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# Empowering Teachers' Digital Literacy: Training on Creating Digital Learning Media at Rural Elementary School

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**ABSTRACT**

Digital learning media play a crucial role in facilitating the transfer of knowledge, particularly in helping students understand abstract concepts. In response to the growing need for technological integration in education, a community service program aims to train teachers in the effective use of digital tool for developing instructional media. This program involved eight teachers at rural elementary school and aimed to enhance their competence, motivation, and consistency in producing digital learning resources. The initiative aligns with the goals of sustainable development goal 4, focuses on improving the quality of education. The activity employed a participatory training and mentoring approach, comprising two key phases: the initial training sessions and subsequent mentoring. The program began with a needs assessment survey administered to participating teachers to understand their prior knowledge and skills. Following this, structured training sessions were conducted, and teachers were guided in the creation of digital learning products. These products were then evaluated and refined through mentoring to ensure their pedagogical quality and relevance. The effectiveness of the program was measured quantitatively using a questionnaire, focusing on four key indicators: basic digital skills, operational competence, motivation to create digital materials, and consistency in their development. The results showed an improvemen across all indicators, demonstrating a strong shift toward digital adoption. Sustained progress requires comprehensive support through institutional policies. It can be concluded that empowering teacher digital literacy could enhance their digital skills.



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## Introduction

Digital learning media play an important role in helping students understand abstract concepts, especially in science and exact subjects such as physics, chemistry, and mathematics. Concepts that are difficult to visualize—such as atomic structure, metabolic processes, or derivative calculations—can be explained more concretely through interactive simulations, animations, and augmented reality (Mayangsari & Mahardhika, 2019; Hidayat & Suryadi, 2023; Lubis et al., 2023). The use of digital media enables more contextual, visual, and multisensory learning, which can significantly enhance students' conceptual understanding and facilitate learner-centered education. Well-designed multimedia learning can enhance understanding and information retention, especially in abstract learning. Thus, the integration of digital media is not just an addition, but an important pedagogical strategy to bridge the gap in students' understanding of complex material (Saraswati et al., 2020; Arsyad et al., 2024; Susanto et al., 2022). However, this must go hand in hand with the digital literacy of its users, namely teachers and students.

Digital literacy refers to the ability to effectively and efficiently utilize technology and information from digital devices across various contexts, including academic, professional, and everyday life (Riel et al., 2012; Reddy et al., 2020; Tinmaz et al., 2022). It is closely linked to the use of digital media such as gadgets, social media, digital platforms, and the internet (Widyaningsih et al., 2021; Sabrina, 2018). Digital literacy influences the integration of technology in instructional material development, signifying that information technology aims to enhance the quality, accessibility, and cost efficiency of instructional delivery. Moreover, it facilitates the establishment of learning communities that can address the challenges posed by globalization. The expected quality of learning across educational institutions aligns with the objectives of the Fourth Industrial Revolution (Industry 4.0) and supports Sustainable Development Goal (SDG) 4, which focuses on quality education.

The ability of digital literacy has become one of the essential competencies that teachers must possess in the 21st-century education era (Gündüzalp, 2021; Isrokatun et al., 2022). Digital literacy not only encompasses technical skills in operating digital devices but also includes the ability to evaluate, select, and effectively integrate digital resources and media into the learning process. Teachers with a high level of digital literacy tend to be more confident and creative in adapting various digital learning media to support interactive, contextual, and relevant learning for students. Conversely, low digital literacy often becomes an obstacle in the optimal utilization of educational technology (Perifanou et a., 2019; Soekamto et al., 2022). Therefore, improving teachers' digital literacy plays a crucial role in encouraging the use of innovative and meaningful digital learning media in the classroom.

