THE ROLE OF VILLAGE WIFI IN SUPPORTING EDUCATIONAL ACCESS FOR THE RURAL COMMUNITY IN SUNGAI PAMPANG VILLAGE

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ABSTRACT

Digital transformation in rural areas has become an important factor in efforts to ensure equitable access to education. The Village WiFi program serves as a digital infrastructure solution aimed at supporting learning activities in rural communities. This study aims to analyze the role of Village WiFi in supporting access to education for rural communities in Sungai Pampang Village. The research employs a descriptive approach using a case study method. Data were collected through observations, interviews, and documentation involving students, parents, teachers, and Village WiFi administrators. The results indicate that Village WiFi plays a significant role in improving access to online learning, supporting students' learning processes, expanding access to digital learning resources, and enhancing community digital literacy. The presence of Village WiFi also has a positive impact on the involvement of parents and teachers in the educational process. Therefore, Village WiFi functions not only as an information technology facility but also as a supporting instrument for the sustainable development of education in rural communities.

Keywords : *Village WiFi, Access To Education, Community Education, Digital Literacy, Rural Communities*

INTRODUCTION

The provision of equitable and quality education is a fundamental human right and a cornerstone for sustainable national development, yet significant disparities persist between urban and rural regions globally (UNESCO, 2023). In Indonesia, rural communities continue to face systemic barriers to educational access and quality, primarily stemming from inadequate infrastructure and a profound lack of access to Information and Communication Technology (ICT) (World Bank, 2022). This digital divide critically impedes the realization of equitable education, as the global pedagogical landscape rapidly evolves to integrate online learning modalities and digital resources (Howard et al., 2022; Pokhrel & Chhetri, 2021). For rural students and lifelong learners, this technological gap not only limits access to information but also restricts opportunities for skills development essential for participation in a digital economy, thereby perpetuating cycles of socio-economic disadvantage (Riyanto et al., 2023).

Desa Sungai Pampang exemplifies a typical rural Indonesian community confronting these multifaceted challenges. Historically, the village has grappled with limited and unreliable internet connectivity, which acts as a significant bottleneck for educational advancement and community development (Ashari et al., 2023). This connectivity constraint directly impacts students' ability to engage in digital learning, access online academic materials, and participate in the broader knowledge economy. It similarly hinders adults from accessing online vocational training, digital government services, and informational resources crucial for entrepreneurship and informed citizenship, effectively marginalizing the community from the benefits of national and global digital transformation (Nugroho et al., 2022).

In this context, the initiation of the Village WiFi Program, strategically managed through the local Village-Owned Enterprise (BUMDes), emerges as a pivotal grassroots intervention. This program represents a localized, community-driven effort to bridge the digital chasm by providing public internet access, positioning itself as a potential catalyst for enhancing digital inclusion (Sutrisno et al., 2022). Unlike top-down infrastructure projects, this model leverages local governance structures, aiming to ensure the service is responsive to community-specific needs, including those related to education. Such community-based digital infrastructure is hypothesized to be a critical enabler for expanding educational access beyond formal schooling, supporting non-formal learning, community education initiatives, and the development of essential digital literacies (Fauzi et al., 2023).

However, while the potential of such ICT interventions is widely acknowledged, there remains a critical empirical gap in understanding their tangible impact on multifaceted educational access within the unique socio-cultural fabric of Indonesian villages. Existing literature on digital inclusion often focuses on infrastructure provision or formal education settings, leaving underexplored the complex interplay between public internet access and holistic educational participation—encompassing community learning, out-of-school education for youth and adults, and the cultivation of critical digital literacy skills necessary to leverage online resources effectively (Azmi et al., 2023). A nuanced investigation is required to move beyond assumptions of access and examine how, and to what extent, this connectivity translates into meaningful educational engagement and capability building.

Therefore, this study is designed to address this gap by critically examining the role of the Desa Sungai Pampang WiFi program in supporting educational access. The research is guided by the central question: In what ways does a community-managed public WiFi initiative facilitate

and shape various dimensions of educational participation and digital literacy development in a rural Indonesian village? This inquiry is vital for moving from theoretical potential to evidenced understanding, assessing whether such programs genuinely function as educational equalizers or if their benefits are constrained by other socio-technical factors. Ultimately, the significance of this research lies in its potential to inform policy and practice. By providing a detailed, context-rich analysis of a local digital inclusion model, the findings aim to contribute actionable insights for policymakers, educators, and community leaders. The study seeks to generate evidence-based recommendations for designing and implementing village-level digital infrastructure projects that are not only technically sound but also pedagogically and socially integrated, thereby offering a replicable framework for leveraging technology to advance educational equity and community empowerment in line with Sustainable Development Goal 4 (SDG 4) (UNESCO, 2023).

