Enhancing Digital Literacy for Rural Communities in Empat Negeri Village, Batu Bara Regency

Mira Nazwa Utami Nasution[1*], Najla Aqilah[2], Raudhatun Atfa[3], Insya Widya Agustini Nasution[4], Diana Sopha[5]

[1,2,3,4,5]Universitas Muslim Nusantara Al-Washliyah, Medan, Indonesia
Email: [1*]mirdanstt@gmail.com, [2]najlaaaqilah309@gmail.com, [3]ochaaa13pisces@gmail.com,
[4]insyanasution@gmail.com, [5]dianasopha30@gmail.com
*Email Corresponding Author: mirdanstt@gmail.com

Abstract

This community service initiative was designed to enhance the technological capacity and digital awareness of residents in Empat Negeri Village, Batu Bara Regency. The community initially faced difficulties in utilizing digital media effectively for learning, communication, and local economic activities. The primary aim of this program was to develop essential digital competencies that would foster independence and long-term community resilience. Implementation involved interactive outreach, practical workshops, and guided digital exercises facilitated by one lecturer and four students from the University of Muslim Nusantara Al Washliyah, working collaboratively with village authorities. The activity involved around 50 participants, consisting of small business owners, youth, and local community figures. The evaluation process included preliminary and final assessments, observational notes, and reflection sessions to measure learning progress and engagement. The outcomes demonstrated a notable increase in digital skills, as participants displayed greater proficiency and confidence in operating computers, smartphones, and digital platforms. The overall digital literacy rate rose from 25% before training to approximately 75% afterward. Several participants were able to apply digital tools in promoting their businesses and accessing online learning opportunities. This initiative successfully strengthened rural communities' readiness for the digital era, while fostering educational equity and economic participation.

Keywords: community development; digital competence; digital inclusion; rural innovation; technology empowerment

1. INTRODUCTION

The rapid advancement of digital technology has transformed how communities access information, communicate, and engage in social and economic life. However, this transformation has not been experienced equally across regions. Many rural areas in Indonesia still face limited access and capacity in utilizing digital tools effectively, creating a widening gap in information and opportunity between urban and rural populations (Akbar & Wijaya, 2023). This situation shows that digital literacy is not merely a technical issue but a form of social capability that determines how individuals adapt, learn, and participate in the digital age.

Several recent studies have emphasized that digital literacy plays a crucial role in empowering rural societies. (Journal & Issn, 2024) revealed that digital training in rural Indonesian communities significantly improved access to public information and increased local productivity. Similarly, (Susanti et al., 2023) found that adolescents in rural areas who engaged in self-directed learning through digital platforms demonstrated better problem-solving and independent study skills. These findings suggest that the ability to understand, evaluate, and apply digital information contributes directly to individual and community development.

Nonetheless, challenges persist. (Idrus et al., 2025) noted that despite government efforts to improve infrastructure, digital transformation in rural areas often stagnates due to the lack of contextualized learning models and sustained mentoring. Many residents remain passive users of technology because training activities are frequently theoretical rather than practice-oriented (Hanifah, 2024). Furthermore, (Hufad et al., 2019) highlighted that women, who play central roles in family and community education, often lack sufficient access to digital capacity-building initiatives, reducing the overall impact of community empowerment.

Responding to these realities, this study introduces a participatory digital literacy empowerment program implemented in Empat Negeri Village, Batu Bara Regency. The initiative focuses on enhancing community competence through direct practice, mentoring, and collaborative learning. The originality of this activity lies in its *community-based participatory model*, emphasizing that learning occurs most effectively when local residents are directly involved in planning, implementing, and evaluating the process (Susilawati et al., 2025). (Setiawan, 2025) also confirmed that when digital training incorporates community participation, it strengthens both motivation and sustainability of digital adoption.

The practical need addressed in this program is the community's limited ability to utilize digital media for economic, educational, and administrative purposes. Many villagers, particularly micro-entrepreneurs and youth, expressed difficulty in promoting products, accessing online learning, and safeguarding personal data. Therefore, this engagement aimed to improve digital awareness and self-reliance through structured, inclusive, and contextually relevant training.

The participation of community members was not merely as training recipients but as active collaborators. Local leaders, youth representatives, and women's groups were involved in identifying priority topics, such as online marketing, safe internet practices, and digital communication skills. Their involvement fostered ownership and ensured that the outcomes responded to genuine community needs. As (Nurkholidah et al., 2019) observed, empowerment efforts are most sustainable when communities are positioned as co-creators rather than passive beneficiaries. This initiative contributes both practically and conceptually to the growing body of knowledge on rural digital empowerment. It seeks not only to enhance digital literacy but also to strengthen the social structure that supports sustainable technological adaptation in rural Indonesia.

2. METHOD OF IMPLEMENTATION

This community engagement program titled *Enhancing Digital Literacy for Rural Communities in Empat Negeri Village, Batu Bara Regency* employed a participatory and action-oriented approach that placed local residents at the center of every stage—from identification of needs to evaluation of results. Such a model was selected to ensure that the activities genuinely addressed the community's digital challenges while allowing participants to experience measurable learning progress. As emphasized by (Izhari et al., 2024), digital literacy initiatives in rural settings become more effective when practical workshops are combined with consistent mentoring, as this approach cultivates both technical proficiency and user confidence.

