

The Effectiveness of the Teacher Professional Education Program in Improving Pedagogical and Professional Competence in the Digital Era

Saifullah

ifulsidrap06@gmail.com

Suleha

sulehasurapati@gmail.com

Yusmah

yusmah@gmail.com

Nuraini K

nuraini.kasman@gmail.com

Muhammad Hanafi

afied70@gmail.com

Jusrianto

jusrianto.jala@gmail.com

Nurlia Arsyad

nurlia.arsyad@gmail.com

Universitas Muhammadiyah Sidenreng Rappang

ABSTRACT

This study aims to evaluate the effectiveness of the Teacher Professional Education Program (PPG) in improving the pedagogical and professional competence of teachers in the digital era. With the rapid advancement of technology, demands for educational quality and teacher competence are increasing. The PPG program, as a means to enhance teacher quality in Indonesia, is expected to contribute significantly to the development of pedagogical competence and teacher professionalism in addressing the challenges of digital education. This research employs a quantitative survey approach involving teachers who have participated in the PPG program across several regions. The results indicate a significant improvement in participants' pedagogical competence, including understanding technology-based learning approaches and managing digital classrooms. However, challenges remain in the application of technology in daily teaching, particularly regarding limited access and adequate training. In conclusion, the PPG program has proven effective in enhancing pedagogical and professional competence, though improvements in modules and intensive training are needed to meet the growing demands of digital learning.

Keywords: Teacher Professional Education; Pedagogical Competence; Digital Era

INTRODUCTION

Education is one of the main pillars of national development. Amid the challenges of globalization and the rapid advancement of information technology, the quality of education has become increasingly vital in preparing a competent generation for an increasingly digital world. Teachers play a pivotal role as the frontline in transforming knowledge and skills to students. Therefore, enhancing teacher quality through various educational and training programs is a key factor in creating a superior educational system. One of the programs designed to improve teacher quality and competence in Indonesia is the Teacher Professional Education Program (PPG). PPG is an advanced education program for teaching graduates aimed at equipping teachers with pedagogical, personal, social, and professional competencies. This program seeks to provide in-depth understanding of educational theories and practical skills for effective classroom management and learning.

In recent years, however, the PPG program has faced significant challenges due to the rapid technological advancements impacting nearly all aspects of life, including education. The digital era has brought substantial changes in teaching and learning methods, necessitating adjustments in teachers' pedagogical and professional competencies. Teachers are now expected not only to teach effectively but also to master technology to support more interactive and adaptive learning. The success of PPG in enhancing teacher competence is influenced by several factors, such as curriculum quality, teaching methods employed, and the skills and practical experience offered during the program. In the context of the digital era, the integration of technology into learning has become an essential competence that every teacher must possess. Hence, PPG programs need to adapt to technological developments and equip teachers with the skills to leverage technology for more effective learning. Despite its goal of enhancing pedagogical and professional competencies, the implementation of the PPG program has encountered challenges in applying the knowledge and skills acquired during the program. These challenges include limited access to adequate technology, particularly in remote areas or resource-limited schools, and the lack of technological proficiency among teachers to effectively use digital tools and platforms in teaching.

It is crucial to evaluate the effectiveness of the PPG program in enhancing pedagogical and professional competencies in the digital era. Such evaluation aims to determine the extent to which the program equips teachers with the necessary skills to teach effectively amidst rapid technological advancements. Furthermore, it seeks to identify the strengths and weaknesses of the PPG program and provide recommendations for further improvement and development. This study examines the effectiveness of the Teacher Professional Education Program in enhancing teachers' pedagogical and professional competencies in the digital era. By evaluating PPG participants, this study aims to provide a clear picture of how well

the program prepares teachers to meet the demands of an evolving educational landscape. Additionally, the study identifies the challenges teachers face in implementing technology in education and offers suggestions to improve the quality of the PPG program in the future. It is hoped that this research will contribute to educational policy development, particularly in strengthening the PPG program as a means of enhancing teacher quality in Indonesia, thereby fostering a more advanced and relevant education system.

