is much improved by practical experience, as seen by the highest mean score (4.1) reported by those with more than five years of experience. The lowest ranking for technology integration competency is given by aspiring teachers with no prior experience (mean = 3.0), indicating that teacher preparation programs might need to offer more structured chances for incorporating technology into their curricula.

Table 4 Comparison of Pedagogical Competence by Gender

Gender	Content Knowledge	Teaching Strategies	Classroom Management	Technology Integration
Male	4.3	3.9	3.7	3.1
Female	4.1	3.8	3.5	3.3

According to the findings, male prospective teachers reported slightly higher confidence in their content knowledge (mean = 4.3) and classroom management (mean = 3.7) than females, suggesting that there are minor gender disparities in pedagogical ability. Nonetheless, the disparities are negligible, as women express greater assurance in integrating technology (mean = 3.3). These findings imply that gender does not seem to significantly affect overall pedagogical skill, even though there may be slight variations in self-reported competences. This may indicate that aspiring teachers, both male and female, are often similarly prepared in the fundamentals of teaching.

Table 5. Impact of Pedagogical Training Workshops on Technology Integration

Workshop Attendance	Pre-Workshop Technology Integration	Post-Workshop Technology Integration	Change (%)
No	2.9	3.1	+6.9%
Yes	3.0	4.0	+33.3%

The effect of pedagogical training workshops on aspiring teachers' proficiency with technology integration is displayed in this table. Workshop participants' confidence in integrating technology increased significantly, as evidenced by a 33.3% improvement in their scores from before and after the workshop. Those who did not attend seminars, on the other hand, just little improved (6.9%). This implies that specialized technology-focused professional development programs can significantly improve aspiring educators' capacity to incorporate technology into their lesson plans. The research data provides multiple perspectives about pre-service primary school teachers' perceived educational capabilities thus laying base for in-depth analysis of teacher education programs' advantages and shortcomings. The academic domain of teacher education demonstrates consistent strength through the high scores pre-service educators reported in their content knowledge (M = 4.2).

Pedagogical content knowledge serves as the essential basis of effective instruction according to the findings of Shulman (1986). The educational institutions have demonstrated effectiveness in transmission of theoretical knowledge because their structured disciplinary foundation-based courses drive academic success in content mastery Academic content depth stands essential according to Darling-Hammond (2000) because it is necessary for creating purposeful learning materials for students. The success rate of academic rigorous curriculum design demonstrates a positive trend according to this observation which shows teacher education programs have achieved their objectives in this area. Academic competence focuses in teacher education programs warrant consideration because it could potentially minimize the development of essential practical classroom skills thus affecting the preparedness of teachers (Sudiarta et al., 2021).

Student teachers show lower confidence rates when it comes to domains that focus on classroom practice particularly classroom management and teaching strategy application. Self-reported evaluation scores for the two domains rate at a moderate level (M = 3.6 and M = 3.8) but demonstrate theoretical-practical discordance. According to Veenman (1984) and Emmer and Sabornie (2015) classroom management stands as a key ongoing difficulty which new teachers encounter in their practice. Classroom management faces escalated difficulties because it requires both disciplinary control and psychological safety together with inclusion for students as part of the fundamental process. These types of outcomes exist beyond the reach of theory-based knowledge only. Neel Kersthagen's (2004) educational model stresses realistic teacher training through hands-on practice as well as mentoring and reflective actions which help address this educational deficit.

This pedagogical approach requires students to learn through practical enactment because this educational constructivism stems from Dewey's experiential theory. These study results demonstrate why such approaches must be given priority during teacher training in the later terms when practical lessons should enhance pedagogical competencies. Educational institutions training teachers should develop systems with built-in feedback mechanisms to help candidates get ongoing feedback on their educational techniques from experts (Ramli et al., 2023). The study's most significant finding includes findings of low self-confidence in technology integration that continuously appeared across all participants (M = 3.2). The results confirm previous research by Hew and Brush (2007) and Bauer and Kenton (2005) who reported that faculty members lacked enough digital resources and teachers received insufficient training about teaching through technology in their academic modeling practices.

The purpose of the TPACK framework (Mishra & Koehler, 2006) is to create a theoretical framework that links technology integration with teaching practices and subject content but many teacher education institutions are unable to effectively apply this model in teaching. The study demonstrates minimal development of technology-related abilities throughout semesters suggesting that students acquire content and pedagogical knowledge better than digital device familiarity. Future teachers demonstrate limited preparedness to thread twenty-first century skills through their classrooms particularly digital literacy and information evaluation combined with technology-enhanced collaboration standards which contemporary classrooms require. The minimal advancement of teacher digital competencies across upper-grade education levels probably results from systemic barriers in the educational system.

The implementation of digital tools faces major barriers in teacher education according to Zhao et al. (2024) particularly when institutions operate without urban or adequate resources and proper digital policies regarding culturally relevant digital pedagogy. The obstacles exist beyond technical limitations because they have deeply rooted themselves within educational cultures alongside institutional values. According to Santoso (2020), Digital tools cannot achieve focused transformation because institutions view them strictly as delivery systems rather than developmental resources. The digital literacy skills of faculty members significantly affect pre-service teacher development because both incompetent and uncertain instructors will not demonstrate model practices needed to build those skills (Muilenburg & Berge, 2005). Without equal attention on professional faculty development institutions must initiate or support concurrent changes in pre-service teacher practices. The evaluation of workshop participation provides additional support to this finding. The structured professional development delivered at the workshop resulted in a significant improvement of technology integration skills that exceeded +33.3%.