Based on the Ministry of Communication and Information survey data in 2022, the digital literacy index of the Indonesian population only reached a score above 3.00—still in the "moderate" category, and has not yet reached the "good" threshold of a score of 4.00 (Nugroho & Nasionalita, 2020; Rumata & Nugraha, 2020). The gap in access and competence is more pronounced in rural areas, where infrastructure and training opportunities are still limited. The impact is that many school teachers in rural areas do not yet understand how to effectively use digital learning media such as LMS, video conferencing applications, or interactive platforms (Soekamto et al., 2022; Rofiah et al., 2024). For example, according to reports in Papua and Sulawesi, despite having received training, the majority of teachers are still unable to conduct interactive learning independently and still rely on conventional methods (Betaubun, 2021; Kadir et al., 2023). This situation shows that without improved literacy and infrastructure support, the use of digital media by the government or private sector in rural areas will be very limited and not optimal.

Based on observations and a preliminary survey conducted among teachers regarding the quality of learning, it was found that the current teaching process primarily relies on conventional methods, particularly lecture-based instruction. This approach tends to result in passive learning experiences due to the prevalent use of 'spoon-feeding' techniques. Additionally, teachers' current competencies are limited to basic software operations and information retrieval. These findings suggest an urgent need for capacity-building initiatives to enhance teachers' skills in developing digital-based instructional materials.

A simple survey reveals that, in general, teachers have previously implemented digital-based learning; however, its application remains limited to specific subject areas. Only a few subjects currently utilize digital media in instruction. This limitation is primarily due to constraints related to infrastructure, teacher capability, student competency, and funding. These components are closely interconnected, indicating the need for policy reform to optimize the implementation of digital-based learning. From a demographic perspective, a significant proportion of the teaching staff are relatively young. This presents an opportunity for schools to invest in capacity building, aiming to enhance teachers' digital proficiency in a consistent manner. If effectively managed, the integration of digital media could serve as a strategic advantage for schools, potentially attracting greater community interest in student enrollment. Moreover, students may feel more motivated and challenged, positioning them as school ambassadors who actively participate in both academic and non-academic competitions.

This article presents novelty by emphasizing context-based practical training interventions specifically designed for elementary school teachers in rural areas. Unlike previous studies that generally focus on digital literacy in urban contexts or merely the introduction of technology, this research emphasizes empowering teachers through the creation of digital learning media tailored to local needs and limitations. The significance of this research lies in its contribution to bridging the digital divide between urban and rural areas, as well as providing empirical evidence that structured training can enhance teachers' practical digital skills and encourage the adoption of technology in learning. Thus, this article supports the transformation of inclusive and sustainable education in remote areas.

## Method

The Community Service Program was conducted based on observational findings, following a "bottom-up" approach in data collection (Nurhidayat et al., 2022). The observations were derived from a community service program activity for students conducted in 2024, during which a simple survey was administered (Powa et al., 2021 & Sartika, 2021). The results indicated that one of the schools in Caringin District required training on digital application tools for instructional material development to align with the goals of the Fourth Industrial Revolution (Industry 4.0) and Sustainable Development Goal (SDG) 4 on Quality Education. The community service activities employed a participatory training and supervision method (Nurhidayat et al., 2022). The training was targeted at teachers, comprising a total of eight participants.

Caringin Village, Caringin District, Bogor Regency, is classified as a rural area with rural characteristics as evidenced by Central Statistics Agency data from 2013: it encompasses 12 villages with a population density of around 1,972 people/km², while Caringin Village itself has a density of 6,652 people/km² and a total population of nearly 113,041 (Sanusi et al., 2024). On the primary education side, there are 34 public elementary schools in this district with a relatively sparse teacher-student ratio—totaling 409 teachers for 9,835 elementary school students in 2012 (Djamdjuri & Prasetya, 2020). This condition reflects the challenge of providing quality teachers, especially in rural areas, and underscores

Caringin's status as a rural area with a need to improve the quality of elementary school teachers.