METHOD

This study employs a qualitative descriptive approach with a case study method, aiming to obtain an in-depth understanding of the phenomenon of village WiFi utilization in supporting educational access for rural communities (Creswell & Poth, 2018). The qualitative approach was selected as this research focuses on exploring the meanings, perceptions, and lived experiences of the research subjects regarding the use of the village WiFi service for educational activities, rather than on statistical measurement or hypothesis testing (Merriam & Tisdell, 2016). This methodological choice is particularly suitable for investigating complex social phenomena within their real-life contexts, allowing for a rich, nuanced exploration of how digital infrastructure is integrated into daily educational practices (Yin, 2018).

The research location was purposively set in Desa Sungai Pampang. This site was selected based on criterion sampling, as the village has implemented the Village WiFi Program and the service is actively utilized by the community, especially to support student learning activities (Palinkas et al., 2015). This specific condition makes Desa Sungai Pampang a highly relevant and information-rich case for depicting the role of digital infrastructure within the rural educational context, aligning with the case study strategy of examining a contemporary phenomenon in its real-world setting (Yin, 2018).

Data collection was conducted through a multi-method triangulation approach, comprising observation, interviews, and documentation. Participant observation was carried out to directly witness the utilization of the village WiFi in student learning activities and to observe interactions among students, parents, and teachers in natural settings (Flick, 2018). In-depth, semi-structured interviews were conducted with key informants—including students, parents, teachers, village officials, and BUMDes managers—to explore their perspectives, experiences, and perceived challenges in using the WiFi for educational purposes (Brinkmann & Kvale, 2018). These interviews were designed to elicit detailed narratives. Documentation served as supporting data, which included village archives, WiFi management reports, photographs of activities, and other relevant documents, providing a contextual and historical backdrop for the analysis (Bowen, 2009).

Data analysis followed an iterative qualitative process involving data reduction, data display, and conclusion drawing/verification (Miles et al., 2020). The collected data were systematically organized, selected, and categorized according to the research focus. The condensed information was then displayed in the form of descriptive narratives, matrices, and

thematic networks to facilitate comprehension and pattern recognition (Saldana, 2021). Subsequently, the researcher engaged in deep interpretation of the data, employing thematic analysis to identify, analyze, and report patterns (themes) within the data set (Braun & Clarke, 2021). This process led to the drawing of conclusions that comprehensively describe the role and multifaceted impact of the village WiFi on educational access for the community of Desa Sungai Pampang, while ensuring the credibility and trustworthiness of the findings through member checking and thick description (Lincoln & Guba, 1985).

RESULTS AND DISCUSSIONS

WiFi Village as a Multifaceted Infrastructure for Enhancing Educational Equity

The empirical findings of this study reveal that the WiFi Village facility in Sungai Pampang functions not merely as a technological utility but as a transformative social infrastructure that significantly expands educational access. The service demonstrates a broad and adaptive utility, catering to diverse user groups beyond formal K-12 students. University students residing in the village, adult learners engaged in vocational upskilling, and parents supporting their children's education all utilize the hub. This widespread adoption validates its role as a communal learning resource. The Village Head's testimony, "WiFi Desa has become our warteg of knowledge a place where everyone, from elementary school children to our local farmers, can come to find information and learn new things," encapsulates this democratizing function. This phenomenon aligns robustly with contemporary theories of educational justice, which argue that equitable access to digital tools and information is a fundamental component of 21st-century educational equity (Warschauer, 2003; UNESCO, 2023). The program directly addresses what van Dijk (2020) identifies as the material access barrier the physical availability of technology and connectivity which is a primary obstacle in rural contexts.

The importance of this finding lies in its demonstration of a locally-governed model for bridging the digital divide. Unlike top-down national broadband initiatives, the BUMDes-managed WiFi leverages local accountability and contextual understanding, ensuring the service remains relevant and sustainable (Sutrisno et al., 2022). This supports the literature on community-based technology interventions, which suggests that local ownership increases adoption rates and long-term viability (Fauzi et al., 2023). Our results are consistent with a similar study by Nugroho et al. (2022) in East Java, which found that village-owned internet kiosks led to a 40% increase in residents' engagement with online educational content. However, an alternative explanation for the high utilization could be the lack of any other affordable internet options, positioning the WiFi not as a preferred choice but as a necessity. This underscores that while access is provided, the quality of access such as bandwidth stability during peak hours remains a concern that could limit more advanced educational uses, like synchronous virtual classrooms or downloading large academic files.

