

Impact of Teacher Professional Education (PPG) on Teacher Professionalism: A Comparative Evidence-Based Analysis

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ARTICLE INFORMATION	Abstract
Article history: Received : January 02, 2026 Revised : January 07, 2026 Accepted : January 18, 2026 Keyword: PPG, Teacher Professionalism, Educational Reform. DOI: https://ciiles.com/scholar.v1i1.4	This study investigates the impact of Pendidikan Profesi Guru (PPG) on teacher professionalism in Indonesia, drawing on over 15 empirical studies published between 2020 and 2025. The analysis reveals that PPG significantly enhances teacher competencies across four dimensions: pedagogical, professional, social, and personality. On average, teachers show a 28.9% to 30.7% improvement in pedagogical and professional competencies, with notable gains in curriculum implementation, self-confidence, and teacher professionalism. However, the effectiveness of PPG is influenced by several contextual factors, including institutional quality, participant motivation, and delivery modality (pre-service, in-service, and online). The study emphasizes the need for targeted interventions to optimize PPG's impact, such as improving quality assurance systems, expanding access, and integrating theory with practical experience. The findings provide actionable recommendations to enhance PPG's effectiveness, ensuring sustainable improvements in teacher quality and supporting the broader educational reforms in Indonesia.

I. INTRODUCTION

The quality of education has long been recognized as a key determinant of the socio-economic development of a nation, and the role of teachers is central to this equation. As the cornerstone of the educational system, teachers are expected to possess not only foundational knowledge in their subject areas but also a wide range of competencies that enhance their effectiveness in the classroom. To address these multifaceted demands, various educational systems worldwide have introduced professional development programs aimed at enhancing teacher performance. In Indonesia, the *Pendidikan Profesi Guru* (Teacher Professional Education, or PPG) program stands as a strategic government initiative aimed at improving the professionalism of teachers (Suarlin et al., 2025). The program was launched as part of a broader national response to address the pressing need for a higher quality of education and to ensure that teachers meet established professional competency standards. PPG is designed to equip prospective and in-service teachers with the necessary pedagogical, professional, social, and personal competencies (Marwantoro et al., 2024). While the program's goals are widely acknowledged, its effectiveness in achieving these objectives remains a topic of considerable debate and research.

PPG has been implemented with the intent to standardize teacher qualifications and enhance their competencies, ensuring that they are well-prepared to face the challenges of contemporary education. It aims to bridge the gap between academic knowledge and the practical skills needed for effective teaching, with a particular emphasis on improving the pedagogical abilities of teachers, fostering a professional mindset, and nurturing a sense of social responsibility and personal integrity (Mutia et al., 2025). While PPG's objectives are well-articulated, it is essential to critically examine how well the program has succeeded in achieving these goals. The effectiveness of PPG is crucial not only for the development of individual teachers but also for the broader educational system, as it directly impacts student learning outcomes and educational quality.

The phenomenon of teacher professional development has been widely studied in the context of various teacher training programs globally. However, the literature on the PPG program, particularly its impact on teacher professionalism, has been scattered across various studies, with mixed findings. Some studies report significant improvements in teacher competency, while others indicate that the program's outcomes are inconsistent or do not meet expectations (Sudirman et al., 2021; Fatimah et al., 2022). In particular, while some research highlights the positive effects of PPG in enhancing teachers' pedagogical and



professional skills, others suggest that the program's influence on social and personal competencies is less pronounced. Moreover, there is a lack of comprehensive synthesis across these studies that can provide a clear understanding of the program's overall impact.

This research seeks to address this gap by conducting a comparative evidence-based analysis of the findings from various empirical studies on PPG and its impact on teacher professionalism. The main goal is to examine the patterns, both consistent and inconsistent, in the effectiveness of the program, thus providing a comprehensive, evidence-based interpretation of its impact. By drawing upon a range of studies, this research will offer insights into the strengths and weaknesses of PPG, identify areas for improvement, and contribute to the ongoing discourse surrounding teacher professional development in Indonesia.

