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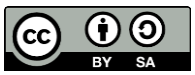

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Incorporating Digital Technology for Preparing English Teaching Materials in the Merdeka Curriculum by PPG Graduates: A Case Study at a Public University

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Abstract

This study is aimed to investigate the challenges that teachers encounter when integrating technology into the preparation of teaching materials and how PPG graduates perceive the impact of technology on the efficiency and effectiveness of preparing teaching materials. The research methodology involves qualitative techniques, including interviews with PPG graduates, to gather data and analyze their perceptions. The study found that there are several challenges faced by the participants when they utilize technology in preparing their teaching material. The challenges encompassed internal and external factors. Simultaneously, it emphasizes the positive impacts of integrating technology in enhancing learning experiences considering both its benefits and challenges. The article provides a comprehensive exploration of the intricate relationship between education, technology, and teacher readiness in Indonesia.

Keywords: *Digital Technology; English Teaching Materials; Merdeka Curriculum; PPG Graduates.*

Introduction

The integration of digital technology in education has become a crucial necessity in Indonesia, particularly in response to the evolving demands of 21st-century learning. Despite the government's various initiatives to enhance digital learning, including the implementation of the *Merdeka* Curriculum, many educators still face challenges in effectively incorporating technology into their teaching practices. Recent data from Indonesia's Ministry of Education, Culture,

Research, and Technology (Kemendikbudristek) indicates that while 80% of schools have access to digital learning resources, only about 50% of teachers feel confident utilizing them effectively. This gap highlights the need for further professional development, particularly among *Pendidikan Profesi Guru (PPG)* graduates, who are expected to facilitate curriculum implementation and innovation. Thus, there is an urgent need to understand the challenges and opportunities that educational technology presents for educators.

Despite various studies highlighting the positive impacts of technology in educational environments, there remains a notable gap in the literature regarding how specific teacher training programs, such as the Pendidikan Profesi Guru (PPG) programs, equip future teachers to take advantage of technology effectively in their teaching. Previous research often addresses general technology integration but provides limited focus on the unique experiences and perspectives of PPG graduates, who form the core of the educators implementing the Merdeka Curriculum. This study addresses this gap by providing an in-depth exploration of how PPG graduates in Jambi perceive and utilize technology in preparing English teaching materials.

Jambi, a province located on the eastern coast of Sumatera, faces unique challenges in educational practice. Limited research has focused on the regional disparities in technology adoption, particularly in Jambi, a province with diverse educational landscapes ranging from urban to rural settings. Jambi was chosen for this study due to its unique challenges, including varying levels of digital infrastructure and teacher readiness, making it a critical case for understanding the broader implications of technology integration in Indonesia. Choosing this region as the site for the study highlights an interesting case where the intersection of educational reform and technological integration can be informatively examined. Specifically, this research investigates the readiness of PPG graduates from a public university in Jambi to embrace digital tools and how their perceptions impact their teaching practices.

To address these concerns, the present study investigates how PPG graduates at one public university in Jambi incorporate digital technology when preparing English teaching materials under the Merdeka Curriculum framework. Specifically, it seeks to answer the following research questions: (1) What are the challenges that teachers encounter when integrating technology into the preparation of teaching materials? and (2) How do PPG graduates perceive the impact of technology on the efficiency and effectiveness of preparing teaching materials? By examining these aspects, this study aims to provide valuable insights into the preparedness of PPG graduates for technology-driven teaching and offer recommendations for more effective digital integration in Indonesian teacher education.

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The integration of technology in language education has transformed traditional teaching methods and greatly impacted the way languages are taught and learned. Technology, encompassing digital tools, online resources, and interactive platforms, has become an integral component of language instruction worldwide (Chapelle, 2001). Digital technology has enabled more interactive and personalized language learning experiences, allowing students to engage with authentic language materials, practice their language skills, and receive immediate feedback through various applications and platforms (Levy & Stockwell, 2006). It has also expanded the reach of language education, making it more accessible to learners regardless of geographical location, fostering global communication, and enhancing cultural understanding (Warschauer & Healey, 1998).

Technology in language teaching encompasses a wide array of tools and resources that have revolutionized pedagogical practices. These include interactive whiteboards, which facilitate dynamic and engaging lessons by enabling teachers to display multimedia content and write notes digitally (Smith & Hardman, 2005). Learning management systems (LMS) like Moodle and Blackboard provide online platforms for course management, content delivery, and student interaction, promoting a flexible and collaborative learning environment (Bonk & Graham, 2012). Additionally, language learning apps and software, such as Duolingo and Rosetta Stone, offer learners the opportunity to practice language skills on their own, often through gamified and interactive exercises (Thorne, Black, & Sykes, 2009). These various types of technology contribute to the diversification of language teaching approaches and the customization of learning experiences to cater to the needs and preferences of individual students.