These positive changes in teaching effectiveness face uncertainty to endure unless staff members receive sustained follow-up assistance and implementation support. According to Harris and Hofer (2011) mentoring activities become progressively less effective after single-time intervention programs stop. The impact of workshops depends on their ability to spark innovations though their effectiveness diminishes when workshop approaches become separate activities instead of being integrated within instructional plans. Instructional programs for teacher education must establish a system of ongoing technology trainings through which educators can develop their skills through collaborative planning sessions and teaching partnerships and video feedback analysis. Educational institutions should deploy innovative professional learning systems that unite classroom sessions and virtual educational tools with peer network opportunities for developing specialized digital instruction skills across various learning contexts.

According to Kolb's (1984) experiential learning model teachers gain pedagogical confidence from their teaching practice particularly when using technology. Teaching veterans expressed elevated confidence because they encountered multiple classroom problems which they learned to address through experience (Mashudi et al., 2020). Research confirms that practicum programs should adopt progressive structures because teaching candidates need

extended access to advanced instructional situations along with guided reflection about their development. Research by Li et al. (2023) pointed to identical patterns among Chinese EFL pre-service teachers when they engaged with complicated practicum assignments which strengthened their ability to apply theory to practice. Quality teaching experiences accompanied by reasonable teaching variety prove most important to develop educator competence and confidence.

The slight absence of substantial gender variations reflects positively for equality but requires careful evaluation. Research by Teo (2009) reveals that male and female pre-service teachers have equivalent competence levels yet their underlying factors including confidence and technology exposure and support differ. In traditional teaching settings female instructors receive indirect pressure to avoid education in technology while their competence fails to develop although their ability remains equal. Training initiatives for equality must provide equal access in addition to recognizing and adjusting their support approach based on individual student experiences. The implementation of gender-responsive pedagogy within teacher education programs enables programs to modify their support methods according to students' social modes of learning so they can better support inclusivity.

The development of pedagogical competence requires teachers to practice reflection-based learning. Pre-service teachers gain an insight into their teaching practices through structured reflection activities like teaching journals and video analysis and guided debriefs that allow for continual development according to Dumlao and Pinatacan (2019). Professional development through reflective teaching combines into both an educational approach and the philosophical framework which facilitates self-assessment and welcomes feedback together with sustained educational progress. Teachers should use reflective tools at every level of their education to build theoretical knowledge through self-evaluation and awareness of their own thought processes. The lesson study method described by Watts et al. (2021) provides the perfect environment for deep reflection through which teachers benefit from experienced mentors and peer feedback in collaborative ways. Through collective learning practices these reflective practices help establish inquiry-based teacher education environments.

The assessment must include important contextual ingredients like national education guidelines together with cultural norms as well as organizational operational abilities. Developing countries along with rural or semi-urban areas located in Indonesia possess centralized rigid education systems which restrict teacher educational innovation (Aris et al., 2022). National standards and testing metrics dominate educational programs in these contexts through which teachers are trained because they focus on compliance rather than innovation in curriculum development. Moreover, the digital divide—both in terms of infrastructure and digital literacy—remains a formidable barrier. Zhao et al. (2024) propose combining Moral education with IT training as rural teacher education programs should consider this recommendation which fits well with the conditions studied. These efforts support ethical teaching growth along with technological ready-making for teachers who need to effectively leverage technology in appropriate manners.

The revealed weaknesses demand multiple solutions to effectively tackle them. The teaching educator curriculum should demand full-year educational experiences that make students design lessons through digital learning and direct classroom instruction. Programs that teach teachers should develop funding for instructor development which ensures faculty shows exemplary teaching practices through both pedagogical and technological best practices. School partnerships need to become stronger because they should deliver sustained instructional mentoring along with progressive field practice and training activities which match present classroom requirements. The recommended changes follow global educational standards for teacher training that OECD and UNESCO have established regarding the need for unified teacher certification and school mentorship systems.

A system needs to adopt innovative approaches for the evaluation of pedagogical competency. The present assessment method using self-reported data serves for measuring confidence yet it produces uncertain results due to faulty reporting. The evaluation of pre-service teachers' capabilities needs further development through combination research methods that combine classroom observations with student feedback data and performance assessments (Paine, 1990; Shulman, 1986). A mixed research design would provide both comprehensive and thorough examinations by measuring trainee teacher perceptions together with their classroom actions and resulting student outcomes. Observing pre-service teachers throughout their initial teaching experience would offer substantial knowledge about how their training competencies transfer and persist after graduation.

The current research study validates content knowledge education frameworks in teacher preparation but reveals that pedagogical practices and technology adoption remain challenging to teach and learn. The development of qualified graduates into proficient reflective adaptable educators requires educational programs to merge academic challenges with hands-on context-specific technology-based learning. Teacher education will meet present-day classroom requirements when it adopts this complete framework which emphasizes reflection and inclusivity for educating highly competent educators for diverse learning environments

CONCLUSION

By identifying strengths in topic knowledge and pointing out notable deficiencies in areas like teaching techniques, classroom management, and technology integration, this study has shed important light on the pedagogical competency of aspiring primary school teachers. The moderate self-assessments in teaching tactics and classroom management highlight the need for more thorough practical training, even while aspiring teachers showed confidence in their material understanding. Given the growing dependence on digital tools in modern classrooms, the poor confidence in technology integration is especially worrisome. These results highlight the necessity for teacher preparation programs to effectively combine academic understanding with real-world, hands-on experience, especially in areas that are essential for efficient technology integration and classroom management. The results make it abundantly evident that teacher preparation programs need to adapt to the shifting demands of the educational environment. More chances for experiential learning, such internships and student teaching positions, could aid aspiring educators in bridging the theory-practice divide. Furthermore, it will be essential to give instructors specialized training in technology use and classroom management in order to equip them to handle the challenges of contemporary classrooms. Teacher preparation programs can improve student learning outcomes by filling these gaps and giving aspiring educators the tools and self-assurance, they need to thrive in their future employment.

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