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Bridging the Digital Divide: Enhancing Teacher Competencies for Student-Centered Learning Through Microsite Development

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ABSTRACT

Elementary school teachers at Tumiyang 1 Public Elementary School face significant challenges in adopting digital technology effectively with 73% having no prior knowledge of microsites and limited skills in creating interactive digital learning media. This digital literacy gap, common in rural educational contexts, results in conventional teaching methods that fail to engage today's digital generation effectively. To address these challenges, a two-day intensive microsite creation training program was implemented using a participatory approach through hands-on training, mentoring, and product-based evaluation. The program consisted of three main stages, preparation, implementation, and evaluation and monitoring. Teachers learned to create web-based learning media using Google Sites and S.Id, integrating various digital resources, including Google Drive, Google Forms, YouTube, and Canva. Post-training evaluation revealed universally positive outcomes that most of the participants gained understanding of microsites, with all teachers successfully creating functional, content-rich microsites tailored to their subject areas. All participants expressed interest in further learning and rated the training as effective with clear and accessible materials. This program successfully bridged the digital competence divide, empowering rural teachers as agents of change capable of creating adaptive, interactive learning environments and contributing to educational equity between urban and rural areas.

A. INTRODUCTION

The development of information and communication technology has brought significant changes to the world of education, particularly in the learning process in elementary schools. Teachers are required not only to master subject matter but also to be able to utilize digital media to make learning more engaging, interactive, and tailored to the needs of today's digital generation (Aini & Nuro, 2023). Teacher's digital competencies have gained prominence in enhancing quality education in the 21st Century, where technology integration in classroom activities has become essential for effective teaching (Demissie et al., 2022). Integrating technology into the curriculum is key to creating relevant and contextual learning

for today's digital generation (Pranata, 2021). However, the reality on the ground shows that many elementary school teachers still face significant challenges in adopting digital technology effectively, resulting in learning methods that tend to be conventional and less interactive (Egok, 2024). Training activities to acquire additional competency skills are often lacking, and teaching materials with examples relevant to real-world contexts that students can access remain limited (Yuniati et al., 2024). These obstacles include a lack of skills in designing digital-based learning media, limited experience using online platforms, and limited innovation in developing interactive teaching materials.

The digital competence divide between rural and urban teachers represents a persistent barrier to education in the digital age, where rural teachers often lack the competence to effectively integrate digital technologies in teaching despite improvements in ICT infrastructure (Lin et al., 2023). Tumiyang 1 Public Elementary School is located in Tumiyang Village, Pekuncen District, Banyumas Regency, Central Java, approximately 25 km from the urban center in Banyumas Regency. As a school located in a suburban area with a rural demographic, this school is highly motivated to improve the quality of education but faces several challenges common in similar environments. Rural schools often face challenges including lack of technological infrastructures, scarcity of digital resources, and insufficient ongoing training for teachers in digital skills (Jerry & Yunus, 2021; Rana, et al., 2018; Hasin & Nasir, 2021). Rural areas frequently experience low literacy rates and gaps in the community's access to education and comprehension of information, necessitating early educational program implementation to provide a solid foundation for later learning (Yusmar & Fadilah, 2023). As an elementary school located in a remote area, Tumiyang 1 Public Elementary School faces unique challenges in adapting to technology. Although its teachers are passionate and committed to innovation, most still rely on conventional teaching methods and have limited digital literacy skills, particularly in creating interactive learning content. This situation makes them desperately need practical training, such as creating microsites, which can be an effective and accessible solution to improve the quality of learning in the digital age.

Learning media plays a crucial role in supporting the teaching and learning process to achieve optimal learning outcomes (Prihadi et al., 2025). Digitalization of education offers a solution to address this gap. Teachers need to utilize various online platforms to develop more engaging and accessible learning media (Rukmana et al., 2023). Microsites have emerged as an innovative solution as concise and flexible digital media. As a form of commitment to improving education quality and implementing educational digitalization, microsites serve not only as branding but also to facilitate the delivery of learning materials, where teachers can embed links to material documents, quizzes, or assignments from Google Docs and Google Forms (Yuniati et al., 2024). Google Sites enables teachers to create websites without coding experience, serving as a centralized location for all class materials including syllabus, assignments, and resources with interactive content and collaborative tools (Patil, 2024). With microsites, teachers can organize curriculum, energize instruction through curated materials from the internet, and create student-centered learning environments where kids work independently while teachers direct learning (Kovich, 2019). Teachers also can package various learning resources, such as videos, interactive quizzes, and links to materials, into one simple webpage, making them easier for students to access. The use of microsites has been proven effective in increasing student learning interest and enabling teachers to create more personalized and structured materials aligned with the applicable curriculum. Using Google Sites as a way to develop a blended learning approach received positive feedback from students because it easier for them to improve their understanding of science materials and literacy skills (Lestari et al., 2025). The use of this type of digital media also supports the

development of student-centered interactive learning media, thereby increasing the effectiveness of the overall learning process (Suryani, 2020).

