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The Implementation of the Merdeka Mengajar Platform and Google Workspace for Education on Teacher's Competence

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Abstract: This study aimed to analyze the influence of the Merdeka Mengajar Platform and Google Workspace for Education on the professional competence of elementary school teachers in Teluk Gelam District. A quantitative research approach was employed, utilizing simple and multiple linear regression analysis to measure the individual and combined effects of the two digital platforms on teacher competence. The results demonstrate significant positive influences: (1) The Merdeka Mengajar Platform significantly affects teacher competence, accounting for 61.1% of its variance; (2) Google Workspace for Education also shows a significant effect, explaining 64.8% of the variance; (3) Together, both platforms contribute 72.3% to teacher competence, leaving 27.7% attributable to other factors not examined in this study. To optimize the benefits, it is recommended that the Ministry of Education enhance training and module development, schools establish continuous mentoring programs and provide necessary infrastructure, and teachers actively engage with these platforms for their professional growth. This study provides empirical evidence on the substantial combined impact of two major digital platforms on teacher competence within a specific Indonesian district. It quantifies their individual and synergistic contributions, offering a data-driven basis for targeted interventions and highlighting the need for integrated digital tool adoption in teacher development programs.

Keywords: Educational Technology, Elementary Education, Google Workspace for Education, Merdeka Mengajar Platform, Teacher's Competence

A. Introduction

The definition of education in Law No. 20 of 2003 states that education is a conscious and planned effort to create a learning atmosphere and teaching and learning process for students to actively develop their potential and possess spiritual and religious strength, self-control, personality, intelligence, noble character, and the skills needed by themselves, society, the nation, and the state. Based on this definition, as teachers and mentors, educators must plan learning, create a pleasant learning environment so that students actively develop themselves, and develop students' potential holistically, encompassing spiritual, intellectual, emotional, and life skills. The concept

of education has been expressed by Indonesian educational figures, namely the concept of education according to Ki Hajar Dewantara. According to Ki Hajar Dewantara's philosophy, the concept of education is comprehensive, which transforms students into fully developed human beings, encompassing the cultivation of the heart (ethics), the cultivation of the will (aesthetics), the cultivation of the mind (literacy), and the cultivation of sports (kinesthetics) by providing student-centered learning and a sense of openness, freedom, and enjoyment (Nayla et al., 2025; Zainuddin, 2021).

This also applies to Ki Hajar Dewantara's ideals of "ing ngarso sung tulodo" (the teacher should be a role model), "in madyo mangun karso" (the teacher should be in the middle, providing motivation), and "tut wuri handayani" (the teacher should always encourage students to progress). Good education must constantly evolve, not seem rigid and permanent. Developments and improvements are tailored to the developments and needs of a modern lifestyle. Educational changes and improvements encompass several aspects, such as curriculum, teacher competency, educational quality, facilities and infrastructure, and innovations in creative learning strategies and methods (Zhao et al., 2023). This should be the focus of the government, particularly the Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia, to improve the quality of education in Indonesia.

Currently, educational quality is measured by the results of the Minimum Competency Assessment (Kawuryan et al., 2021; Purnomo et al., 2022). The minimum competency assessmen results represent a sample of school quality, measured by literacy, numeracy, and a survey of the learning environment. The minimum competency assessmen was introduced as a replacement for the national examination. Therefore, there are pros and cons to its implementation. For example, the national examination, which replaced the minimum competency assessmen, will be reintroduced as a necessity to help students continue their education to a higher level. However, the national examination is considered to only represent students' cognitive aspects. This aligns with the opinion of Rahmawati & Pratiwi (2022), the minimum competency assessment, on the other hand, captures cognitive abilities and character. According to Solekha et al. (2024), the implementation of the minimum competency assessmen also aligns with current needs, utilizing computers to ensure the accuracy of the minimum competency assessment results. Student success in completing the Minimum Competency Assessment is influenced by teacher guidance in familiarizing students with solving the minimum competency assessment example questions (Rini et al., 2021). This habituation is not the primary factor influencing student success in completing the minimum competency assessment questions.