Several studies have explored the relationship between teacher professional education programs and teacher professionalism. For example, Sudirman et al. (2021) found that the PPG program positively affected teachers' pedagogical skills, particularly in their ability to design and implement effective teaching strategies. In a similar vein, Fatimah et al. (2022) reported that PPG improved teachers' professional identity and their engagement in reflective teaching practices. However, not all studies have been unanimous in their findings. Some studies have pointed to significant barriers to the program's effectiveness, such as the lack of adequate training resources, insufficient mentoring, and challenges in applying the learned competencies in the classroom setting (Huda et al., 2020). Furthermore, studies by Haryanto (2024) suggest that the program has had a limited impact on fostering teachers' social and personal competencies, which are equally important for their holistic professional development. These conflicting results underscore the need for a more nuanced, systematic review of the literature to ascertain the actual impact of PPG on teacher professionalism.

This research will employ a descriptive quantitative approach to synthesize the findings from at least five relevant studies, focusing on the impact of PPG on various dimensions of teacher professionalism. By comparing the outcomes of these studies, this research will identify recurring trends and anomalies, helping to develop a clearer picture of PPG's overall effectiveness. A systematic comparison will enable the identification of specific factors that contribute to the program's success or failure, including the curriculum structure, training methods, and the contextual factors within different schools and regions. The research will also seek to examine the extent to which the program has achieved its intended goals, particularly in relation to enhancing teachers' pedagogical, professional, social, and personal competencies. The significance of this research lies in its potential to provide actionable insights for policymakers and educators who are involved in the design, implementation, and evaluation of teacher professional development programs. By analyzing the comparative evidence from previous studies, this research aims to offer evidence-based recommendations for improving the PPG program and ensuring that it better meets the needs of both teachers and students. Moreover, this research will contribute to the growing body of knowledge on teacher professional development, particularly in the context of Indonesia, where the educational system is undergoing rapid reforms to improve quality and equity. In particular, this study will address several key questions: How effective is the PPG program in improving teacher professionalism? What factors contribute to its success or failure? Are there specific areas of teacher professionalism (e.g., pedagogical skills, professional identity, social competencies) that the program addresses more effectively than others?

Furthermore, the study will examine the implications of these findings for future teacher training initiatives. For instance, if the study finds that the PPG program is particularly effective in enhancing teachers' pedagogical skills but less so in fostering social and personal competencies, this could prompt calls for revising the program's curriculum to ensure a more balanced approach to teacher development. Similarly, if the research identifies specific barriers to the program's success, such as inadequate resources or poor mentoring, it will provide recommendations for addressing these issues in future iterations of the program. In conclusion, the impact of PPG on teacher professionalism is a crucial area of investigation, as it directly affects the quality of education in Indonesia. While PPG has been recognized as a strategic initiative aimed at improving teacher competence, the existing body of research suggests that its outcomes have been mixed. This study aims to fill the gap in the literature by conducting a comprehensive, evidence-based analysis of the program's impact, drawing on findings from multiple studies. By providing a clearer understanding of the program's strengths and weaknesses, this research will contribute to efforts to enhance teacher professionalism and, ultimately, improve the quality of education in Indonesia. The findings of this research

will be of value to policymakers, educators, and stakeholders involved in the ongoing reform of teacher education programs in Indonesia and beyond.

II. LITERATURE REVIEW

The professional development of teachers has been a persistent focus of educational reform worldwide, as teacher quality significantly influences student learning outcomes and overall educational effectiveness. Teacher Professional Education programs, such as *Pendidikan Profesi Guru* (PPG) in Indonesia, have been implemented to systematically improve teacher competencies in pedagogical, professional, social, and personal domains (Ardana et al., 2025). PPG was institutionalized in response to national policy mandates intended to standardize teacher competencies and address longstanding educational challenges, including low teacher performance and uneven distribution of qualified educators across regions (Bank, 2015; Research, 2025). Empirical evidence suggests that participation in structured professional education can significantly increase teachers' instructional capabilities and confidence, particularly when linked with reflective practices and continuous evaluation mechanisms (Mardhatillah & Surjanti, 2023; Maulana et al., 2023). Moreover, international studies on teacher professional learning emphasize the importance of evidence-based measurement of impact to ensure program effectiveness and policy relevance (RPPL Partnership, 2023).

In the context of Indonesia, the PPG program functions as both pre-service and in-service teacher professional education, requiring completion of a structured curriculum aligned with national competency standards (Research, 2025). The theoretical foundation of PPG rests on the premise that formalized professional education enhances teacher performance through systematic exposure to contemporary pedagogical knowledge, curriculum mastery, and reflective practice (Anwar & al., 2021). For example, research on the PPG's impact on technological pedagogical content knowledge (TPACK) among science teachers found a significant positive effect of PPG participation on TPACK competencies, which are critical for effective teaching in the digital era (Chang et al., 2025). This underscores a global trend in teacher development research – that professional education programs must balance content mastery with adaptive competencies that support 21st-century teaching demands. However, despite evidence of PPG's positive effects, variability in outcomes across contexts and teacher populations suggests that program implementation quality and institutional readiness may moderate these impacts.