LITERATURE REVIEW

The Teacher Professional Education Program (PPG) is a critical component in the career development of educators. It aims to enhance teacher quality and competence through structured professional education that focuses on developing pedagogical and professional skills. According to the Regulation of the Indonesian Minister of Education and Culture No. 74 of 2013 on Teacher Professional Education, this program is a prerequisite for prospective teachers to teach in formal schools. Through PPG, teachers are expected to gain deeper knowledge of educational theories, classroom management, and professional development in teaching (Wahyudi, 2016).

Pedagogical competence is one of the four key competencies required of teachers, alongside personal, social, and professional competencies. Pedagogical competence refers to a teacher's ability to plan, implement, and evaluate the learning process effectively. Surya (2017) emphasizes that pedagogical competence plays a crucial role in the success of teaching and learning, as it encompasses classroom management, the use of diverse teaching methods, and the ability to adapt materials to students' needs. Therefore, PPG is designed to equip teachers with skills that align with classroom challenges, particularly in the digital era.

In the digital era, pedagogical competence extends beyond conventional classroom management to include the ability to use technology as a learning tool. The rapid technological development has significantly influenced teaching and learning methods. Educational technologies, such as digital devices and online platforms, are now integral to modern education. Platforms like Google Classroom, Moodle, and video conferencing tools like Zoom have been widely adopted by teachers for delivering materials and interacting with students, especially since the COVID-19 pandemic (Haryanto, 2020). This shift necessitates that teachers possess strong digital literacy skills to conduct effective learning sessions.

Professionalism in the digital era also demands a focus on teachers' ability to adapt to new technologies, understand student needs, and manage technology-based learning. According to Nugroho (2018), being a professional teacher in the digital age requires the ability to use technology to enhance interaction with students, enrich learning materials, and improve the learning evaluation process. Beyond pedagogical skills, PPG also emphasizes improving teachers' professional

competence. This competence includes mastery of subject matter, the ability to reflect on teaching practices, and the willingness to engage in lifelong learning. Professional teachers continuously seek self-improvement through professional development activities such as seminars, workshops, and training. Sari (2019) found that teachers participating in professional development programs demonstrate better classroom performance, leading to improved educational quality.

While PPG is designed to enhance pedagogical and professional competencies, its implementation faces several challenges. One of the main issues is the lack of adequate facilities and infrastructure to support technology-based learning. In many areas, especially remote regions, access to the internet and digital devices remains limited, hindering teachers' ability to participate in technology-driven learning and training (Sulistyo, 2019). Additionally, research by Rachmawati (2021) shows that despite many teachers completing PPG, the application of technology in classrooms remains relatively low. This is attributed to limited time, insufficient technical training, and difficulties in integrating technology into the existing curriculum. To address this, PPG curricula must incorporate deeper, more practical digital competencies to ensure that teachers can not only use technology but also leverage it to improve the quality of teaching and interaction with students. Implications for PPG Development.

The findings from various studies suggest that while PPG has a clear objective of enhancing teachers' pedagogical and professional competencies, its implementation in the digital era requires adjustments to curricula, training, and greater support in terms of facilities and infrastructure. Effective integration of technology into PPG can provide teachers with practical skills and strategies to overcome challenges and make digital learning more engaging. To ensure that PPG achieves its goals, ongoing adjustments and enhancements are necessary. This includes the development of training modules focused on digital tools, the provision of broader access to technology, and efforts to improve digital literacy among teachers. Strengthening professional competence through continuous self-development activities is also a crucial factor in achieving quality education.

METHOD

Design and Sample

This research employs a quantitative approach using a survey method to evaluate the effectiveness of the Teacher Professional Education Program (PPG) in improving teachers' pedagogical and professional competencies in the digital era. The quantitative approach allows for the collection of numerical data that can be analyzed statistically to identify relationships between the variables studied. The study focuses on measuring changes in teacher competence after participating in the PPG program and identifying factors that influence the program's effectiveness. The research design adopted is descriptive evaluative, which aims

to describe existing conditions and evaluate the impact of the PPG program on teachers' competencies. Additionally, this study seeks to identify significant elements within the PPG program that contribute to the improvement of teachers' abilities, particularly in implementing digital technology in the teaching process. The population in this study consists of teachers who participated in the PPG program in Indonesia during the 2022–2023 academic year. A purposive sampling method was used to select teachers with a minimum of one year of experience after completing the PPG program. The sample comprises 200 teachers across various education levels, including primary and secondary schools, with active engagement in technology-supported teaching and learning.