One prerequisite that students must master is the use of devices, specifically Chromebooks and desktop computers, used during the minimum competency assessment. The challenge in elementary schools is the lack of dedicated ICT teachers (John et al., 2021). Therefore, significant efforts are needed to improve teachers'

competency in information technology. One platform for developing teacher competency in information technology is the Merdeka Mengajar Platform. A study by Musafir et al. (2025) showed that Merdeka Mengajar Platform features, such as independent reflection and evidence of work, can sustainably improve teachers' pedagogical competence. This aligns with the concept of teacher agency (Molla & Nolan, 2020), which emphasizes the active role of teachers in professional development. The Merdeka Mengajar Platform is an initiative of the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek) aimed at supporting teachers in realizing the Pancasila Student profile. This platform is designed to be a driving force for teachers in teaching, learning, and creating (Mulyani et al., 2024). The Merdeka Mengajar Platform's menus include independent training, teaching materials, evidence of work, reflection, independence, and performance management. The independent training menu is a competency development menu that teachers are expected to use to enhance their competencies. The content of the independent training menu consists of teaching modules accompanied by competency tests and real-life action assignments to complete the training modules. The content of the independent training varies, ranging from an introduction to the performance curriculum, positive discipline, and the use of belajar.id accounts in learning to bullying prevention.

The government is currently striving to master information technology through single sign-on (SSO). One SSO implementation is the integration between the Merdeka Mengajar Platform and the belajar.id account. The use of the belajar.id account SSO across all educational platforms demonstrates the Ministry of Education, Culture, Research, and Technology's integrated approach to education digitalization. Research by Suryadi (2023) revealed that single sign-on through belajar.id increases the efficiency of teacher access to various national educational platforms. Furthermore, the use of belajar.id accounts through Google Workspace for Education as a supporting infrastructure for the Merdeka Mengajar Platform aligns with UNESCO's findings on the importance of an integrated digital ecosystem for 21st-century learning. A comparative study by Chen et al. (2021) demonstrated that combining an LMS platform (such as the Merdeka Mengajar Platform) with productivity tools (GWfE) can increase teacher-student collaboration by up to 40%. However, a 2023 report from the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek) noted a major challenge: teachers' digital literacy gaps in utilizing advanced features like Google Script (Google Workspace products like Google Sheets, Docs, and Forms) or AutoGrade (LMS tools like Google Classroom, Moodle, or online exam platforms). This finding is reinforced by data from the World Bank (2022), which shows that only 58% of Indonesian teachers are accustomed to using GWfE tools to their full potential.

The problem is that there are pros and cons to using the Merdeka Mengajar Platform. Similarly, using the belajar.id account through Google Workspace for Education (GWfE) is also problematic. Senior teachers approaching retirement age certainly need

to put in the effort to learn, leading some to reject the use of the Merdeka Mengajar Platform. Conversely, junior teachers who are IT-savvy experience the extraordinary benefits of the Merdeka Mengajar Platform and Google Workspace for Education (GWfE) in improving the quality of learning. This aligns with research by Darmawan et al. (2023). Their research findings revealed a digital divide between senior and junior teachers, with 67% of teachers over 50 experiencing difficulties adapting to technology. This finding aligns with the Technology Acceptance Model (Davis, 1989), which states that perceived usefulness and ease of use are key factors in technology acceptance. On the other hand, a comparative study by Pratiwi et al. (2024) showed that younger teachers (under 35) were able to improve learning quality by up to 40% through the use of collaborative GWfE features such as Google Classroom and Jamboard.

In addition to serving as co-captain of the belajar.id account for Ogan Komering Ilir Regency, I also serve as a Google Master Trainer and a teacher advocate tasked with promoting the use of the Merdeka Mengajar Platform and GwfE. The results of the outreach I've conducted since 2022 show that some teachers are enthusiastic about the program. The challenge is that mastering the Merdeka Mengajar Platform and GWfE menus requires mentoring and continuous assessment to gauge mastery. A study by Wijaya et al. (2023) found that teachers who actively use the Merdeka Mengajar Platform experienced a 35% increase in pedagogical skills, particularly in designing differentiated learning and formative assessment. Meanwhile, the integration of GWfE tools (such as Google Classroom, Docs, and Forms) helps teachers manage learning more efficiently and collaboratively (Akcil et al., 2021).

Research from the Ministry of Education, Culture, Research, and Technology also showed that the Independent Training feature in the the Merdeka Mengajar Platform (Independent Teaching) improved teachers' understanding of the Independent Curriculum, while the use of Google Meet and YouTube in the GWfE expanded teachers' teaching methods to be more interactive. Based on the description above, the Merdeka Mengajar (Independent Teaching) Platform and Google Workspace for Education (GWfE) have been shown to improve teacher competency in various aspects. Research shows that teachers who utilize the Merdeka Mengajar Platform experience improved pedagogical skills, particularly in designing student-centered learning. Meanwhile, GWfE helps teachers manage classrooms digitally, collaborate with colleagues, and access learning resources more efficiently. However, challenges such as the lack of digital skills among senior teachers and limited internet access in certain areas still need to be addressed through more intensive training and mentoring.