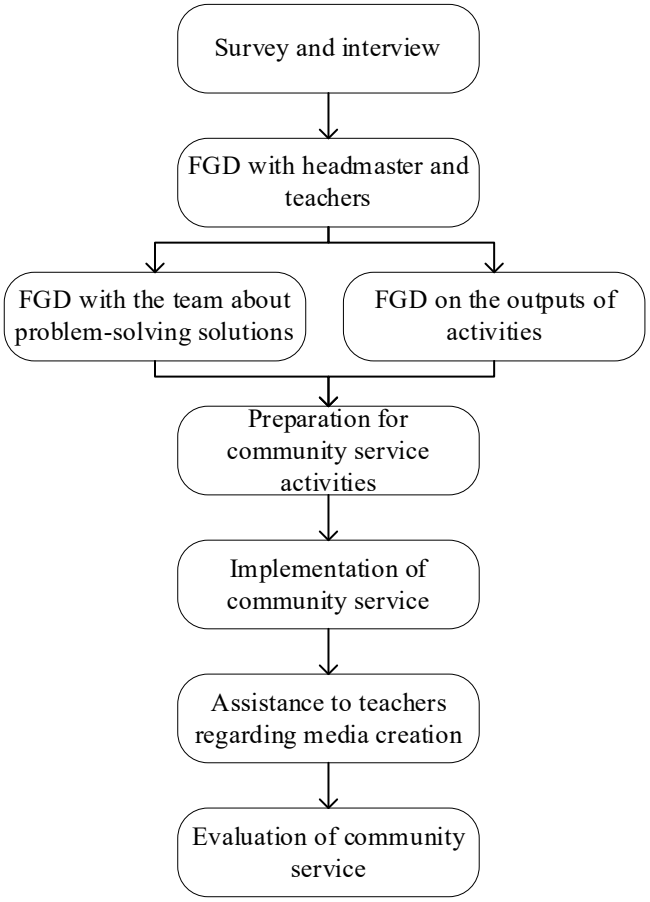


**Figure 1.** The Flowchart of Community Service

The program was conducted in a classroom located in Muara Jaya Village, Caringin District, Bogor Regency as rural area. The training and mentoring activities were carried out in two stages: (1) the first stage involved training teachers on the use of the digital application Mentimeter (2) the second stage focused on mentoring teachers to maintain motivation and consistency in developing digital instructional media over a one-month period. A participatory supervision approach was implemented, engaging both teachers and the school principal to ensure a more accountable and high-quality process.

## Results and Discussion

The results of a simple survey (Figure 2) indicate that teachers' foundational knowledge and basic operational skills in software usage remain at a basic level. Their proficiency in digital-based instructional media applications is primarily limited to operating Microsoft PowerPoint. Several factors contribute to this condition, including limited access to personal laptops and school-owned computers, as well as the availability of projectors to facilitate digital content presentation. The survey also revealed that teachers expressed a need to enhance their competence in using various digital applications to improve their ability to develop digital instructional materials. The applications identified as priorities included Microsoft PowerPoint, Canva, Mentimeter, and Quizizz. Based on the percentage of application preferences, the most in-demand tools, in descending order, were Microsoft PowerPoint, Mentimeter, Canva, and Quizizz.