The integration of technology in education offers a range of benefits and presents unique challenges. On the positive side, technology enhances engagement and interactivity in the learning process, making lessons more dynamic and appealing to students (Means et al., 2009). It provides access to vast online resources, including multimedia content, authentic language materials, and interactive exercises, which can enrich the learning experience and cater to diverse learning styles (Mann, 2003). Technology also facilitates instant feedback and assessment, enabling teachers to monitor progress and tailor instruction to individual needs. However, challenges such as the digital divide, where not all students have equal access to technology, and concerns about screen time and distractions need to be considered (Hargittai, 2010). Moreover, the proper integration of technology into the curriculum requires teacher training and support, and issues related to data privacy and security must be addressed to ensure a safe and effective learning environment.

The teaching profession is fundamentally rooted in the acknowledgement of the capacity to educate, community endorsement, and the community's trust to impart education to students. As articulated in Permendikbud Number 8 of 2009, Article 2, the primary objective of the Pre-Service Teacher Professional Education Program (PPG) is to cultivate prospective teachers equipped with competencies in designing, executing, and evaluating learning processes. This involves guiding and training students based on assessment outcomes, along with continuous engagement in research and professional development.

Permendikbud Number 87 of 2013 outlines that the Teacher Professional Program (PPG) is designed for graduates of Bachelor of Education, Bachelor of Education and Non-Educational Bachelor/D-IV. The aim is to prepare individuals with the inclination and aptitude to become proficient teachers, ensuring a comprehensive mastery of teacher competencies aligned with national education standards. Successful completion of the program enables participants to obtain a professional educator certificate in early childhood education, primary education, and secondary education.

To enhance teacher competencies, the Indonesian government, as outlined by the Ditjen Dikti (2018), has instituted the Teacher Certification (PPG) Program. This initiative aims to equip teachers with the necessary competencies outlined in the aforementioned regulations. The adequacy of teacher competencies plays a pivotal role in determining the success of educational goals.

Various studies have explored the benefits of participating in the PPG program as a means of fostering teacher competence and professionalism. Triwinarni (2016) suggests that PPG is effective in not only advancing knowledge but also acquainting participants with the latest technology. Keeping abreast of technological developments proves advantageous for both teachers and students, facilitating the selection of relevant materials, creation of interactive media, and enhancing assessment efficiency. This aligns with the principles outlined in Law No. 12/2012, Article 17, Verse 1 on Higher Education, which forms the basis for establishing the PPG program. It emphasizes that professional education, a form of higher education pursued after a degree or undergraduate program, aims to develop or prepare student-teachers for occupations requiring specialized skills (Kemenristekdikti, 2017).

The Merdeka Curriculum in Indonesia sets forth ambitious objectives and carries significant implications for the nation's education system. It aims to promote student independence, critical thinking, and creativity while fostering a sense of national identity and cultural awareness (Kemendikbud, 2020). By emphasizing student-centered learning and active participation, the curriculum seeks to prepare students for the challenges of the 21st century, including the integration of technology. These objectives have wide-ranging implications, including the need for teacher training and professional development to effectively implement the Merdeka Curriculum. Overall, the Merdeka Curriculum represents a

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forward-looking approach to education in Indonesia, with the potential to shape the nation's future by producing students who are well-equipped for the demands of the modern world.

Technology plays a pivotal role in the implementation of the Merdeka Curriculum for English teaching in Indonesia, reflecting the curriculum's emphasis on innovation and active learning. The Merdeka Curriculum recognizes the potential of technology to enhance language learning and offers opportunities for learners to engage with digital resources, interactive platforms, and online collaboration (Kemendikbud, 2020). By integrating technology, English teachers can create dynamic and engaging lessons, facilitate authentic language practice, and provide immediate feedback to students. Technology also supports the development of 21st-century skills, aligning with the curriculum's objectives. It enables students to access a wide range of multimedia materials, participate in collaborative projects, and develop digital literacy. This underscores the importance of technology as a facilitator of effective English language teaching within the framework of the Merdeka Curriculum.