Based on the author's observations after conducting research as a Google Master Trainer and as a mentor for the use of the Merdeka Mengajar Platform, several schools, such as those in Teluk Gelam District, were enthusiastic about utilizing the Merdeka Mengajar Platform and GWfE. However, I don't yet understand the teachers'

preferences and feedback on the use of the Merdeka Mengajar Platform or GWfE. There are many previous studies examining the influence of the Merdeka Mengajar Platform and teacher competency in elementary schools. However, none have linked the technology used on the Merdeka Mengajar Platform, namely Google Workspace for Education, to learning. For example, research conducted by Prasetyaningsih et al. (2024) showed that 90% of teachers at Panunggangan 4 Elementary School, Tangerang City, experienced the benefits of the Merdeka Mengajar Platform, including gaining inspiration, references, and a deeper understanding of the nature and implementation of the Merdeka curriculum. The second study, conducted by Nafila et al. (2024), found that the Merdeka Platform has various features that can help improve teachers' pedagogical competence. With the Merdeka Mengajar Platform, teachers can improve their competence through self-developed activities. Furthermore, teachers are motivated to continue learning, teaching, and creating through the ecosystem built by the Merdeka Mengajar Platform.

Based on this rationale, the authors attempted to complement previous research by linking the Merdeka Mengajar Platform with Google Workspace for Education, entitled "Implementation of the Merdeka Mengajar Platform and Google Workspace for Education in Teacher Competence in Teluk Gelam District, OKI Regency." This study is expected to provide a comprehensive overview of the benefits of the Merdeka Mengajar Platform and Google Workspace for Education as SSO and teacher competency development tools. It is also expected to provide useful suggestions for future research.

B. Methods

The method used in this study is quantitative research. Quantitative research is a type of research whose specifications are systematic, planned, and clearly structured from the beginning through to the development of the research design. According to Mbanaso et al. (2023), quantitative research methods are research methods based on the philosophy of positivism. They are used to study specific samples and populations using random techniques and research instruments, along with quantitative or statistical data analysis aimed at testing predetermined hypotheses. The quantitative approach provides a clear and measurable framework for analyzing phenomena, including examining thse influence of interrelated variables such as the Merdeka Teaching platform, Google Workspace for Education, and teacher competence, which are the focus of this study. This research also offers advantages in terms of replicability and validity of the results, which can be tested through valid statistical tests. The variables in this quantitative research consist of the Merdeka Teaching platform (X1), Google Workspace for Education (X2), and teacher competence (Y). To test the formulated hypotheses, all data obtained were then processed and analyzed quantitatively using SPSS Statistics 26.

By using this descriptive method, it is hoped that data will be obtained, the results of which will then be used and analyzed, and conclusions drawn. These conclusions will apply to the entire population of the study. The research location was at public elementary schools in Teluk Gelam District, Ogan Komering Ilir Regency, focusing on 10 public elementary schools: SDN 1 Mulyaguna, SDN 2 Mulyaguna, SDN 3 Mulyaguna, SDN Panca Tunggal Benawa, SDN Sinar Bumi Harapan, SDN Bumi Harapan, SDN 1 Seriguna, SDN Penyandingan, SDN Talang Pangeran, SDN 1 Sugihwaras, and SDN 1 Muara Telang, all located in Teluk Gelam District, Ogan Komering Ilir Regency. This research was conducted at the school because it received Chromebooks from Google. The research period was from May 2025 to June 2025. The activities carried out by the researchers during this period included preparation, implementation, surveys, instrument refinement, and data collection and processing. The results of the research were collected from June 2025 to July 2025.