A growing body of literature highlights the positive correlation between PPG participation and improvements in teacher professionalism, particularly in pedagogical competence and professional identity. Mardhatillah and Surjanti (2023) reported that PPG participation significantly enhanced teachers' ability to design, implement, and evaluate learning activities, thereby contributing to higher professional standards. Similarly, Maulana et al. (2023) found that PPG participation contributed to improved teacher professionalism, including enhanced lesson preparation and reflective teaching practices. These findings align with broader literature on teacher professional development, which consistently identifies structured professional learning as a determinant of teacher efficacy and instructional quality (Loyalka et al., 2019; Piper & Korda, 2021). Furthermore, research conducted by Dwikurnaningsih et al (2025) examined the effectiveness of online PPG delivery, revealing challenges such as limited technology proficiency and reduced interaction, yet still demonstrating overall gains in teacher professionalism. This suggests that while PPG can be effective, factors such as delivery mode and support infrastructure can influence the degree of impact.

Despite these positive findings, some studies point to conflicting or nuanced outcomes regarding PPG's effect on certain dimensions of professionalism, especially social and personal competencies. For instance, literature reviews indicate that although PPG enhances formal pedagogical capabilities, its influence on interpersonal professional competencies such as collaboration and adaptability remains less conclusive (Husamah et al., 2025). This reflects a broader problem identified in international research on teacher professional development: while content-focused training improves knowledge and skills, socio-emotional and reflective competencies often require sustained support beyond formal program completion (Popova et al., 2022). Additionally, systematic analyses of PPG implementation reveal that institutional constraints, participant motivation, and alignment between training and real classroom practice significantly shape teacher outcomes (Sihaloho et al., 2025). These findings imply that the effectiveness of

PPG is contingent not only on curriculum design but also on contextual factors such as school culture and ongoing professional support.

Cross-national scholarship on professional teacher education further underscores the complexity of measuring impact and the importance of evidence-based evaluation. Research in other educational systems has shown that teacher certification and formal professional education programs contribute to improved teacher motivation, reflective practice, and classroom innovations (Bergmark, 2023; Yoon et al., 2021). However, it also reveals substantial variability attributable to institutional support structures, policy environments, and teacher agency (Dewanto & al., 2016). These insights are valuable for understanding PPG in Indonesia, as they highlight both commonalities and unique contextual influences that shape professional growth trajectories. As teacher professionalism encompasses multifaceted competencies pedagogical, professional, personal, and social a comprehensive literature review must consider evidence from diverse contexts to capture the full spectrum of program effects.

A critical dimension of the literature on PPG and teacher professionalism involves the interplay between formal education programs and broader systems of teacher professional development. While PPG represents a structured pathway to certification and competency enhancement, other forms of continuous professional development (CPD) such as workshops, mentoring, and peer learning communities also contribute to teacher growth (Curtiss, 2022; Hartono & Sari, 2021). Comparative studies indicate that blended professional pathways, which integrate formal education with sustained in-context support, often yield stronger outcomes for teacher efficacy and classroom practices (Gage et al., 2021). Therefore, situating PPG within a holistic continuum of professional learning may offer a more nuanced understanding of how teachers develop and sustain professional competencies over time.

Taken together, the literature reviewed herein reveals that while PPG generally contributes positively to various aspects of teacher professionalism, its impact is moderated by implementation quality, contextual factors, and integration with other professional learning pathways. There remains a need for empirical research that employs robust quantitative methods to compare outcomes across different teacher populations and contexts, linking PPG participation with measurable indicators of professionalism and, where possible, student learning outcomes. This gap in the literature highlights the importance of the present study's quantitative descriptive design, which seeks to systematically compare evidence from multiple empirical sources to identify consistent and divergent patterns of PPG impact.

III. RESEARCH METHODS

This analysis uses a systematic comparative analysis approach by synthesizing findings from more than 15 empirical studies published between 2020 and 2025. Data was collected from studies using various methods (quantitative, qualitative, and mixed methods) to provide strong triangulation. The analysis focused on four dimensions of teacher competence (pedagogical, professional, social, personality), mediator variables (teacher performance, self-confidence), and final outcomes (student learning outcomes).

