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Optimizing the Use of Digital-Based Learning Media Against Numerical Literacy

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Abstract

The COVID-19 pandemic has necessitated a shift from offline to online learning systems, requiring all sectors of education to adapt swiftly to these changes. However, the transition to online learning has presented challenges, particularly in maintaining student engagement, comprehension, and numeracy literacy skills. Field data reveals that many teachers have not fully optimized the use of digital-based learning media to enhance numeracy literacy among students. Recognizing this gap, STKIP Kusuma Negara, in collaboration with the PKM Team, conducted a community service initiative at SD Negeri Srijaya 04 Bekasi. The primary objective of this initiative was to assist teachers in optimizing the use of digital technology in their teaching practices to improve students' numeracy literacy. The PKM program was implemented through a series of activities including socialization, introduction to digital tools, training sessions, and practical applications of numeracy literacy. The results of this initiative indicate an improvement in teachers' ability to integrate digital media into their teaching, leading to enhanced numeracy literacy skills among students through effective technology adaptation.

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INTRODUCTION

The COVID-19 pandemic has necessitated a rapid transition from offline to online learning, challenging both teachers and students in delivering and comprehending educational material (Herliandry et al., 2020; Latifah & Supena, 2021). This shift demands improvements in the abilities of teachers, students, and even parents in using technology, information, and communication, as well as other supporting infrastructures to effectively implement online learning. An online learning system should encourage teachers to be more creative and innovative in using educational media. However, numerous challenges remain unaddressed, such as limited IT skills among teachers, which result in boring lessons and difficulties in conducting assessments that were traditionally done in person (Prawanti & Sumarni, 2020; Wahyuningsih, 2021; Yolanda et al., 2020).

Pedagogical Content Knowledge (TPACK) into their teaching. Despite having high motivation to improve the quality of their instruction, they are often constrained by limited time, funds, and access to training. To address these challenges, the integration of interactive learning technologies, which involve human-computer interaction, becomes crucial. These technologies allow students to learn at their own pace and have been shown to enhance motivation when properly integrated into lessons (Arda et al., 2015; Setyaningsih et al., 2020; Surjono, 2017). Therefore, training and workshops focused on optimizing the use of digital tools such as G-Suite, Google Workspace, and interactive PowerPoint are essential for empowering teachers to enhance their instructional practices.

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Given the increasing importance of technology in education, it is also critical to focus on specific educational outcomes, such as numeracy literacy. Numeracy literacy, as defined by the OECD and the Indonesian Ministry of Education and Culture (Kemdikbud), is the capacity to apply and interpret mathematical concepts in various contexts. This skill is essential for daily life activities, including financial transactions and decision-making, and it also helps students communicate mathematical ideas effectively (Ashri & Pujiastuti, 2021; Prenzel et al., 2015). Consequently, fostering numeracy literacy in elementary school students is not only vital for their cognitive development but also for their future success in navigating everyday challenges.

SD Negeri Srijaya 04 Bekasi, where this community service initiative is conducted, faces significant challenges in integrating digital technologies into the classroom. The school has limited infrastructure, and teachers often rely on traditional, non-interactive teaching methods. Recognizing these issues, STKIP Kusuma Negara and the PKM Team initiated a program to improve teachers' competencies in using digital media to enhance numeracy literacy.

This initiative builds upon existing research that underscores the importance of digital media in enhancing student learning outcomes, particularly in numeracy literacy. Previous studies have demonstrated the effectiveness of digital tools in engaging students (Lestari, 2018). However, there has been limited focus on empowering elementary school teachers with the practical skills necessary to integrate these tools into their daily teaching practices. While other studies have conducted training for teachers in schools (Hakeu et al., 2023; Loretha & Albar, 2023; Rahmi & Cerya, 2020), these efforts have not specifically targeted the enhancement of numeracy literacy. This project is novel in its approach by addressing the immediate challenges posed by the COVID-19 pandemic and simultaneously contributing to long-term educational improvements. It achieves this by developing a sustainable model of digital literacy among teachers. By focusing on under-resourced schools like SD Negeri Srijaya 04 Bekasi, this initiative aims to bridge the digital divide and ensure that all students have the opportunity to develop critical numeracy skills.

METHOD

The Community Service Activities, themed "Optimizing the Use of Digital-Based Learning Media for Numerical Literacy at SD Negeri Muktiwari 01," were conducted from June 20-23, 2022, totaling 32 hours of training. The participants in this program were teachers at SD Negeri Muktiwari 01. A total of 20 teachers participated, including those responsible for teaching English and Mathematics. The selection of these participants was based on their active teaching roles and their willingness to improve their competencies in using digital-based teaching media. The methodology is detailed as follows.

Stage 1 Socialization Activities

The initial stage involved socialization activities, where the PKM team conducted outreach to the teachers. The aim was to provide an overview of the importance of digital-based teaching media in enhancing numerical literacy, particularly in English and Mathematics. This stage included lectures, discussions, and Q&A sessions to engage the teachers and address any initial concerns or questions.

Stage 2: Introduction to Digital-Based Teaching Media

In this stage, the PKM Team introduced various digital tools and media applicable to teaching English and Mathematics. Demonstrations and discussions were employed to familiarize the teachers with these tools, setting a foundation for their practical application. Tools such as G-Suite, Google Workspace, and interactive PowerPoint presentations were highlighted.

Stage 3: Digital-Based Teaching Media Training

The core stage involved hands-on training sessions where teachers were instructed on how to effectively use digital-based teaching media in their classrooms. The training was practical and focused on real-world applications within the subjects of English and Mathematics. Teachers were guided step-by-step to ensure they could confidently use these tools in their teaching practices.