Research has shown that intervention plans should be designed specifically for rural teachers, such as providing teacher training and initiating mutual aid activities between rural and urban teachers to promote exchanging and sharing their digital teaching experience. Previous microsite training for elementary school teachers showed that 95,8% participants felt satisfied with the training meeting their expectations, achieved an average validity percentage of 91,2% by the experts and categorized as very suitable for use, and reached an N-Gain Score of 64,5% indicated that the media was effective in learning (Nadlifah et al., 2025). However, previous microsite training programs have primarily focused on urban or semi-urban schools with better technological infrastructure and higher baseline digital literacy skills. Research on implementing such training in remote rural contexts remains limited. Tumiyang 1 Public Elementary School exemplifies this gap, where teachers face compounded challenges including infrastructure limitations, geographic isolation, and minimal prior exposure to educational technology. This community service activity addresses this gap by adapting the microsite training model specifically for rural elementary teachers. The program provides insights into effective strategies for developing digital competencies in underserved educational contexts. Through interactive microsite creation training, elementary school teachers are expected to improve their digital competencies, utilize technology effectively, and produce innovative learning media relevant to students' needs in the digital age. Teachers' in-service training, leadership support, attitude towards technology, and technological-content domains are significant predictors of successful technology integration in classroom practice (Nurhidayati et al., 2025). This activity not only strengthens teachers' capacity to face the challenge of 21st-century learning but also empowers them as agents of change capable of creating a more adaptive, interactive, and relevant learning environment in line with current technological developments.

B. METHODS

This community service activity was implemented using a participatory approach through hands-on training, mentoring, and product-based evaluation. Each stage was designed to ensure teachers not only understood the material conceptually but also practiced it in real classroom learning contexts. The stage is illustrated in the Figure 1.