1. Approach and Program Framework

Before implementation, an initial needs analysis was conducted to map the major digital constraints faced by villagers. The key problems identified included limited familiarity with internet applications, lack of awareness about online safety, and underutilization of technology for education and small business management. To respond to these findings, three interconnected strategies were developed: (1) basic training sessions on computer and smartphone use, (2) applied learning on internet-based communication and information access, and (3) guided mentoring on digital entrepreneurship. Each component was structured to achieve the program's broader goals—enhancing practical digital competence and encouraging independent use of technology for daily and economic purposes.

2. Techniques of Data Collection

A combination of quantitative and qualitative methods was used to collect data comprehensively. Through purposive sampling, 50 individuals were chosen to represent a diverse cross-section of the village population—young adults, homemakers, local entrepreneurs, and administrative officers. Quantitative information was collected using pre- and post-program questionnaires to measure changes in knowledge and digital usage patterns, while qualitative insights were obtained from in-depth interviews and focus group discussions. To ensure instrument validity, the tools were reviewed by two experts in information technology and rural empowerment. Reliability

was tested through comparison of consistent responses between the pre- and post-assessments. This dual method enabled a more complete understanding of participants' cognitive and behavioral development.

3. Data Analysis

The gathered data were examined using a mixed-method analysis. Quantitative data were summarized descriptively to calculate the percentage increase in digital literacy indicators, including device operation, online engagement, and digital security awareness. The qualitative responses were analyzed through thematic interpretation to capture shifts in motivation, confidence, and practical skill application. The program's level of success was determined by comparing pre- and post-activity results. A performance gain exceeding 50 percent was considered a substantial indicator of progress. In addition, qualitative evidence—such as the emergence of small online-based enterprises and more independent technology use—served as confirmation of community empowerment.

4. Location, Period, and Duration

All activities were conducted in Empat Negeri Village, located in the Datuk Lima Puluh Subdistrict of Batu Bara Regency, North Sumatra. The engagement took place over eight weeks, from July to August 2025. Training sessions occurred twice weekly in the village community hall, with active participation from local leaders, youth volunteers, and facilitators from the University of Muslim Nusantara Al Washliyah. Throughout the process, consistent guidance and observation were provided to ensure that learning outcomes were achieved and that participants continued to practice digital literacy skills beyond the project period.

3. RESULTS AND DISCUSSION

Results

The community engagement program to enhance digital literacy in Empat Negeri Village was conducted over eight weeks from July to August 2025. A total of 50 participants took part, consisting of 20 youth, 15 housewives, 10 small business owners, and 5 local administrators. The results demonstrated measurable progress in participants' knowledge, skills, and attitudes toward digital technology.

Before the implementation, most residents were unfamiliar with basic digital functions such as document editing, e-mail communication, and online searches. Only **24%** of participants could operate smartphones for productivity tasks, and less than **10%** used the internet for business or educational purposes. After the training, **82%** of participants demonstrated the ability to perform basic computer and smartphone operations independently, while **70%** reported confidence in accessing and utilizing online resources for work, learning, and communication.

Table 1. Comparison of digital literacy indicators before and after implementation.

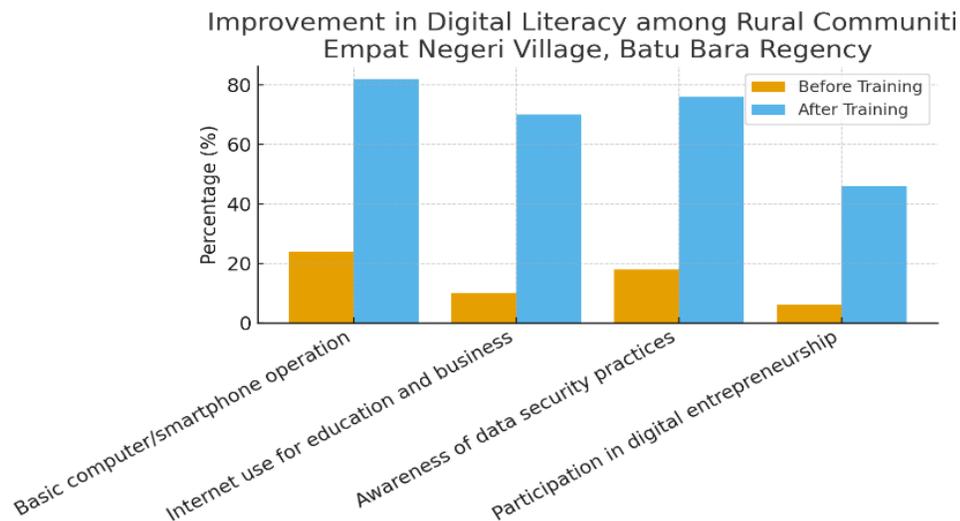| Indicator	Before Activity (%)	After Activity (%)
Basic computer/smartphone operation	24	82
Internet use for education and business	10	70
Awareness of data security practices	18	76
Participation in digital entrepreneurship	6	46

Figure 1 : Improvement in Digital Literacy among Rural Community

Qualitative feedback from participants indicated a strong sense of empowerment and independence. Many expressed enthusiasms for continuing to use digital tools to promote agricultural products and local crafts through social media. The village government also showed commitment to sustaining the initiative by integrating digital literacy sessions into their regular community education programs.