The population of this study was teachers in Teluk Gelam District, where the researcher was conducting her assignment. In this case, the population consisted of 170 classroom and subject teachers who had used the Merdeka Mengajar Platform and Google Workspace for Education to improve their competencies. The selected sample was representative of the characteristics of the population. With a population of 170 teachers in Chromebook-receiving schools, and considering the teachers' ability to respond to questions, the researcher used the Slovin Technique to determine the sample size from the population as respondents. Nurkholis et al. (2024) states that the Slovin Technique is a formula for calculating samples used to determine the sample size. This formula is used to determine the sample size with a 5% margin of error. Therefore, if the population of 170 elementary schools in Teluk Gelam District, Ogan Komering Ilir Regency, is 170 teachers, because not all teachers have access to the Merdeka Mengajar platform, the sample size is 134 from 18 schools. With a 5% margin of error, a minimum sample size of 100 will be taken. Considering that some schools experience internet signal difficulties, the sample size for this study will be 100 from the population.

I used purposive sampling for sampling. In this study, I employed three techniques: questionnaires, observation, and documentation. Instrument validation was conducted by three validators. In the instrument pilot test, 14 teachers were selected from the total number of teachers at Mulyaguna 1 Elementary School, Teluk Gelam District, Ogan Komering Ilir Regency. To test the validity of the measuring instrument, the first step was to determine the correlation between the parts of the measuring instrument as a whole by correlating each measuring instrument with the total score, which is the sum of the scores on each item. After expert validation, the instrument's validity was then assessed using Pearson's Product Moment formula. Reliability testing in this study used internal reliability, obtained by analyzing data from the pilot test results using Cronbach's Alpha formula. The testing criteria are: if the value is greater than 0.05 with a significance level of 0.05, the measuring instrument is reliable. Conversely, if the value is less than 0.05, the measuring

instrument is unreliable. Hypothesis testing was conducted statistically using partial (t-test) and simultaneous (f-test) tests using SPSS Statistics 26 software.

This study proposed four research hypotheses:1) There is a positive and significant relationship between the independent variable, the Merdeka Mengajar Platform, and the dependent variable, teacher competence. 2) There is a positive and significant relationship between the independent variable, Google Workspace for Education, and the dependent variable, teacher competence. 3) There is a positive and significant relationship between the independent variable, the Merdeka Mengajar Platform and Google Workspace for Education, and the dependent variable, teacher competence. Data analysis was conducted using simple linear regression and multiple linear regression. The influence of a variable on the dependent variable is shown by the t-statistic test, which basically shows how much influence the independent variables Merdeka Mengajar Platform (X1) and Google Workspace for Education (X2) have on the dependent variable Teacher Competence (Y). The F test is used to determine whether the independent variables simultaneously (together) have a significant effect on the dependent variable. So, in other words, three independent variables, the Merdeka Mengajar Platform (X1) and Google Workspace for Education (X2), will be analyzed simultaneously to determine whether or not they have an effect on the dependent variable, namely teacher competence (Y).

C. Results and Discussion

Merdeka Mengajar Platform (X1)

The frequency distribution shows that respondents' use of the Merdeka Mengajar platform varied widely, with scores ranging from 44.00 to 150.00. The majority of respondents (15%) scored 120.00, indicating high levels of use. Furthermore, 71% of respondents scored above 115.00, indicating that the majority of teachers actively utilize the platform. However, some respondents (4%) scored below 90.00, possibly due to technological adaptation and limited access to digital platforms. Previous research has shown that the integration of technology in education has transformed conventional teaching patterns into more digital ones, while also opening up new opportunities for teacher professional development through various online training platforms (Wati & Nurhasannah, 2024). However, the success of this transformation depends heavily on several key factors, such as the availability of adequate technological infrastructure, ongoing training programs, institutional policy support, and teachers' intrinsic motivation.

Recent empirical studies have shown that the use of digital platforms such as Merdeka Mengajar has significantly improved teachers' digital pedagogical competencies (Noverma Noverma et al., 2025). However, significant challenges remain, particularly in terms of the digital divide, with the average teachers in rural areas experiencing difficulties accessing technology due to limited infrastructure (Sutrisno et al., 2024).

Infrastructure limitations, such as infrastructure, electricity, and internet access, can be addressed through a comprehensive offline competency development model, starting with a preparation phase encompassing teacher technology and mental preparation, an implementation phase involving intensive training and mentoring, and an evaluation phase to measure impact and refine the program.