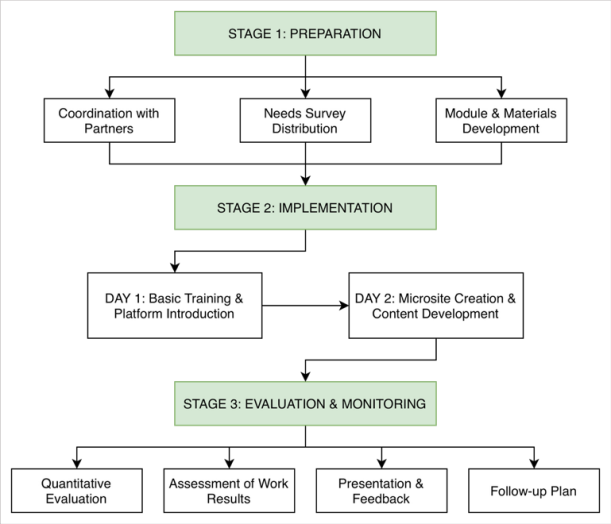

Figure 1. Stages of the Program Activities

1. Preparation
   The preparation stage served as a crucial foundation before the core activites were implemented. Activities carried out at this stage included:
   - Coordination with Partners: The community service team held an initial meeting with Tumiyang 1 Public Elementary School to explain the program's objectives, develop a technical implementation agreement, and establish a schedule that accommodated the teachers' availability and school calendar.
   - Participant Needs Survey: A short questionnaire was distributed to teachers to assess their level of understanding of learning technology, identify existing digital literacy gaps, and determine specific needs in creating digital media for their classrooms.
   - Development of Training Modules and Materials: The team developed comprehensive teaching materials in digital formats to be used during the training, including step-by-step technical tutorials in creating a microsite, customizable design templates, and examples of effective teaching content suitable for elementary education.
2. Implementation
   The training was designed as a two-day intensive activity divided into two main sessions, combining theoretical understanding with practical application:
   - Day 1: Socialization and Basic Training
     The first day focused on introducing participants to the importance of digital literacy in elementary education, socializing the microsite concept and its benefits, providing a comprehensive introduction to the Google Sites and S.Id platform with examples from various subject areas, and guiding teachers through account creation and platform navigation.
   - Day 2: Microsite Creation and Teaching Material Development
     The second day emphasized practical application, where teachers created their own microsites tailored to their learning topics, developed multimedia teaching materials, integrated supporting platforms such as Google Drive, Google Forms, YouTube, and Canva, and received personalized one-on-one consultation and technical assistance.
3. Evaluation and Monitoring
   After the training was completed, a comprehensive evaluation was conducted using a quantitative descriptive approach to assess both the effectiveness of the training program and the quality of the resulting microsites:
   - Quantitative Evaluation: A structured post-training questionnaire was administered to all participants to measure four dimensions, including (1) understanding of microsites, (2) interest in further learning, (3) training effectiveness, and (4) clarity of materials delivered. The questionnaire used a Likert scale with two response categories ("Agree" and "Strongly Agree"). Then, the data were analyzed descriptively through frequency counts and percentage distributions, with the results visualized using charts.
   - Assessment of Work Results: The community service team evaluated the microsites created by teachers based on multiple criteria including completeness and accuracy of content, alignment with learning objectives, ease of site navigation and user experience, design creativity and visual appeal, and appropriateness for the target student age group.
   - Presentation of Results and Feedback: Teachers were given the opportunity to present their microsites to their peers in a collaborative showcase session, fostering peer learning and receiving constructive feedback from both colleagues and facilitators to refine their digital products.

- Follow-up Plan: Sustainability strategies were developed to ensure long-term impact, including plans for continued content development and regular updates, establishment of a collaborative teacher network for sharing best practices, creation of microsite repository accessible to all teachers in the school, and scheduling of community-based follow-up training sessions to address advanced features and emerging needs.

C. RESULTS AND DISCUSSION

This community service activity was conducted at Tumiyang 1 Public Elementary School, involving elementary school teachers who participated in a two-day intensive microsite creation training program. The results are presented based on the three main stages of implementation, consisting of preparation, implementation, and evaluation and monitoring.

1.1. Preparation

During the preparation stage, coordination with Tumiyang 1 Public Elementary School proceeded smoothly, with the school headmaster expressing strong support for the digital literacy enhancement initiative. The needs survey revealed critical findings regarding teachers' initial digital competencies. The majority of participants, approximately 73%, indicated that they had never heard of or used microsites before, confirming the significant digital literacy gap identified in the background.

Furthermore, teachers expressed that while they recognized the importance of digital learning media, they lacked the technical skills and practical knowledge to create such resources independently. The survey also identified specific needs, including the desire for simple, user-friendly platforms that did not require coding skills, and learning materials that could be easily accessed by students both in school and at home. The fact that most teachers at Tumiyang 1 Public Elementary School were unfamiliar with microsites underscores the need for targeted, practical training programs that introduce accessible technologies rather than complex platforms requiring advanced technical skills.

1.2. Implementation

1.2.1 Socialization and Basic Training (Day 1)

The first day began with opening activities that introduced participants to the critical importance of digital literacy in contemporary elementary education. Following the opening session, the facilitators conducted a socialization of the microsite concept, explaining its benefits as an accessible web-based learning medium that can enhance teaching and learning processes. Participants then received a comprehensive introduction to the Google Sites and S.Id platform, which covered how to access the platform, its key features and functionalities, and diverse examples of effective learning microsites from various subject areas as shown by Figure 2. The session concluded with individual account creation, where each teacher set up their own Google Sites and S.Id account, and engaged in guided exploration of the interface, ensuring all participants could navigate the platform confidently before moving to the practical creation phase.

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Figure 2. Socialization about Microsites

Based on observations and informal feedback during Day 1, teachers demonstrated high engagement levels during the socialization session, particularly when viewing real examples of microsites created by other teachers. Many participants expressed surprise at the simplicity of the Google Sites and S.Id interface and appeared enthusiastic about the possibilities for their own classrooms. By the end of the day, all participants successfully created their accounts and completed basic navigation exercises, indicating that the foundational knowledge objectives were achieved.