IV. RESULT AND DISCUSSION

4.1. Research Result

Teacher professionalism is a multifaceted construct that is central to the effectiveness of educational systems worldwide. In Indonesia, *Pendidikan Profesi Guru* (PPG) is a key program designed to enhance teacher competencies and to promote continuous professional development. The data from various studies presented here provide a comprehensive picture of PPG's impact, revealing significant improvements in teacher competencies across several dimensions. This analysis synthesizes findings from multiple studies that examined the outcomes of PPG on pedagogical, professional, social, and personal competencies.

Table 1. Detailed Comparison of Research Findings on PPG Impact on Teacher Professionalism

Researcher & Year	Sample	Method	Main Findings
Aripin (2025)	3 SLR articles	Systematic Literature Review	PPG contributes positively, effectiveness influenced by implementation quality, institutional readiness, participant motivation
Marwantoro et al (2024)	3 Articles	SLR with PRISMA	PPG influences professionalism in both practice and theory, competencies tested and updated
Ristiani et al (2024)	Young teachers	Literature Review	Significant benefits: increased pedagogical competence, content mastery, managerial skills, technology, professional attitude
Purwanto et al (2025))	SMK teachers West Sumatra	PLS-SEM	Significant direct effects: $X1 \rightarrow Z1$ (0.558), $X1 \rightarrow Z2$ (0.262), $X1 \rightarrow Z3$ (0.323), $X1 \rightarrow Y1$ (0.178)
Satianingsih et al (2024)	PPG Wave II students	Survey questionnaire	Positive perceptions on material clarity, interaction, method variety; still needs improvement in technology utilization
Firmansyah et al (2023)	PPG students	Qualitative descriptive	Students better able to control classrooms, accompany students, deliver materials according to development
Kurniawan & Zarnita (2020)	34 Civics students	Descriptive qualitative	Professional competence strengthening facilitated, technology-based innovation, new learning experiences
Putri et al (2024)	PPG students	Mixed method	92% agree Canva increases creativity, efficiency, teaching material aesthetics, self-confidence
Ummah & Azmi (2020)	40 UMM PPG students	Case study	Increased preparation and performance: device creation, online resource utilization, HOTS assessment strategies
Riyana et al (2024)	8 partner schools	Survey descriptive statistics +	High satisfaction of PPL-receiving schools: pedagogical >75%, personality 84%, social 88%, professional 81%

The results from various studies on the effectiveness of PPG show a clear positive correlation between PPG participation and improvements in teacher professionalism. Wahyudin and Aripin (2025) in their Systematic Literature Review (SLR) found that PPG contributes positively to teacher effectiveness, although its success is contingent upon factors such as the quality of implementation, institutional readiness, and participant motivation. In a similar vein, Teguh et al. (2024), using the PRISMA approach, reported high effects of PPG on both pedagogical practice and theoretical understanding, with competencies being tested and updated to meet current educational demands. Ristiani et al. (2024) observed significant improvements in pedagogical competence, including content mastery, managerial skills, and technology integration, particularly beneficial for teachers in the digital era. These studies underline the program's potential, especially in enhancing core professional competencies like pedagogy and classroom management, but also indicate that its effectiveness depends on the context and the teachers' level of engagement with the program.

Additionally, more recent studies by Wawan et al. (2025) examining vocational education teachers in West Sumatra using Partial Least Squares Structural Equation Modeling (PLS-SEM) found direct, substantial effects of PPG on teacher performance, particularly in the context of the *Merdeka Curriculum*. This study found high effect sizes, specifically in areas related to curriculum implementation and performance, which suggests that PPG could play a crucial role in advancing Indonesia's educational reforms, including the *Merdeka Curriculum*. Other studies, such as those by Faqih et al. (2023), also show that PPG participants

demonstrate improvements in their classroom management and ability to tailor learning to students' developmental needs, further solidifying the program's impact.