The practical implications of this study emphasize the importance of providing equitable technological infrastructure across all regions, designing training programs tailored to teachers' real-world needs, establishing a community of practitioners as a platform for knowledge sharing, and establishing an adequate incentive system to motivate teachers in professional development. A holistic approach that combines technological aspects with human resource development is expected to create an educational ecosystem that supports the sustainable improvement of teacher competency in this digital era. Based on the above data, it can be concluded that digital platforms such as the Merdeka Mengajar Platform significantly influence teacher competency improvement. Several other factors influence competency improvement, including internet connectivity. Areas with poor internet connectivity make it difficult to use digital platforms. The government addresses this through offline platforms. This, of course, impacts teachers' technological adaptation speed in these areas, which is relatively slower than in areas with stable internet connectivity. The slow adaptation of senior teachers to digital platforms is another significant factor influencing teacher competency. The questionnaire results indicated that senior teachers rarely access PMM due to the need for mentoring.

Google Workspace for Education (X2)

The use of Google Workspace for Education showed a relatively even distribution, with the lowest score being 31.00 and the highest being 135.00. The highest frequencies were at 101.00 and 107.00 (6% each), indicating that most teachers have used tools such as Google Classroom, Drive, and Docs in their learning activities. Approximately 56% of respondents scored above 110.00, indicating a good level of utilization. However, 22% of respondents still scored below 100.00, possibly reflecting the need for further training to optimize the available features. Previous research has shown that Google Workspace for Education significantly improves teachers' digital pedagogical competencies through its collaborative features (Akcil et al., 2021). This platform facilitates continuous professional development by providing an integrated learning ecosystem.

Features like Google Classroom and Jamboard help teachers create interactive learning experiences (Shamsuddin et al., 2023). Real-time collaboration capabilities through Google Docs and Slides enhance creativity in developing teaching materials (Barbetta, 2023). Google Meet supports competency building in hybrid learning (Kučera & Haffner, 2025). Meanwhile, Google Drive facilitates the organized management of digital learning resources (Kumar & Sharma, 2021). The Google for

Education certification program also improves teachers' professional competency. The use of Google Forms for assessments develops digital evaluation skills (Adelia et al., 2021). Based on the discussion above, it can be concluded that GWfE significantly impacts teacher competency development. However, network limitations, a lack of supporting Chromebooks, limited GWfE training, and the speed at which teachers adapt to technology differ across regions and certainly influence the significance of GWfE variables on teacher competency development.

Teacher's Competence

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Based on the discussion above, it can be concluded that GWfE significantly impacts The teacher competency variable has a score range of 32.00 to 140.00, with 13% of respondents scoring 112.00, indicating that competency levels are concentrated at the medium-high level. Fifty-five percent of respondents scored above 112.00, indicating that most teachers have adequate competency in implementing learning. However, 15% of respondents scored below 90.00, which may require more intensive professional development programs. Based on the descriptive analysis above, it can be concluded that:

1. The Merdeka Mengajar platform has been widely used by teachers, with the majority of respondents at a high level of use (>115.00).
2. Google Workspace for Education has also been adopted by the majority of respondents, although there is still room for improvement in the utilization of advanced features.

3. Teacher competency is generally at a good level, but a small number still require assistance to achieve optimal competency development. However, network limitations, a lack of supporting Chromebooks, limited GWfE training, and the speed at which teachers adapt to technology differ across regions and certainly influence the significance of GWfE variables on teacher competency development.

The Influence of the Merdeka Mengajar Platform on Teacher Competence

Based on the results of the partial t-test and simultaneous F-test using SPSS 26, it can be concluded that the Merdeka Mengajar Platform has a significant impact on improving teacher competency. The t-test yielded a calculated t-value of 12.398 with a significance level of 0.000 ($p < 0.05$). This result firmly rejects the null hypothesis and accepts the alternative hypothesis, which states that the Merdeka Mengajar Platform does indeed have a significant impact on teacher competency. This finding is further strengthened by the results of the previous ANOVA test, which showed a calculated F-value of 153.701 with a significance level of 0.000, proving that the regression model was overall significant. These results align with previous research, including one by Haryanto & Suryani (2023), which found that the Merdeka Mengajar Platform significantly improves teachers' pedagogical competency through its self-paced training features and online learning communities. Their study showed that teachers who actively used this platform experienced a 25% increase in their ability to design differentiated learning. This finding aligns with the findings of this study, where the majority of respondents (71%) scoresd above 115.00, indicating that the platform is effective in supporting teacher professional development.

Another study by Rahmadani & Kamaluddin (2023) revealed that the Merdeka Mengajar platform helps teachers access the latest curriculum materials and share good practices, thereby enhancing teaching creativity. This finding is supported by the data from this study, where 15% of respondents achieved the maximum score (120.00), indicating that the platform has significant potential for improving competency if utilized optimally. Theoretically, this finding aligns with the concept of TPACK (Technological Pedagogical Content Knowledge), which emphasizes the importance of technology integration in teacher competency development. The development of knowledge and technology after the COVID-19 pandemic has forced teachers to constantly adapt to advances in education. For example, in competency development, teachers are more comfortable using platforms that are practical yet multi-resourced, such as the Merdeka Mengajar platform.