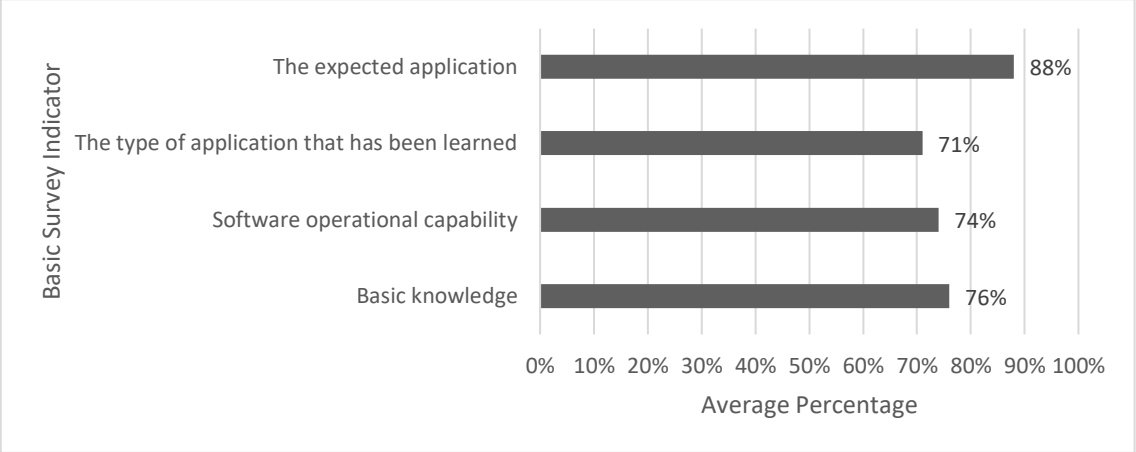


**Figure 2.** Results of a Preliminary Survey on the Initial Condition of Teachers

Digital applications serve as essential tools that facilitate teachers in transferring knowledge, particularly in abstract dimensions. Interviews with students revealed that they found digital-based instructional materials more engaging and enjoyable compared to traditional lecture-based methods. The implementation of digital media-based teaching materials has led to several positive outcomes among students, including increased learning motivation (Utami et al., 2021), enhanced digital literacy (Hendaryan et al., 2022, Syahrir et al. 2023, Anam et al. 2021), improved critical thinking skills (Jannah & Atmojo, 2022), better learning outcomes (Novita & Sundari, 2020, Sari, 2019), higher academic achievement (Hapsari & Zulherman, 2021), and greater curiosity across various subjects. These improvements can serve as a positive initiative to enhance students' understanding and contribute to achieving the minimum competency criteria.

In addition to improving student learning outcomes, this community engagement program has also contributed to enhancing teachers' competencies. Following the training and mentoring on the development of digital media-based teaching materials, teachers experienced improvements in various aspects, including increased digital literacy (Usmeldi et al., 2023, Yunitasari & Prasetya, 2022), digital operation skills (Surur et al., 2024), teaching professionalism (Fauzi et al., 2023), digital numeracy literacy (Aini et al., 2024), and overall digital competence (Miftachurohmah, 2024).

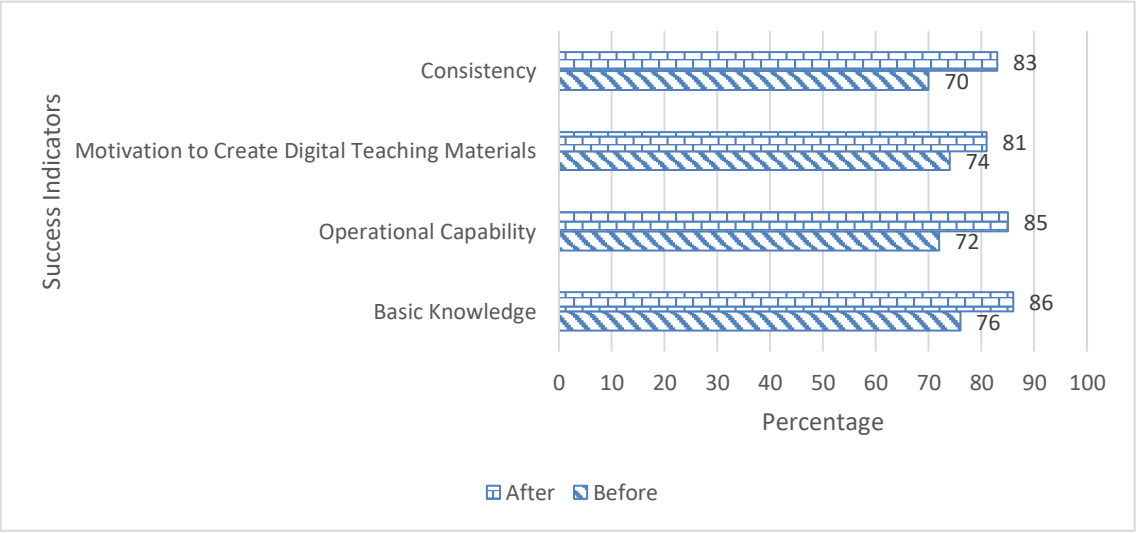


**Figure 3.** Enhancment of Digital Applications Utilization

Figure 3 elaborate that there is a significant increase across various indicators related to the utilization of digital applications. These improvements include basic knowledge

(86%), basic operational skills (85%), motivation to create digital instructional materials (81%), and consistency in developing digital learning media (83%). The lack of teacher competence in designing and structuring instructional materials (Putra et al., 2021) has been identified as one of the primary reasons for the limited adoption of digital-based teaching resources. Another critical factor is teachers' motivation and consistency in creating digital instructional materials, which should be a key area of concern for school administrators, particularly school principals and educational foundations.