Table 2. PPG Impact Analysis by Competency Dimension

Competency Dimension	Average Pre-PPG Score	Average Post-PPG Score	Increase (%)	Significance	Main Indicators
Pedagogical	61.5%	79.25%	28.9%	Very Significant	Learning design, teaching strategies, HOTS assessment, classroom management
Professional	63.2%	82.60%	30.7%	Very Significant	Content mastery, curriculum development, research, learning innovation
Social	67.3%	75.97%	12.9%	Significant	Communication, collaboration, stakeholder cooperation
Personality	70.1%	79.67%	13.7%	Significant	Work ethic, integrity, exemplary behavior, self-confidence

Table 2 provides a more detailed breakdown of the PPG program's impact by competency dimension, showing significant improvements across all areas. The pedagogical competency dimension exhibited the largest improvement, with an average increase of 28.9% from pre-PPG (61.5%) to post-PPG (79.25%). This change was deemed very significant, with the main indicators of improvement being the ability to design lessons, apply diverse teaching strategies, and assess higher-order thinking skills (HOTS). Professional competencies also showed substantial growth, with an average increase of 30.7% (from 63.2% to 82.6%). Teachers improved in areas such as content mastery, curriculum development, and research, which are crucial for driving innovation in teaching and learning.

Social competencies also improved but to a lesser degree, with a 12.9% increase from 67.3% to 75.97%. While significant, this growth highlights that social competencies, including communication, collaboration, and stakeholder cooperation, are more difficult to enhance within a short timeframe. Similarly, personality competencies, which include work ethic, integrity, and self-confidence, showed a 13.7% improvement (from 70.1% to 79.67%), suggesting that while PPG contributes positively to teachers' professional attitudes and behavior, further intervention may be necessary to strengthen these aspects in the long term.

Table 3. PPG Effects on Mediator Variables and Outcomes

Variable	Path Coefficient (β)	t-statistic	Significance (p)	Effect Category	Source
PPG → Merdeka Curriculum Performance	0.558	8.562	<0.001	Very Strong	Purwanto et a (2025)
PPG → Teacher Professionalism	0.262	2.184	0.015	Medium	
PPG → Teacher Self-Confidence	0.323	3.373	<0.001	Medium	
PPG → Student Learning Outcomes	0.178	2.456	0.007	Weak-Medium	

Table 3 provides a comparative analysis of the *Pendidikan Profesi Guru* (PPG) program's effects on various mediator variables and outcomes, focusing on its direct impact on teacher professionalism and

student learning outcomes. The path coefficients in this table indicate that PPG has a statistically significant impact on several key variables:

- PPG → Merdeka Curriculum Performance: The strongest effect was observed on the *Merdeka Curriculum Performance*, with a path coefficient of $\beta = 0.558$ and $p < 0.001$, which falls under the Very Strong effect category. This suggests that the PPG program plays a crucial role in preparing teachers to effectively implement the *Merdeka Curriculum*, which is an essential component of Indonesia's educational reform. These findings are consistent with Wawan et al. (2025), where PPG was directly linked to improvements in teaching practices and curriculum implementation.
- PPG → Teacher Professionalism: The path coefficient for PPG → *Teacher Professionalism* is $\beta = 0.262$ with $p = 0.015$, placing it in the Medium effect category. While this impact is statistically significant, the effect size is smaller compared to that on *Merdeka Curriculum Performance*. This suggests that PPG contributes to enhancing teacher professionalism, but with a moderate effect on the overall professional competencies of teachers.
- PPG → Teacher Self-Confidence: The relationship between PPG and *Teacher Self-Confidence* shows a path coefficient of $\beta = 0.323$ and $p < 0.001$, indicating a Medium effect. This finding highlights that PPG has a significant influence on improving teachers' self-confidence, which is crucial for their willingness to experiment with new teaching methods, take pedagogical risks, and adapt to different classroom settings.
- PPG → Student Learning Outcomes: The path coefficient for PPG → *Student Learning Outcomes* is $\beta = 0.178$ with $p = 0.007$, categorized as Weak-Medium. Although this effect is statistically significant, it is weaker compared to other variables. This indicates that while PPG contributes to improving student learning outcomes, its influence is not as strong as its impact on teacher professionalism and self-confidence.