The Merdeka Curriculum in Indonesia presents both challenges and opportunities in the realm of education. Its emphasis on student-centered and technology-integrated learning poses the challenge of providing adequate training and resources for teachers to effectively implement these innovative approaches (Kemendikbud, 2020). Additionally, the need for continuous professional development and support for teachers is evident. However, the curriculum also brings promising opportunities for a more dynamic and engaging education system. It encourages students to become active learners, fostering critical thinking, creativity, and problem-solving skills. The Merdeka Curriculum opens the door to more diverse and personalized learning experiences, which can cater to individual students' needs and learning styles. The challenges underscore the importance of investment in teacher development and resources, while the opportunities suggest a more vibrant and student-centric future for Indonesian education. Therefore, the researchers intend to explore what are the challenges that teachers encounter when integrating technology into the preparation of teaching materials and how do PPG graduates perceive the impact of technology on the efficiency and effectiveness of preparing teaching materials.

Method

A qualitative technique used in this study. The process of gathering and evaluating non-numerical data is known as qualitative research. To go deeper into the subject matter of the study, the researcher opts for qualitative research. Instead of being displayed as numbers, the data is explained in form words.

According to Creswell (2009), Qualitative research is an interpretive process that investigates a social issue, constructs a theory, scrutinizes language, and presents in-depth, naturalistic perspectives from informants. A case study is the type of study that this one is. According to Baxter & Jack (2008), a case study is a research methodology that helps explore a phenomenon within some particular context through various data sources.

This research was carried out at one public university in Jambi, in the PPG program. This institution was chosen as the setting of the research because the access is available for the researchers, and this institution also offers a PPG program. Furthermore, the purposive sampling strategy employed by the researcher to select the participants in a purposeful manner. When doing a qualitative study and looking for volunteers who have the most in-depth understanding of the subject matter, purposeful sampling is appropriate. Purposive sampling is mostly employed by researchers in qualitative research, according to Creswell (2009). Using purposeful sampling, a researcher chooses a sample in accordance with the study's objectives.

The researcher conducted interviews with three PPG graduates from one public university in Jambi. The participants were selected based on three criteria such as alumni of the PPG program at the selected public university who are willing to participate in the research voluntarily, have experience in teaching English in Merdeka curriculum, and have an experience in integrating technology for preparing teaching material. In this research, the researcher used interviews to collect the data. The goal of conducting interviews with people is to learn more about their thoughts, feelings, and opinions. In this research, the researcher employed semi-structured interviews with the guidance of an interview guideline. The purpose of the interview guideline is to collect comprehensive data regarding PPG graduates' perception towards the use of technology in preparing English teaching material in Merdeka curriculum.

Data analysis is the systematic process of identifying, organizing, and interpreting information within a monologic framework. In qualitative research, this involves reviewing field notes and other available resources to enhance understanding and facilitate report preparation. The process includes working with data, organizing it into manageable units, identifying key insights, and determining which findings will be included in the final report.

According to Creswell (2014), qualitative data analysis consists of six sequential steps:

1. Organizing and Preparing the Data for Analysis – This step involves collecting, transcribing, and arranging the data systematically to facilitate the analysis process.

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2. Reading or Reviewing All the Data – Researchers immerse themselves in the data by thoroughly reading and familiarizing themselves with the content to identify patterns and initial insights.
3. Coding the Data – This step involves systematically labeling segments of the data to categorize and organize relevant themes.
4. Using the Coding Process to Generate Descriptions and Themes – The researcher interprets the coded data to develop detailed descriptions of the setting, participants, and emerging themes for further analysis.
5. Representing the Data Through Narrative or Visuals – Findings are presented through textual descriptions, tables, or visual models to illustrate key themes and relationships.
6. Interpreting the Findings – The researcher derives meaning from the data by linking findings to existing theories, drawing conclusions, and discussing their implications.

Findings

The findings of this study are organized into two main themes: Challenges in Integrating Technology and Perceptions of Technology's Impact. Each theme is further divided into subthemes to provide a systematic and detailed analysis of the data collected from PPG graduates.

1. Challenges in Integrating Technology

The participants identified several challenges when integrating technology into the preparation of English teaching materials. These challenges were categorized into internal and external factors.

1.1 Internal Challenges

Internal challenges stemmed from the participants' personal capabilities and awareness of using technology. One participant stated, *"I often feel overwhelmed by the variety of digital tools available. I'm not sure which one is the most effective for my teaching context."* This highlights a lack of confidence and familiarity with digital tools, which hindered their ability to integrate technology effectively. Another participant mentioned, *"I need more training on how to use these tools creatively. I know the basics, but I struggle to make my lessons interactive."* This suggests that while participants had some exposure to technology, they lacked the advanced skills needed to fully leverage it in their teaching.