Educational media as a bridge for knowledge transfer, facilitating the concretization of abstract concepts. In the current era of rapid technological advancement, both teachers and students have unlimited opportunities to develop and enhance their skills (Supratman, 2023, Kuntari, 2023; Supratman et al., 2024; Rahmawati & Atmojo, 2021). For teachers, integrating technology into classroom instruction is essential, as it not only increases students' motivation to learn but also assists in lesson preparation and instructional delivery. One notable example of technological advancement frequently utilized by educators is Canva, a graphic design application that supports teachers in creating instructional materials. Canva is designed to help users develop various types of creative designs online. This application enables teachers to design posters, brochures, greeting cards, presentations, book covers, icons, and more. Additionally, Canva is accessible across multiple platforms, including web-based, Android, and iPhone versions. As a result, any user with access to technology whether a smartphone, computer, or laptop along with an internet connection, can effectively utilize Canva for educational purposes.

Another application that can be effectively utilized in education is Mentimeter. Mentimeter serves as a learning platform that can both deliver content and enhance student engagement. It is a versatile tool with numerous features, one of the key ones being its ability to facilitate presentations. With this feature, teachers can use Mentimeter to present material in a more engaging and interactive manner, ensuring that students remain attentive and are less likely to become bored. Moreover, Mentimeter includes a live polling feature, allowing teachers to conduct simple surveys within the classroom. This feature can be particularly useful for gauging students' understanding of the material being taught (Nur et al., 2023; Mohamed et al., 2022). Additionally, Mentimeter can be employed to conduct quizzes, where teachers can prepare questions related to the lesson, and students respond in real time. The use of quizzes via Mentimeter is highly practical and convenient, as students only need to enter a code to answer the questions provided. This makes the process seamless and easy for both teachers and students (Nur et al., 2023).

During the training, teachers showed great enthusiasm in learning Microsoft PowerPoint and Canva, while only basic features of Mentimeter and Quizizz were covered. This illustrates that digital learning media for delivering educational material is very important for teachers to capture students' attention and enhance their learning motivation so that students' understanding of the lessons can improve. Digital learning media can enhance students' understanding along with their learning motivation (Saraswati et al., 2020; Arsyad et al., 2024). Meanwhile, digital learning media related to assessment and ice breaking are not considered the main focus; if they exist and can be developed by teachers, it would be better, and the learning experience would be more vibrant.

Throughout the session, each teacher developed a digital instructional media product aligned with the subject matter they teach. This approach facilitated the creation of materials that enhanced both motivation and competency in conveying ideas related to the concepts or learning objectives they aimed to achieve. These products were utilized in the learning process and refined according to the teachers' unique creative styles. Subsequent mentoring activities were conducted to monitor progress and assist teachers in addressing any

challenges encountered while developing digital-based instructional media. The mentoring aimed to provide continuous support and ensure the effective use of digital tools in their teaching practices.

## Conclusion

It can be concluded that empowering teacher digital literacy could enhance their digital skills, operational competence, and motivation to use and or create digital learning media in the clasroom. The digital application training aimed to align with the objectives of the Fourth Industrial Revolution (Industry 4.0) and the SDGs related to quality education. The training focused on utilizing Microsoft PowerPoint, Canva, Mentimeter, and Quizziz to enhance teachers' competence in creating digital-based instructional materials. The more skilled teachers are in creating digital-based learning media, the more engaging the classroom learning becomes, which in turn is likely to increase students' motivation and learning outcomes. The hope is that the community service initiative will contribute to enhancing teachers' digital literacy, digital literacy skills, professionalism, digital numeracy literacy, and overall digital competence. The primary goal of this activity is to increase teachers' motivation and consistency in continuously developing digital learning media, especially in rural area.

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