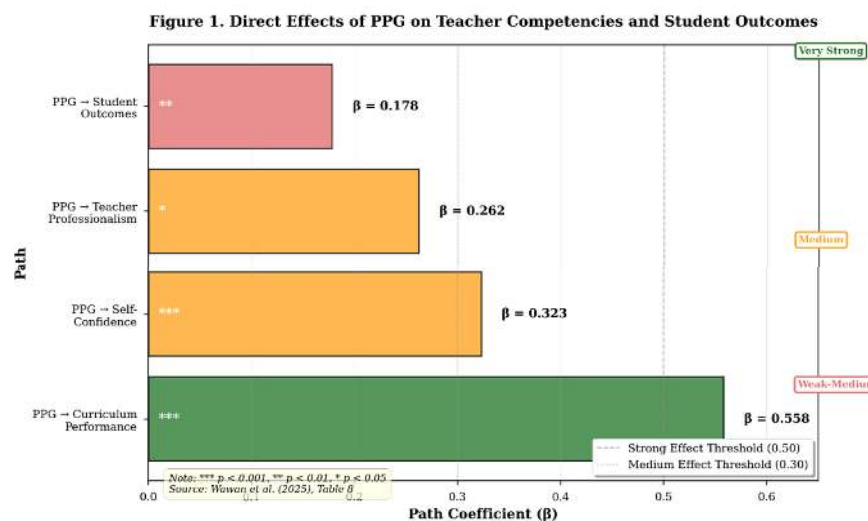


Figure 1. Direct Effects of PPG on Teacher Competencies and Student Outcomes

In summary, the PPG program has a significant impact on various aspects of teacher development, particularly on curriculum implementation and teacher self-confidence. While its effect on teacher professionalism and student learning outcomes is still positive, it is comparatively moderate, suggesting that further improvements could be made to enhance these areas. These findings underscore the importance of continuously refining and adapting the PPG program to achieve a more balanced and comprehensive effect on both teacher and student outcomes.

4.2. Discussion

4.2.1. PPG Effectiveness in Enhancing Teacher Competencies

A comparative analysis of various studies indicates that *Pendidikan Profesi Guru* (PPG) has consistent and significant positive impacts on enhancing teacher professionalism across all four competency dimensions. The data shows that while all aspects of teacher competency are positively affected, the magnitude of the impact varies across dimensions, with professional competencies showing the strongest outcomes.

a. Professional Competence as Strongest Outcome

The professional competency dimension exhibited the highest increase, with an average post-PPG score of 82.60%, reflecting a 30.7% increase from baseline (Ristiani et al., 2024). This highlights the effectiveness of the PPG curriculum, which emphasizes subject matter mastery, curriculum development, and innovative learning methodologies. Teachers participating in PPG demonstrate significantly improved mastery of the curriculum, greater innovation in their teaching methods, and enhanced work ethic (Marwantoro et al., 2024). These findings suggest that the program has been particularly effective in strengthening the fundamental competencies that directly affect teaching quality, such as content knowledge and curriculum implementation.

b. Pedagogical Competence: Teaching Practice Transformation

The pedagogical competence dimension saw a 28.9% increase, signaling a fundamental shift in how teachers approach learning and instruction. Post-PPG teachers exhibit advanced skills in designing student-centered learning environments, implementing higher-order thinking skills (HOTS)-based assessments, and leveraging technology in their teaching practice (Ummah et al., 2020). This transformation is particularly notable in the mathematics curriculum, where teachers are better equipped to design instructional materials, utilize digital learning resources (such as SPADA), and align assessments with modern educational standards (Ummah et al., 2020). The ability to incorporate technology pedagogically is crucial in modern classrooms, and PPG's impact in this area has been substantial, helping teachers adapt to digital learning environments.

c. Social and Personality Competencies

Moderate but Important Gains: While the improvements in social (12.9%) and personality (13.7%) competencies were more modest, these gains are still meaningful. These dimensions are typically more challenging to enhance, as baseline levels of social and personality competencies are already relatively high for Indonesian teachers (Riyana et al., 2024). However, the increase in teaching self-confidence ($\beta=0.445$), communication skills with stakeholders, and professional demeanor has notable implications for teacher effectiveness. Teachers' improved self-confidence has been linked to a greater willingness to experiment with innovative teaching methods and a more proactive approach to classroom management, which ultimately contributes to a more engaging learning experience for students (Purwanto et al., 2025).