1.2 External Challenges

External challenges were related to institutional and infrastructural limitations. Participants frequently cited insufficient facilities as a major barrier. For example, one participant noted, *"The Wi-Fi in our school is very unstable, and sometimes there's no electricity. It's frustrating when I plan a tech-based lesson, and*

I can't execute it." Another participant added, *"We don't have enough projectors or cables, so I often have to share with other teachers, which disrupts my schedule."* These infrastructural issues significantly impacted their ability to incorporate technology consistently.

2. Perceptions of Technology's Impact

Despite the challenges, participants acknowledged the positive impact of technology on teaching efficiency and effectiveness. This theme is divided into two subthemes: Benefits of Technology Integration and Inefficiencies in Time Allocation.

2.1 Benefits of Technology Integration

Participants agreed that technology enhanced their creativity and made teaching materials more engaging. One participant shared, *"Using Canva and PowerPoint has allowed me to create visually appealing materials that capture students' attention. It's a big improvement from traditional methods."* Another participant emphasized the accessibility of resources: *"With technology, I can find a wide range of references online, which helps me design more comprehensive lessons."* These responses align with previous studies (Levy & Stockwell, 2006; Means et al., 2009), which highlight how technology enables interactive and personalized learning experiences.

2.2 Inefficiencies in Time Allocation

However, participants also noted that integrating technology often required more time than traditional methods. One participant explained, *"It takes me hours to prepare a single lesson using digital tools. Sometimes, I wonder if it's worth the effort."* Another participant added, *"I spend a lot of time troubleshooting technical issues, which takes away from actual teaching preparation."* This inefficiency in time allocation was a recurring concern among participants, suggesting a need for better training and support to streamline the process.

Discussion

The findings of this study reveal both the potential and the challenges of integrating technology into English teaching material preparation under the Merdeka Curriculum. Below, the results are discussed in relation to previous studies, implications for PPG program improvement, and the specific context of the Merdeka Curriculum.

1. Comparison with Previous Studies

The challenges identified in this study align with findings from previous research. For instance, Hargittai (2010) and Means et al. (2009) have highlighted the digital divide and the need for teacher training as significant barriers to technology integration. Similarly, the participants in this study emphasized the lack of infrastructure and technical skills as major obstacles. However, this study adds a unique perspective by focusing on PPG graduates, who are expected to be at the forefront of implementing the Merdeka Curriculum. Unlike general studies on

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technology integration, this research highlights the specific struggles of newly trained teachers in adapting to digital tools.

2. Implications for PPG Program Improvement

The findings suggest that the current PPG program may not adequately prepare graduates for the demands of technology-driven teaching. Participants expressed a need for more hands-on training and practical workshops on digital tools. For example, one participant suggested, "The PPG program should include a module on how to integrate technology into lesson planning. We need more than just theoretical knowledge." This feedback underscores the importance of revising the PPG curriculum to include comprehensive digital literacy training, focusing on both basic and advanced skills.

Additionally, the study highlights the need for ongoing professional development. As one participant noted, "Technology is always evolving, so we need continuous training to keep up with the latest tools and trends." This aligns with the recommendations of Rabani et al. (2023), who advocate for regular upskilling programs to ensure teachers remain competent in using digital tools.

3. Relationship to Merdeka Curriculum Implementation

The Merdeka Curriculum emphasizes student-centered learning and the integration of technology to foster 21st-century skills (Kemendikbud, 2020). However, the findings of this study reveal a gap between the curriculum's objectives and teachers' readiness to implement them. For instance, while the curriculum encourages the use of interactive platforms and digital resources, participants struggled with technical issues and time constraints, which hindered their ability to fully embrace these innovations.

To address this gap, the study suggests that the Merdeka Curriculum implementation must be accompanied by robust support systems, including improved infrastructure, access to digital tools, and targeted training for teachers. As one participant pointed out, "The curriculum is great, but without the right tools and training, it's hard to put it into practice."

4. Technology Integration Strategies

Participants shared specific examples of how they integrated technology into their teaching. These strategies included:

4.1 Using Canva and PowerPoint: to create visually engaging presentations.

4.2 Incorporating Kahoot and Quizizz: for interactive quizzes and assessments.

4.3 Editing videos: to provide multimedia content for lessons.

4.4 Accessing online resources: such as e-books and educational websites to enrich teaching materials.

These examples demonstrate the potential of technology to enhance teaching practices. However, participants also noted that these strategies required significant time and effort, highlighting the need for more efficient tools and training.