1.2.2 Microsite Creation and Teaching Material Development (Day 2)

The second day focused on the practical application of knowledge gained from the first day. Teachers began creating their own microsites with a page structure tailored to their chosen learning topics and grade levels, allowing them to design content that would be directly applicable to their classrooms. During the creation process, teaching materials were developed incorporating multiple formats such as text, images, videos, and links to curated learning resources, enabling teachers to create rich and engaging digital content for their students. The training then progressed to microsite integration with supporting platforms such as Google Drive for document sharing, Google Forms for creating quiz, YouTube for educational videos, and Canva for visual design elements, demonstrating how various digital tools could be seamlessly combined within a single microsite. Throughout the day, one-on-one consultation and technical assistance sessions were provided for each participant, offering personalized support to address individual challenges and enhance the overall quality of their microsites.

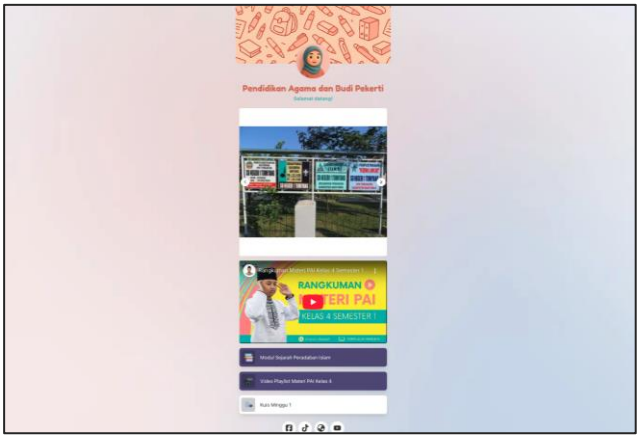

Figure 3. Microsite Development by the Teacher

By the end of Day 2, all participating teachers successfully created at least one functional microsite containing multiple pages and various types of learning content. The topics chosen by teachers varied widely, including mathematics, Islamic education, Indonesian language, and character education, demonstrating the versatility of the platform across different subject areas as the example shown by Figure 3. Several teachers expressed excitement about implementing their microsites in their upcoming lessons and requested additional time to further develop their content.

1.3. Evaluation and Monitoring

The effectiveness of this community service activity was evaluated using a quantitative descriptive approach to systematically assess training outcomes and participant satisfaction. A structured post-training questionnaire was developed and administered to all participating teachers (N=11), immediately following the completion of the two-days training program. The questionnaire employed a Likert scale format with two response categories consists of "Agree" and "Strongly Agree", measuring four critical dimensions: (1) understanding the microsites, (2) interest in further learning, (3) training effectiveness, and (4) clarity of materials delivered. Data were analyzed descriptively by calculating the frequency and percentage distribution of responses for each dimension. In addition to quantitative questionnaire data, qualitative assessment was conducted through evaluation of the microsites created by teachers and observations during the presentation and feedback session.

The evaluation stage revealed significant positive outcomes across multiple dimensions. Assessment of the microsites created by teachers showed that all participants successfully produced functional, content-rich websites that met basic quality criteria including completeness of content, alignment with learning objectives, ease of navigation, and appropriate design for elementary students. While the sophistication of the microsites varied based on individual teachers' prior technical experience and creativity, even the most basic sites represented substantial progress from the teachers' starting point of zero microsite knowledge.

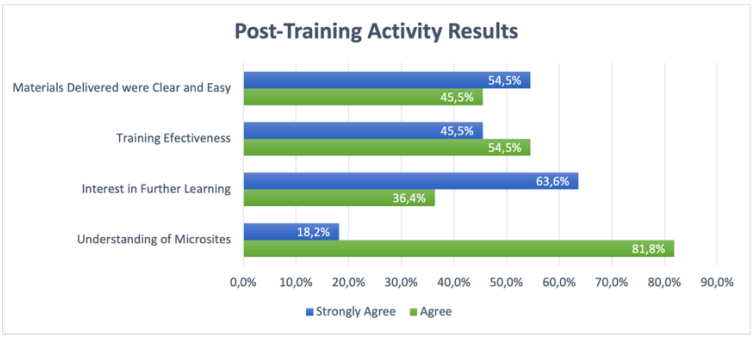

Figure 4. Post-training questionnaire Results

The post-training questionnaire revealed highly positive results as shown by Figure 4. The results revealed a dramatic transformation in teachers' understanding of microsite. Prior to the training, the needs survey indicated that most teachers had never heard of or used microsites. However, the post-training results showed a complete reversal 81,8% of participants agreed and 18,2% strongly agreed that they now understood what microsites are and how they can be applied in education. Participants also demonstrated strong motivation for continued professional development in this area, with 63,6% strongly agreed and 36,4% agreeing that they were interested in learning more about microsites. Regarding the overall effectiveness of the training program, responses were evenly distributed yielding 100%