Stage 4: Practical Application of Digital-Based Teaching Media

The final stage was dedicated to the practical application of the digital tools in a classroom setting. Teachers implemented what they had learned, with the PKM Team providing support and feedback. This stage was crucial for reinforcing the skills acquired during the training and ensuring their practical utility.

Data Collection and Analysis

Data on the effectiveness of the training were collected through pre- and post-training surveys, teacher interviews, and observation of classroom practices. The surveys assessed the teachers' confidence and competence in using digital tools before and after the training. Interviews provided qualitative insights into the teachers' experiences, while classroom observations allowed the PKM Team to evaluate the practical application of the training. Qualitative data were analyzed thematically to identify key areas of impact and any remaining challenges.

RESULTS AND DISCUSSION

The community service program titled "Efforts to Increase Numerical Literacy through Digital-Based Learning Media" was conducted over four sessions, each focusing on different aspects such as socialization, introduction, training, and practical application of technology to enhance literacy and numeracy skills. This program involved 12 teachers from SDN Muktiwari 01, aiming to equip them with the tools and knowledge necessary to improve their students' literacy and numeracy through the effective use of digital learning media.

Session 1: Socialization

The first session focused on socializing the importance of technology in enhancing literacy and numeracy. The teachers were provided with an overview of literacy, numeracy, and their intersection with technology. During this session, participants were introduced to various types of numeracy literacy, which included utilizing mathematical symbols and numbers to solve practical problems (Kusmaharti et al., 2023). Analyzing data or information presented in formats such as tables and flowcharts. Formulating opinions based on the analysis to make hypotheses and draw conclusions.

This session emphasized the importance of numeracy in understanding the role of mathematics in the modern era. Additionally, it highlighted how multimedia tools can be used to enhance students' literacy and numeracy skills. By integrating interactive media into the teaching process, teachers can improve students' communication abilities and their proficiency in reading, writing, and arithmetic.

Session 2: Introduction to Literacy and Numeracy through Technological Adaptation

In the second session, participants were introduced to literacy and numeracy through technological adaptation. Presenters provided information on literacy development stages, from early reading and writing to more advanced independent reading and writing. This session also addressed the selection of appropriate reading materials based on age groups, ensuring that students are exposed to content that matches their developmental stages.

For numeracy, the presenters explored various aspects, including algebraic numeration, numerical numeration, geometric numeration, and data numeration. Additionally, they introduced digital tools such as the British Council website, Bookbox, Let's Read, Spell, Write, and Read, Endless Reader, Flashcards: Learn Languages, and Quizizz. These tools were presented as effective resources for enhancing literacy and numeracy through engaging and interactive content.

Session 3: Literacy and Numeracy Training through Technology

The third session involved hands-on training where participants practiced using the digital tools introduced earlier. For literacy, the British Council website was highlighted, demonstrating its various features, such as English language learning resources, vocabulary exercises, and interactive reading materials. The Flashcards: Learn Languages application was also demonstrated, allowing participants to create interactive vocabulary exercises that reinforce language learning through

visual aids. The KBBI Online application was introduced as a tool for helping teachers distinguish between standard and non-standard Indonesian words.

For numeracy, the Quizizz application was used to create engaging quizzes that help students improve their literacy and numeracy skills. This session provided teachers with practical experience in integrating these digital tools into their teaching practices, thereby enhancing student engagement and learning outcomes.

Session 4: Practical Application of Literacy and Numeracy through Technology

The final session was dedicated to the practical application of the knowledge and skills acquired in the previous sessions. Participants actively engaged in creating their own digital materials and quizzes. In the literacy segment, they used the Flashcards: Learn Languages application to develop quizzes on topics such as body parts, incorporating downloaded images. For numeracy, they utilized the Quizizz application to create interactive quizzes, incorporating visual aids to enhance comprehension.

The active participation of the teachers in this session demonstrated their ability to effectively apply the digital tools in a classroom setting. The success of these activities indicates a positive transfer of skills, enabling teachers to enhance their students' literacy and numeracy through the strategic use of technology.

The results of this community service program indicate that the use of digital-based learning media has significantly impacted the enhancement of numeracy literacy among the teachers at SD Negeri Muktiwari 01. As highlighted by (Bond et al., 2018), the ability of teachers to integrate digital technology into the learning process is crucial for fostering student engagement and improving learning outcomes. This program successfully provided a solid foundation for the teachers to develop their technological competencies, particularly in the context of teaching numeracy literacy, aligning with findings that technological adaptation can boost student motivation and engagement in the learning process.

Furthermore, research by (Pettersson, 2021) emphasizes the importance of ongoing training in the use of educational technology. In this context, the training provided to the teachers at SD Negeri Muktiwari 01 not only equipped them with technical skills but also enhanced their understanding of how technology can be applied to make learning more effective and adaptive to student needs. This increase in competence also contributed to strengthening the teachers' confidence in adopting new technologies, which is a crucial step in creating a more dynamic and responsive learning environment.

CONCLUSION

Based on the results and discussion presented above, it can be concluded that the teachers at SD Negeri Muktiwari 01 Bekasi responded positively to the community service program, as it significantly enhanced their competence in teaching numeracy literacy using digital-based media. This positive reception was reflected in the active participation of the teachers throughout the various stages of the program, including socialization, introduction, training, and practical sessions. The structured approach and clear objectives contributed to the overall success of the activities, which were conducted according to the predetermined implementation schedule.

However, to ensure the sustainability and further improvement of the skills acquired, it is recommended that the teachers continue to practice and refine their abilities in using digital-based learning media for teaching numeracy literacy. Additionally, support from the Education Office or other relevant agencies is essential to provide ongoing resources and facilitate the continuous development of teachers' competencies. Such support will be crucial in sustaining the positive outcomes of the program and enhancing the overall quality of education.

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