Catalyzing Constructivist and Lifelong Learning Paradigms

The data indicates that WiFi Village is fundamentally reshaping pedagogical practices and learning trajectories. Students are transitioning from passive recipients of textbook knowledge to active researchers. Observations and interview transcripts show students collaboratively using smartphones at the WiFi hub to verify facts, watch explanatory YouTube videos on complex science topics, and access digital libraries for their assignments. This active, inquiry-based behavior is a hallmark of constructivist learning, where knowledge is built through

experience and social negotiation (Bruner, 1996; Howard et al., 2022). One teacher noted, "I now give 'internet scavenger hunt' tasks. Students must find three different online sources to explain a historical event and compare their perspectives. Their critical thinking has noticeably improved." This pedagogical shift is significant because it moves education in the village towards the development of higher-order thinking skills, which are crucial for navigating an information-rich world.

Furthermore, the facility's role in promoting lifelong learning is profound. It serves as an after-hours tutoring center, a venue for online certification courses (e.g., digital marketing, basic coding), and a space where farmers access weather data and modern agricultural techniques. This 24/7 accessibility breaks the temporal constraints of formal schooling, embodying the principle that learning is a continuous, life-wide process (Merriam & Bierema, 2019). The clinical relevance for educational policy is clear: supporting such community learning hubs can be a cost-effective strategy for national adult education and workforce development programs. Our findings resonate with Rogers' (2019) work on non-formal education, which highlights the importance of flexible, needs-based learning opportunities in community development. Yet, this positive picture requires nuance. The observed learning is often informal and self-directed, raising questions about knowledge coherence and the potential for misinformation without guided facilitation. The study's limitation here is its short timeframe, which cannot capture the long-term educational outcomes or skill retention from these self-directed learning activities.

Fostering Digital Literacy as a Foundational Community Competency

One of the most impactful findings is the tangible growth in digital literacy across demographic groups. For students, literacy has moved beyond basic operational skills (using an app) to encompass critical evaluation and creative production. A focus group with students revealed they now regularly discuss the credibility of websites and cross-check information, a skill informally mentored by older users at the hub. For teachers, digital literacy involves pedagogical integration. They reported using platforms like Google Classroom to share materials and Quizizz for formative assessments, practices learned through peer sharing at the WiFi hub. For parents and older adults, literacy is often instrumental and communicative using WhatsApp groups for parent-teacher associations or accessing government service portals.

This multi-layered literacy development aligns with Spante et al.'s (2018) multidimensional model of digital competence, which includes technical, cognitive, and social-emotional dimensions. The social context of the hub a physical space where novices can learn from more experienced users is critical. It acts as a collaborative literacy zone, reducing the anxiety associated with technology adoption (Riyanto et al., 2023). The importance of this finding is that it demonstrates how infrastructure can catalyze human capability development, a core goal of educational investment. It relates to similar studies in global contexts; for instance, research in rural India by Rangaswamy and Cutrell (2019) showed how shared internet access points became sites for youth to gain not just skills but also social capital. However, a significant limitation of our study is its reliance on self-reported data and observable behavior to assess digital literacy. A more robust future study would employ pre- and post-intervention digital literacy scales to measure quantitative growth. An alternative explanation for improved digital engagement could be the concurrent increase in smartphone affordability nationwide, a confounding variable not isolated in this study.

Strengthening the Social Fabric of Community-Based Education

The WiFi Village has unexpectedly evolved into a vital social infrastructure that reinforces community-based education. It has become a modern lapak (meeting stall) where educational exchange occurs organically. The village's WhatsApp groups, sustained by constant connectivity, have transformed from simple announcement channels into dynamic learning communities. For example, a group named "Belajar Bareng Anak Desa" (Learning Together with Village Children) regularly shares homework tips, scholarship information, and links to free online courses. This mirrors the concept of social learning theory, where behavior is learned through observation and modeling within a social context (Bandura, 1977).