Discussion

The noticeable rise in participants' digital literacy illustrates how effective a community-centered and participatory learning approach can be. The growth in their digital competence indicates progress not only in understanding technology but also in changing attitudes and behaviors. This outcome suggests that training models designed to fit local realities are capable of reducing the digital disparity between urban and rural populations. Participants' improved confidence in using digital tools for communication, education, and small-scale business activities shows that the program's impact extended beyond technical skill development—it fostered motivation and adaptability aligned with community needs.

The results further highlight that practical, problem-based learning serves as a stronger foundation for digital empowerment than abstract or theory-driven instruction. Many participants acknowledged that interactive workshops, collaborative tasks, and guided mentoring sessions were the most engaging aspects of the program. These components allowed them to learn experientially, strengthen teamwork, and develop confidence through peer interaction and shared problem-solving.

A defining feature of the initiative was the active involvement of the community. From the earliest stages of preparation, residents contributed to identifying relevant learning priorities such as social media marketing, online business communication, and digital etiquette. This participatory process nurtured a sense of collective ownership and ensured that outcomes reflected real social and economic needs. The inclusion of local youth volunteers as peer trainers also proved instrumental, as it encouraged faster learning and promoted the exchange of digital knowledge across generations.

One of the most meaningful outcomes of the project was the emergence of innovation within the community. Several participants began experimenting with small online enterprises, selling local food products and handicrafts through social media platforms. These early entrepreneurial ventures demonstrate that the program not only raised digital capability but also stimulated small-scale economic creativity. Another achievement was the

creation of a village digital information board, managed collectively by participants—a symbol of the community's increasing digital awareness and autonomy in managing information.

From an evaluative standpoint, the project achieved a 58-point improvement in digital literacy indicators, rising from 24% before implementation to 82% afterward. This substantial progress reflects both measurable skill enhancement and deeper qualitative transformation. Participants expressed greater enthusiasm for exploring more advanced digital applications, indicating readiness for subsequent levels of digital training.

The community engagement initiative successfully met its primary goals—enhancing digital literacy, promoting inclusive social participation through technology, and fostering the early stages of digital entrepreneurship among rural residents. The participatory design and inclusive training atmosphere generated long-lasting learning outcomes and improved the community's capacity to adapt to digital transformation. The experience in Empat Negeri Village presents a replicable model for other rural areas seeking to narrow the digital divide through locally driven innovation and sustained community empowerment.

4. CONCLUSION

The execution of the digital literacy initiative in Empat Negeri Village, Batu Bara Regency has led to a remarkable advancement in the technological competence and awareness of local residents. The findings reveal that participants experienced a significant rise in digital literacy following a sequence of well-organized training and mentorship sessions. The most visible progress was found in their ability to operate computers and smartphones, utilize the internet for education and business, and recognize the importance of safeguarding data online. This transformation demonstrates a growing sense of confidence and autonomy among villagers in applying digital tools to both every day and economic activities. Beyond individual skill development, the program generated substantial social outcomes. Local micro-entrepreneurs began to integrate digital marketing strategies to promote their goods, while younger participants became more active in engaging with online learning resources. The synergy between trainers, community leaders, and residents cultivated a collaborative learning environment, reinforcing the community's capacity to adapt to ongoing digital change. The initiative's success extended beyond technical literacy—it strengthened digital consciousness, encouraged knowledge exchange across generations, and contributed to the community's overall economic resilience in an increasingly digitalized world. However, the implementation process was not without its challenges. Limited internet connectivity, unequal access to digital devices, and differing levels of prior experience initially constrained participants' progress. Some encountered difficulties comprehending advanced subjects such as cybersecurity and online financial transactions. These constraints underline the importance of continuous guidance, better digital infrastructure, and multi-stakeholder collaboration involving local authorities and private organizations to ensure lasting digital empowerment. Looking forward, it is advised that future community programs incorporate modules on advanced entrepreneurship, cybersecurity awareness, and the use of mobile-based business platforms. Creating a community-managed digital hub, led by local youth, could offer ongoing access to resources, mentorship, and troubleshooting support. Furthermore, partnerships with universities and internet providers would help promote long-term sustainability and inclusivity. From a theoretical standpoint, this initiative introduces a Community Digital Empowerment Model (CDEM)—a practical framework that combines participatory education, context-driven learning, and sustainable digital practices. The model, grounded in field data and participatory evaluation, presents a replicable approach for other rural areas seeking to expand digital literacy and reinforce community resilience. Ultimately, it emphasizes that genuine digital literacy development is not merely a process of adopting technology but a social transformation journey that strengthens human potential, innovation, and empowerment.

5. ACKNOWLEDGMENTS

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