Instrument and Procedures

The primary instrument used in this study is a questionnaire divided into two sections: respondent profile, which includes demographic data such as age, educational background, teaching experience, and use of technology in teaching, and competency assessment, which uses a Likert scale to measure pedagogical and professional competencies before and after PPG participation. The pedagogical competencies assessed include lesson planning, classroom management, and evaluation, while professional competencies include curriculum understanding and self-management. Additionally, semi-structured interviews were conducted with selected teachers and PPG program managers to gain in-depth insights into their experiences with the program and the impact of digital technology on their competencies. These qualitative data complement the quantitative findings and provide a richer understanding of the program's outcomes.

Data Analysis

Data analysis was carried out using descriptive and inferential statistical techniques. Descriptive statistics were used to summarize respondent characteristics and questionnaire results, while inferential statistics, such as a t-test, were used to determine significant differences in teacher competencies before and after the PPG program. Regression analysis was also employed to identify factors influencing competency changes, particularly those related to the use of digital technology. To ensure the validity and reliability of the instruments, content validity was confirmed by consulting educational experts and PPG program organizers to verify that the questionnaire aligns with the research objectives. Instrument reliability was tested through a pilot study with a small sample of respondents, ensuring consistent measurement results.

Ethical principles were adhered to throughout the research process. Participation was voluntary, and respondents provided informed consent after understanding the study's purpose and procedures. Confidentiality was maintained by anonymizing data to protect respondents' identities. By employing these methodologies, this study aims to provide an objective evaluation of the PPG program's effectiveness in improving teachers' competencies and to identify areas for enhancement,

particularly in addressing the demands of the digital era.

RESULT AND DISCUSSION

This study evaluates the effectiveness of the Teacher Professional Education Program (PPG) in enhancing teachers' pedagogical and professional competencies in the digital era. A survey of 200 teachers who participated in the program reveals significant improvements, particularly in adapting to technology-driven education. The key findings and their implications are summarized below.

Pedagogical Competence

The study indicates that 85% of respondents experienced notable improvements in their pedagogical competence after completing the PPG program. Teachers reported an enhanced understanding of learning theories, improved classroom management skills, and increased confidence in designing technology-based lesson plans. Many participants highlighted their ability to utilize digital platforms such as Google Classroom and Zoom to support interactive and engaging learning environments. Despite these advancements, some teachers faced challenges in accessing adequate digital tools and resources, which limited their ability to fully integrate technology into their teaching practices. Teachers in remote or rural areas, in particular, cited unreliable internet connections and limited access to modern devices as barriers to leveraging digital technology effectively.

Professional Competence

The program also had a positive impact on teachers' professional competencies, with 70% of respondents reporting improvements in self-evaluation and reflective teaching practices. Teachers felt better equipped to identify and address weaknesses in their teaching methods and to adapt to curriculum changes. The program fostered confidence in managing diverse student needs and maintaining high teaching standards. However, some participants expressed concerns about the program's emphasis on theoretical content, which left limited opportunities for practical exploration of advanced digital tools. This gap hindered teachers' ability to master complex technologies and apply them effectively in real-world classrooms.

Challenges and Recommendations

While the program demonstrated overall effectiveness, significant challenges remain. Rural teachers faced substantial infrastructure barriers, including unreliable internet and insufficient access to devices, which hampered their ability to apply the skills learned during training. Additionally, 30% of participants reported difficulties in navigating the complexity of certain digital platforms, underscoring the need for targeted training on specific tools.