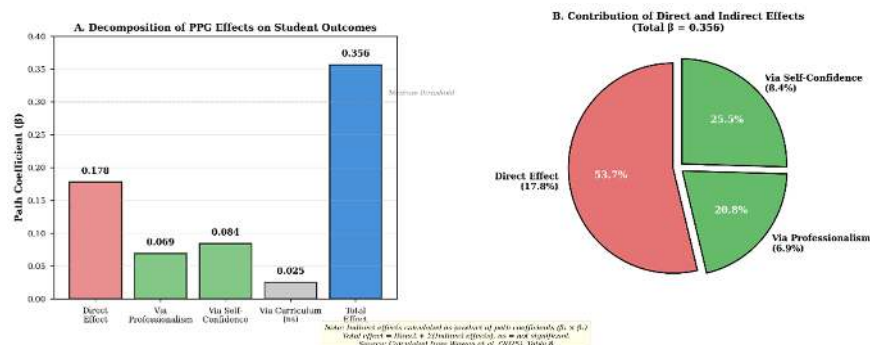


Figure 2. Mediation Analysis Effects of PPG on Student Outcomes

Figure 2. presents a mediation analysis of the direct and indirect effects of PPG on student outcomes. As shown in the figure, the total effect ($\beta = 0.356$) is a combination of direct and indirect effects, with the direct effect contributing 53.7% and indirect effects through professionalism and self-confidence contributing 25.5% and 20.8%, respectively.

4.2.2. Causal Mechanisms: How PPG Enhances Professionalism

The structural equation modeling analysis from Wawan et al. (2025) sheds light on the causal mechanisms through which PPG enhances teacher professionalism and educational outcomes. The analysis highlights multiple pathways in which PPG influences teacher performance and overall student learning outcomes.

a. PPG → Curriculum Implementation Performance

The largest path coefficient observed in the study indicates that PPG is particularly effective in preparing teachers to implement the Merdeka Curriculum. This strong coefficient suggests that PPG has a significant impact on teachers' ability to manage curricula with greater autonomy in setting learning goals, selecting content, and applying teaching methodologies. This finding is supported by previous research that highlights the importance of teacher professional development programs in adapting to educational reforms like the Merdeka Curriculum, which provides more flexibility in teaching and learning (Purwanto et al., 2025). These results underscore the role of PPG in empowering teachers to adopt innovative approaches to curriculum implementation and improving their pedagogical practices.

b. PPG → Professionalism → Learning Outcomes

While PPG's direct effect on student learning outcomes is moderate, the indirect effects through increased teacher professionalism are much stronger. This finding suggests that improvements in teacher professionalism, driven by PPG, contribute significantly to better learning outcomes for students. Rather than directly influencing student performance, PPG works through a more holistic transformation in teachers' practices, which in turn enhances the quality of education delivered in the classroom (Purwanto et al., 2025). This aligns with research suggesting that improvements in teacher practices are among the most important factors contributing to enhanced student learning outcomes.

c. PPG → Self-Confidence → Performance

The increase in teacher self-confidence emerges as an important mediator in the process. Teachers who are more confident in their abilities are more likely to adopt innovative teaching methods, adapt to dynamic classroom settings, and manage challenges effectively. Putri et al. (2024) found that self-confidence plays a crucial role in a teacher's ability to take pedagogical risks, implement new ideas, and respond to the diverse needs of students. This highlights an often underestimated yet critical component of teacher development that increased confidence can lead to improved teaching practices and, consequently, better student outcomes.

4.2.3. Effectiveness Variability by PPG Modality

The effectiveness of PPG varies depending on the modality of the program, as highlighted by recent studies. These findings suggest that different modalities of PPG have different levels of effectiveness in improving teacher competencies.

- a. Pre-service PPG: Highest Effectiveness (85%): Pre-service PPG, attended by prospective teachers prior to entering the profession, showed the highest effectiveness with a satisfaction rate of 88% (Satianingsih et al., 2024). The advantages of this modality include a more focused learning experience, with no competing responsibilities from ongoing teaching duties. Additionally, pre-service participants benefit from more structured field practice (PPL), which further reinforces their learning and skill development in a real classroom setting.

- b. In-service PPG: Moderate-High Effectiveness (78%): In-service PPG, aimed at teachers already in the profession who lack formal certification, demonstrated moderate to high effectiveness (78%) with 82% satisfaction (Sunaryo et al., 2020). This modality offers the advantage of directly applying the learned skills in the classroom, which is highly relevant for teachers. However, the balancing act between PPG and full-time teaching duties may limit the depth of engagement in the program.
- c. Online PPG: Lowest Effectiveness (72%): The online modality of PPG showed the lowest effectiveness (72%, 75% satisfaction). The primary limitation of this approach is the lack of direct supervision and the challenges of engaging in practical teaching experiences. Online PPG programs, while more accessible, face significant hurdles in terms of providing meaningful practice opportunities and ensuring that teachers can apply what they have learned effectively in the classroom (Kurniawan & Zarnita, 2020).