5. Differences and Similarities in Participants' Experiences

While all participants faced challenges, their experiences varied based on their teaching contexts. For example, teachers in urban areas reported better access to digital tools but struggled with time management, while those in rural areas faced more infrastructural issues. Despite these differences, all participants agreed on the importance of technology in improving teaching effectiveness and student engagement.

6. Limitations of the Study

This study has several limitations. First, the small sample size of three participants limits the generalizability of the findings. Second, the study focused solely on PPG graduates from one public university in Jambi, which may not represent the experiences of teachers in other regions or institutions. Future research should include a larger and more diverse sample to provide a broader perspective on the challenges and opportunities of technology integration in Indonesian education.

Conclusion

The findings of this study highlight the dual nature of technology integration in education. While digital tools offer significant benefits, such as enhanced creativity and access to resources, they also present challenges related to infrastructure, time allocation, and teacher readiness. This study examines the various challenges educators face when using technology in their teaching, considering both internal and external factors. Internal challenges include teachers' familiarity with digital tools, confidence in using them, and the need for training. External challenges involve institutional support, access to resources, infrastructure limitations, and changing educational policies. Despite these difficulties, the study highlights the positive impact of technology on learning, as it can increase student engagement, support personalized learning, and provide greater access to educational materials. It also emphasizes how digital tools encourage collaboration and interactive learning, helping to improve traditional teaching methods.

The findings stress the importance of a well-planned approach to technology use in education, ensuring that its benefits are fully utilized while addressing the challenges educators face. Rabani, S., Khairat, A., Guilin, X., & Jiao, D. (2023) study shows that technology can enhance learning quality, increase student engagement, and bridge educational gaps across different regions. Digital tools such as online learning platforms, AI-assisted tutoring, and interactive learning apps have proven effective in supporting student-cantered learning. However, challenges remain,

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including inadequate infrastructure, limited teacher training, and unequal access between urban and rural areas. These findings emphasize the need for stronger digital infrastructure, continuous teacher training, and clear policies to ensure technology is used effectively and fairly in education.

Many students in rural and low-income areas struggled with poor internet connectivity, a lack of devices, and limited digital literacy. To address these issues, the report recommends that the government and stakeholders invest in digital infrastructure, establish public-private partnerships, and implement community programs to improve digital literacy. Additionally, Indonesia needs a flexible and inclusive digital education system that can adapt to future disruptions.

Beyond infrastructure, digital literacy plays a crucial role in maximizing the benefits of technology in education. As Valentia, T. (2023) study highlights that Indonesia's digital divide is not only about access to devices and the internet but also about the ability to use technology effectively for learning. While some teachers have successfully incorporated digital tools, others struggle due to a lack of training and confidence. To bridge this gap, experts suggest integrating digital skills into the national curriculum, enhancing teacher training programs, and developing tailored strategies to meet the needs of different schools and communities.

Student readiness for digital learning is another key consideration. Studies indicate that excessive screen time, digital distractions, and a lack of self-discipline can negatively impact learning outcomes. To address these challenges, schools and policymakers should implement a balanced approach to digital education. This includes combining online and offline learning, teaching responsible technology use, and promoting programs that develop students' self-regulation and emotional well-being in digital environments.

To effectively integrate technology in education, the government must invest in digital infrastructure, particularly in remote areas, and develop policies that incorporate digital literacy into the curriculum. Funding should be allocated for schools to acquire digital tools and train teachers, while partnerships with private companies can enhance internet accessibility and affordability. Regular assessment of technology use in education is necessary for continuous improvement. Schools and administrators should provide ongoing teacher training, establish digital resource centres, and implement blended learning strategies that combine digital and traditional teaching methods. Clear policies on responsible technology use and collaboration among educators can further improve digital learning outcomes.

Teachers and educators must actively engage in digital skills training and integrate technology creatively into their teaching. They should adapt digital tools to meet students' diverse learning needs while ensuring a balanced approach to

screen time and offline activities. Technology developers and private companies can support education by designing user-friendly, culturally relevant digital tools, collaborating with educators to create AI-based learning solutions, offering affordable training programs, and funding digital inclusion initiatives for underserved communities. Furthermore, Parents and communities should guide children in responsible technology use, participate in digital literacy programs, advocate for better digital access in schools, and help students establish healthy digital habits.

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