To optimize the program's impact, teachers recommended several improvements:

1. Increasing the practical components of training, with a focus on advanced digital tools.
2. Fostering collaboration among participants through online forums or group discussions to enhance knowledge-sharing and problem-solving skills.
3. Addressing regional disparities by improving access to digital resources and infrastructure in rural and remote areas.

The findings of this study highlight the effectiveness of the PPG program in equipping teachers with the competencies needed to navigate the digital era. The significant improvements in both pedagogical and professional competencies are consistent with the literature on teacher professional development, which underscores the importance of structured training programs in fostering technology integration (Nugroho, 2018; Haryanto, 2020). However, the challenges identified reveal critical areas for improvement in the program's design and implementation. One of the key gaps identified is the limited emphasis on practical, hands-on training with advanced digital tools. While theoretical foundations are essential, they must be balanced with opportunities for real-world application to ensure teachers can confidently implement their knowledge in classrooms. Future iterations of the PPG program should integrate practice-oriented modules, such as simulated teaching sessions using digital platforms or workshops focused on mastering specific technologies. This approach could enhance the program's relevance and applicability, ensuring teachers are better prepared for the demands of modern education.

The disparity between urban and rural participants in accessing digital tools and resources is a pressing issue that policymakers must address. Teachers in rural or remote areas face significant barriers, including unreliable internet connections and outdated infrastructure, which hinder their ability to apply the skills acquired during the program. To mitigate these challenges, the government and program organizers should invest in improving digital infrastructure, providing subsidized access to devices, and offering offline training resources that can be adapted to low-connectivity environments.

Another area for enhancement is fostering collaboration among participants. Encouraging peer learning through online forums, group discussions, or mentoring programs can provide a platform for teachers to exchange ideas, share best practices, and collectively address challenges. Collaborative learning can also promote innovation in teaching strategies, enabling teachers to adapt and evolve in response to changing educational demands. Sustainability is another critical consideration for the PPG program. Continuous professional development beyond the initial training is essential for teachers to stay updated with emerging technologies and pedagogical advancements. Establishing a structured follow-up system, such as periodic refresher courses or access to online professional learning communities, could support teachers in maintaining and expanding their competencies over time.

From a policy perspective, this study highlights the need for a more comprehensive approach to teacher training that aligns with the broader goals of digital transformation in education. Policymakers should prioritize integrating digital literacy into national teacher education standards, ensuring that all training programs address the competencies required for technology-enabled teaching. Additionally, regional governments should be empowered to develop localized solutions that address the unique needs of their communities, fostering equitable access to quality education across diverse contexts. Collaboration among stakeholders, including educational institutions, technology providers, and government agencies, is crucial for addressing the challenges identified. Partnerships with technology companies could provide access to advanced tools and training, while engagement with local communities can ensure the program's initiatives are culturally relevant and impactful. Stakeholders should also focus on creating inclusive policies that support marginalized groups, ensuring that no teacher or student is left behind in the transition to digital education.

CONCLUSION

This study evaluated the effectiveness of the Teacher Professional Education Program (PPG) in enhancing teachers' pedagogical and professional competencies in the digital era. The findings indicate that the PPG program has successfully contributed to significant improvements in teachers' understanding of learning theories, classroom management, and the use of technology in education. Most participants reported increased confidence in designing and implementing technology-based learning strategies, reflecting the program's success in preparing teachers to meet the demands of the digital era. However, the study also identified challenges, including limited access to adequate digital infrastructure and insufficient practical training in advanced technological tools. Teachers in remote areas faced barriers in fully utilizing the skills and knowledge gained during the program. These challenges underscore the need for targeted interventions, such as enhanced infrastructure support and more practical training components, to ensure equitable implementation and maximize the program's impact. The PPG program has proven to be an effective initiative for improving teacher competencies in Indonesia. Nevertheless, continuous improvement in curriculum design, access to technology, and ongoing professional development is necessary to address emerging challenges and ensure the program remains relevant in the rapidly evolving educational landscape. By addressing these issues, the PPG program can better equip teachers to deliver high-quality education and foster innovation in teaching practices in the digital era.

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