The Influence of Google Workspace for Education on Teacher Competence

Based on the results of the hypothesis testing using the t-test, the calculated t-value was 13.444 with a significance level of 0.000. These results clearly reject the null hypothesis and accept the alternative hypothesis, which states that Google Workspace

for Education does have a significant effect on teacher competence. This is supported by the results of the simultaneous F-test of 126.561 with a significance level of 0.000 < the probability value of α 0.05. Meanwhile, the F-table corresponds to a significance level of 0.05 (2.92) of 3.09. Therefore, the calculated F-table > F-table (126.561 > 3.09), thus rejecting Ho. This means there is a significant joint influence between the Merdeka Teaching platform and Google Workspace for Education on the competence of public elementary school teachers in Teluk Gelam District.

These results reinforce previous research conducted by Fauziah & Nugroho (2024) examining the impact of Google Workspace for Education on teachers' technopedagogical competence. The results showed that the use of Google Classroom, Drive, and Docs improves the efficiency of learning managsfement and collaboration between teachers, with 56% of respondents scoring above 110. This indicates that these digital tools have contributed to improving teacher competency.

The Simultaneous Influence of the Merdeka Mengajar Platform (X1) and Google Workspace for Education (X2) on Teacher Competence

Based on the results of a simultaneous ANOVA test using SPSS 26, the regression model using the Merdeka Mengajar Platform and Google Workspace for Education simultaneously had a significant impact on teacher competency. This is evidenced by the calculated F-value of 126.561, which is significant at the 0.000 level ($p < 0.001$). The Sum of Squares Regression value of 19,125.448 with 2 degrees of freedom (df) indicates that these two digital platforms together can explain most of the variation in teacher competency. This finding is consistent with previous research by Suryana & Pratama (2023) in the journal "Jurnal Inovasi Pendidikan," which found that the combination of digital teacher training platforms had a synergistic effect on improving teacher competency, with an F-value of 118.72 ($p < 0.001$). Another study on the impact of Google Workspace for Education was conducted by Sumardi (2023) in a School Action Research study at Kalikepek Public Elementary School (Yogyakarta). The results showed an increase in competency in using Google Workspace for Education from only 14% to 86% after participating in an intensive workshop. This demonstrates Google Workspace for Education's high effectiveness in improving teachers' professional skills in a relatively short period of time. The difference with this study is that no previous research used the Merdeka Mengajar Platform and Google Workspace for Education variables together. The researcher used both variables because Google Workspace for Education materials are in the Merdeka Mengajar Platform self-training menu, and Google Workspace for Education is integrated with all Merdeka Mengajar Platform menus from SSO, teaching content menus, assessments, performance management, and teacher inspiration menus. Some data are presented with integrated Google tools by utilizing the advantages of the Google Workspace for Education menu.

D. Conclusion

This study concludes that both the Merdeka Mengajar Platform and Google Workspace for Education individually and synergistically contribute to enhancing the pedagogical and professional competence of teachers. The key finding is that each digital platform has a strong, significant positive impact, with Google Workspace showing a slightly higher correlation, particularly in managing digital learning. Crucially, their combined use creates a synergistic effect, leading to a greater overall improvement in teacher competency than when either is used alone. However, a substantial portion of competency variance is still influenced by external factors such as infrastructure, network quality, training, motivation, and school policies, indicating that these technological tools are powerful but not standalone solutions. The practical implication is that for optimal results, teacher professional development programs must move beyond simply providing access to these platforms. Schools and policymakers should design and implement integrated training modules that combine the curriculum and content resources of Merdeka Mengajar with the collaboration and classroom management tools of Google Workspace. Furthermore, this technological investment must be supported by concurrent efforts to ensure reliable infrastructure, foster a supportive school policy environment, and cultivate teacher motivation. For future research, it is recommended to investigate the specific external factors such as teaching experience, self-efficacy, or school leadership that moderate the effectiveness of these platforms. Conducting longitudinal studies would also be valuable to assess the long-term sustainability of the competency improvements and to understand how the integration of these tools evolves over time within the teaching and learning ecosystem.

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