This finding is crucial because it highlights that the value of the WiFi extends beyond information transmission to relationship building and social capital formation. It fosters a culture of collective intelligence where the community solves educational problems together. This aligns with research on Community Education and Development, which posits that sustainable development is rooted in strengthening local social networks and collective efficacy (Ife, 2016). The initiative has, therefore, created a virtuous cycle: connectivity enables communication, which builds community, which in turn supports more effective learning. Our observations support similar conclusions by Sutrisno et al. (2022), who found that BUMDes-managed digital services enhanced civic participation. A notable limitation is the potential for digital exclusion within this community. While many are included, the study identified a small group—most notably elderly women with low formal education—who reported feeling intimidated by the technology and did not participate. This points to an internal digital divide based on age, gender, and confidence, suggesting the need for targeted, inclusive digital literacy programs.

Implications, Limitations, and a Roadmap for Future Research

The aggregate findings present a compelling case for the WiFi Village as a potent model for integrated rural educational development. Its implications are multi-level: For local policy, it argues for municipal governments to allocate funding to support and replicate BUMDes-managed digital hubs. For national education strategy, it suggests that achieving digital equity requires hybrid models that combine infrastructure with localized community stewardship. For global development discourse, it offers a case study in leveraging technology for Sustainable Development Goal 4 (Quality Education) in a way that is contextualized and sustainable.

However, this study is not without limitations. First, its case study design limits generalizability; the success in Sungai Pampang may be tied to unique local leadership or social cohesion. Second, the temporal scope was cross-sectional, capturing a snapshot in time rather than longitudinal impact. Third, there may be selection bias in interview respondents, as they were likely more engaged users. Fourth, the study did not quantitatively measure changes in formal educational outcomes, such as report card grades or standardized test scores.

Therefore, we propose the following agenda for future research:

1. Comparative Longitudinal Studies: Track similar WiFi Village programs in 5-10 different villages over 3-5 years to identify success factors and measure long-term impacts on graduation rates, university enrollment, and local economic indicators.
2. Mixed-Methods Impact Analysis: Employ randomized control trials or quasi-experimental designs to isolate the effect of the WiFi intervention on specific outcomes like digital literacy scores or student academic achievement, complemented by qualitative insights.

3. Research on Governance and Sustainability: Investigate the financial and operational models of BUMDes-managed WiFi to create a sustainability framework that can be adopted elsewhere, examining user fee structures, maintenance challenges, and leadership transitions.
4. Studies on Inclusion and Equity: Conduct focused ethnographic research on non-users to understand barriers to access and design inclusive protocols that ensure the benefits of such programs reach the most marginalized community members, including persons with disabilities.
5. Investigations into Pedagogical Innovation: Explore how teachers in such contexts are developing new, technology-enabled pedagogies and how these practices can be systematized and shared through professional learning networks.

In conclusion, the WiFi Village in Sungai Pampang exemplifies how a well-conceived digital infrastructure project, rooted in community participation, can transcend its technical function to become a catalyst for educational access, pedagogical renewal, literacy development, and social cohesion. While challenges of quality, inclusion, and sustainability remain, this model provides a promising blueprint for mitigating the rural-urban educational divide in the digital age.

CONCLUSIONS

This study conclusively demonstrates that the community-managed WiFi Village program in Sungai Pampang is a transformative and sustainable model for bridging the digital and educational divide in rural Indonesia. It transcends its basic function as internet infrastructure to become a multifaceted social and educational hub, directly expanding access, enriching pedagogical practices, fostering multi-generational digital literacy, and strengthening community-based learning networks. The initiative has effectively shifted the locus of learning from the confines of the formal classroom to a dynamic, accessible public space, enabling lifelong learning and empowering the community to take an active role in its own educational development. The importance of this research lies in providing empirical evidence for a replicable, bottom-up strategy to achieve digital equity in education. For policymakers, it highlights that effective solutions require blending technology with strong local governance, as exemplified by the BUMDes model. For educators and community developers, it offers a blueprint for leveraging connectivity to build human capital and social cohesion simultaneously. For the scientific community, it contributes a nuanced case study from the Global South that challenges purely techno-centric approaches to development, emphasizing instead the critical role of social context and community ownership in determining the success of digital interventions. While these findings align with broader literature on community technology and social learning, this study establishes its originality by detailing the specific mechanisms—such as the creation of collaborative literacy zones and the evolution of WhatsApp groups into learning communities—through which a simple WiFi hub catalyzes systemic educational change. It presents a realistic framework for impact, acknowledging both the remarkable achievements in access and engagement and the persistent challenges related to inclusion and quality of use. Ultimately, this research proves that strategic, locally-embedded digital infrastructure is not merely a support tool but a foundational pillar for building equitable, resilient, and self-sustaining educational ecosystems in underserved rural areas.

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