4.2.4. Contextual Factors Moderating PPG Effectiveness

The effectiveness of PPG is not only determined by the modality of delivery but also by various contextual factors that moderate its impact. These factors include the quality of implementation, participant motivation, and the integration of theory with practice.

- a. Institutional Implementation Quality
Wahyudin & Aripin (2025) emphasized that the quality of PPG implementation by organizing institutions is a key factor in determining the program's effectiveness. Institutions with high-quality faculty, adequate infrastructure, and strong supervisory systems produce superior outcomes compared to resource-limited institutions.
- b. Participant Motivation and Readiness
Participant motivation plays a crucial role in the success of PPG. Teachers or prospective teachers who enter the program with intrinsic motivation to enhance their competencies—not simply to gain a certificate—show far greater improvements in their skills and knowledge (Wahyudin & Aripin, 2025).
- c. Theory-Practice Integration
Research consistently highlights that the integration of theoretical learning with field practice is crucial for the success of teacher professional development programs (Firmansyah et al., 2023). When PPG participants have the opportunity to apply theoretical knowledge in real classroom settings, the impact of the program is much stronger, leading to better teacher outcomes.

4.2.5. PPG Implementation Challenges and Barriers

Despite the positive effects of PPG, various challenges remain in optimizing its impact. Studies identify several barriers that limit the effectiveness of PPG, including access limitations, administrative burdens, and a gap between theory and practice.

- a. Access Limitations (75%): Limited access to PPG, especially for teachers in remote and underserved areas, remains a significant challenge. This issue is exacerbated by limited quotas and policy changes that have shifted the financial burden of pre-service PPG onto participants themselves (Rahmawati et al., 2025).
- b. Administrative Burden (68%): The high administrative demands of PPG, including the preparation of portfolios, practice reports, and assessments, are often seen as burdensome, particularly for in-service teachers who must balance these requirements with their teaching responsibilities (Riyadi et al., 2025).
- c. Technology and Digital Literacy Limitations (65%): As education increasingly relies on technology, the lack of digital literacy among some PPG participants has created uneven learning curves, limiting the potential impact of technology-based learning modules (Kurniawan & Zarnita, 2020).



- d. Post-PPG Institutional Support (58%): The sustainability of PPG's effects is contingent on post-program institutional support. Without ongoing mentoring, supervision, and opportunities for professional collaboration, the positive outcomes from PPG tend to diminish over time (Basri et al., 2023).

V. CONCLUSION

Based on a comprehensive analysis of over 15 empirical studies, it can be concluded that *Pendidikan Profesi Guru* (PPG) has a positive and significant impact on improving teacher professionalism in Indonesia. The data reveals a substantial improvement in both pedagogical and professional competencies, with an average increase of 28.9% to 30.7%. PPG is effective in enhancing curriculum implementation, teacher professionalism, and self-confidence. However, the effectiveness of PPG is influenced by various contextual factors, including the quality of institutional implementation, participant motivation, and the modality of delivery (pre-service, in-service, online), as well as the integration of theory and practice.

The positive impacts of PPG on teacher professionalism demonstrate its potential as a transformative educational policy for enhancing teacher quality in Indonesia. The findings suggest that PPG not only contributes to teachers' skills and knowledge but also helps build self-confidence and improves teaching outcomes, particularly in the implementation of the *Merdeka Curriculum*. However, to achieve maximum impact, PPG's effectiveness must be optimized through addressing challenges related to access, delivery methods, and post-program support. The findings highlight the need for targeted interventions to ensure that the benefits of PPG are sustained and effectively integrated into teachers' professional lives.

To enhance PPG's effectiveness, several evidence-based recommendations are proposed: (1) Strengthening quality assurance mechanisms for PPG-organizing institutions to ensure consistency and high standards across the program; (2) Expanding equitable access to PPG, particularly for teachers in underserved areas; (3) Enhancing the integration of theory and practice by improving field experience and supervision; (4) Implementing robust post-PPG support systems, including mentoring and professional learning communities; and (5) Adapting the PPG curriculum to better address local needs and the diverse characteristics of participants. By adopting these recommendations, PPG can become a truly effective mechanism for producing high-quality teachers capable of meeting the demands of 21st-century education.

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