positive feedback. This balanced distribution indicates consistent satisfaction across all participants, with all teachers perceiving the training as effective in meeting their professional development needs. Assessment of the training materials and presentation quality showed that 54,5% of participants strongly agreed and 45,5% agreed that the materials delivered were clear and easy to understand. The 100% positive response demonstrates that the community service team successfully communicated complex technical concepts in an accessible manner appropriate for teachers with varying levels of prior digital literacy.

These positive outcomes align closely with findings from previous microsite training programs for elementary teachers. Nadlifah et al. (2025) reported that 95,8% of participants felt satisfied with microsite training meeting their expectations, comparable to the 100% positive satisfaction achieved in this study across all measured dimensions. The previous study's expert validation achieving 91,2% validity and N-Gain Score of 64,5% effectiveness further supports the viability of microsite training as an effective professional development intervention. However, the current study extends these findings by demonstrating that such positive outcomes are achievable even in remote rural contexts where teachers face compounded challenges of infrastructure limitations and minimal prior technology exposure. The 73% of participants which had zero prior knowledge of microsites in this study represents a more severe baseline gap than typically reported in urban or semi-urban settings, yet the achievement of 100% positive understanding post-training demonstrates that well-designed participatory training can overcome even substantial digital literacy divides. Furthermore, the unanimous expression of interest in further learning suggests that the training not only built technical skills but also fostered intrinsic motivation, addressing the sustainability challenge often faced in rural teacher professional development programs.

Figure 5. After the Presentation of The Microsites Development

Beyond the questionnaire data, the assessment of work products revealed that all participating teachers successfully created at least one functional microsite containing multiple pages and various types of learning content. During the presentation and feedback session, teachers shared their microsites with peers, fostering a collaborative learning environment as shown by Figure 5. Most teachers expressed appreciation for seeing their colleagues' diverse approaches to organizing content and designing pages, noting that this peer learning aspect provided additional ideas and inspiration for future development.

D. CONCLUSION

This community service activity successfully achieved its primary objective of enhancing teacher competencies for student-centered learning through microsite development at Tumiyang 1 Public Elementary School. The program effectively bridged the digital literacy gap, transforming most of the teachers who had no prior knowledge of

microsites into confident digital content creators within two days. All participating teachers successfully created functional microsites tailored to their subject areas and demonstrating mastery of essential digital skills including content organization, multimedia integration, and platform navigation.

The impact of this training extends beyond immediate skill acquisition to fostering sustainable change in teaching practice and professional attitudes. Teachers demonstrated not only in technical competence but also genuine enthusiasm for educational technology integration, with all the participants expressing interest in further professional development. The program successfully empowered teachers as agents of change capable of creating more adaptive, interactive, and relevant learning environments aligned with 21st-century educational demands. By providing practical and accessible training in microsite creation, this activity directly contributed to reducing the digital competence divide between rural and urban teachers, promoting educational equity and improving the quality of learning opportunities for students in rural areas. The establishment of collaborative learning communities and follow-up support mechanisms ensures that the program's impact will continue beyond the initial training, supporting ongoing innovation and digital literacy development at Tumiyang 1 Public Elementary School.

E. ACKNOWLEDGEMENTS

The authors would like to express sincere gratitude to all parties who contributed to the success of this community service activity. We extend our deepest appreciation to the headmaster, teachers, and administrative staffs of Tumiyang 1 Public Elementary School, Pekuncen District, Banyumas Regency, for their enthusiastic participation, commitment, and openness to learning new digital competencies throughout the training program. We are also profoundly grateful to the Directorate of Research and Community Service of Telkom University for providing the financial support through the 2025 Internal Grants that made this community service program possible. We hope that the outcomes of this program contribute to the university's mission of fostering community development and educational equity through meaningful partnerships with schools in rural areas.

F. AUTHOR CONTRIBUTIONS

Activity implementation: ARD, TY, ABA, DKS, SDA, Article preparation: ABA, SDA, Impact analysis: TY, DKS, Results presentation: ARD, Article revision: ABA.

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