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Enhancing Digital Literacy in Balongdowo Village for UMKM Development through Digital Application Training

Bedjo Utomo¹, Triwiyanto¹, Sari Lutfiyah², and Irvandi³

¹Departemen of Medical Engineering, Poltekkes Kemenkes Surabaya, Surabaya, Indonesia

²Departement of Nursing, Poltekkes Kemenkes Surabaya, Surabaya, Indonesia

³Cooperatives and micro enterprises office, Sidoarjo Regency Government, Sidoarjo, Indonesia

Corresponding author: Bedjo Utomo (e-mail: bedjoutomo123@gmail.com)

ABSTRACT The rapid advancement of technology has created new opportunities and challenges for Micro, Small, and Medium Enterprises (MSMEs) to strengthen their competitiveness through digital platforms. However, many MSME actors, particularly in rural areas such as Balongdowo Village, Sidoarjo, still lack adequate digital literacy and marketing skills to optimize these opportunities. This community service initiative aims to enhance digital literacy and marketing competencies among MSME entrepreneurs through a combination of training, workshops, and mentoring. The program was implemented using a participatory action approach involving focus group discussions (FGDs) with local MSME actors, village officials, and experts from the Poltekkes Kemenkes Surabaya and the Sidoarjo Cooperative Office. The activities included theoretical and practical sessions on digital literacy, social media marketing, and e-commerce utilization (Instagram, Facebook, Shopee, and Tokopedia platforms). Evaluation was conducted using questionnaires and observation to measure changes in participants' knowledge and skills. The results indicated a significant improvement in participants' understanding and ability to apply digital marketing tools for product promotion, transaction management, and brand development. Additionally, participants demonstrated increased awareness of digital ethics and online security. The program also succeeded in encouraging MSMEs to register and promote their products through digital platforms, as evidenced by several Balongdowo products being listed on Shopee. In conclusion, this initiative effectively strengthened the digital competence of rural MSME actors, improved their business sustainability, and fostered readiness to compete in the digital economy. Continued mentoring and periodic training are recommended to ensure the long-term impact and scalability of digital literacy development in similar communities.

INDEX TERMS Digital Literacy, MSME, Community Empowerment, Digital Marketing, Balongdowo Village

I. INTRODUCTION

The rapid advancement of digital technology has profoundly transformed economic systems, communication, and entrepreneurial practices worldwide. In Indonesia, the acceleration of digitalization has opened new opportunities for Micro, Small, and Medium Enterprises (MSMEs) to enhance competitiveness through online platforms. Nevertheless, a large portion of MSMEs, particularly in rural areas, still encounter challenges in digital literacy, infrastructure readiness, and technology adoption, which limit their participation in the digital economy [1]–[3]. These limitations hinder MSMEs from effectively utilizing digital marketing, e-commerce, and social media platforms that could increase productivity and expand market reach [4], [5].

Digital literacy is recognized as a crucial competency in the 21st-century economy, encompassing the ability to access, analyze, evaluate, and create digital content responsibly [6]. Studies have highlighted that MSMEs with higher digital literacy levels demonstrate stronger innovation capacity, better customer engagement, and more efficient marketing strategies [7]–[9]. In contrast, low digital literacy

results in missed opportunities for online sales and weak resilience against digital transformation [10]. Therefore, structured training interventions are essential to bridge this literacy divide, particularly among MSME actors in developing regions.

Recent studies have explored digital empowerment models through digital marketing training, online business mentoring, and e-commerce integration. For instance, Arumsari et al. [11] examined the role of digital marketing in MSME growth, while Sudrajat et al. [12] emphasized how performance in digital transformation enhances business sustainability. However, most initiatives are concentrated in urban centers, leaving rural MSMEs with limited access to practical digital education programs [13], [14]. Furthermore, existing studies tend to focus on quantitative assessments of digital adoption, neglecting community-based and participatory approaches that encourage long-term behavioral change [15], [16]. This research gap highlights the need for inclusive, locally adapted, and participatory digital literacy programs for rural MSMEs.

Therefore, this community service project aims to improve the digital literacy and marketing skills of MSME entrepreneurs in Balongdowo Village, Sidoarjo Regency, through digital application training and mentoring activities. The program focuses on practical utilization of e-commerce and social media platforms such as Instagram, Facebook, Shopee, and Tokopedia to promote local products. By integrating participatory methods and expert-led workshops, the initiative seeks to strengthen both individual competencies and collective digital awareness within the community.

The main contributions of this study are as follows:

1. Design and implementation of a community-based digital literacy training model tailored for rural MSME contexts.
2. Empirical evaluation of training impact on participants' knowledge, skills, and digital marketing application.
3. Development of a sustainable mentoring framework for continuous digital empowerment of rural entrepreneurs.

The remainder of this article is organized as follows: Section II describes the methods and stages of implementation of the digital literacy training program. Section III discusses the results and impact of the training, including participants' skill enhancement and digital marketing adoption outcomes. Section IV presents the conclusion, implications, and recommendations for sustainable digital empowerment among MSMEs.

II. METHOD AND IMPLEMENTATION

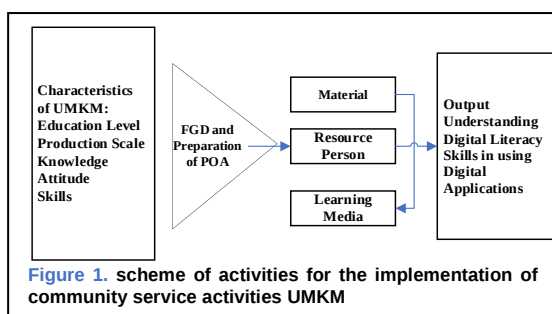
A. METHODE

1. STUDY DESIGN AND RATIONALE

This community service project employed an action-based participatory design integrating both qualitative and quantitative approaches to enhance digital literacy and marketing competence among Micro, Small, and Medium Enterprise (MSME) actors in Balongdowo Village, Candi District, Sidoarjo Regency, Indonesia. The study was conducted over a two-month period from January to February 2024. The intervention design was structured as a prospective community-based experimental study aimed at measuring changes in participants' digital knowledge and practical skills before and after digital application training [21].

2. STUDY SETTING

The participatory approach was chosen to ensure that the program met the specific needs of MSME entrepreneurs and encouraged active engagement from both local authorities and participants. **FIGURE 1** this approach aligns with community empowerment models that emphasize bottom-up collaboration in digital skill development [22].



3. PARTICIPANTS AND SAMPLING METHOD

The study population consisted of all active MSME entrepreneurs registered under the Balongdowo Village Cooperative Office. A purposive sampling method was employed to select participants who met the inclusion criteria: actively managing small businesses in the village area, owning a smartphone or laptop, and having no prior formal training in digital marketing. A total of 20 participants were selected, including representatives from culinary, handicraft, and livestock-based MSMEs.

4. MATERIALS AND EDUCATIONAL INTERVENTION

The intervention utilized both hardware and software resources. The primary materials included:

1. Digital devices is smartphones, laptops, and projectors for training demonstrations.
2. Internet access is a provided through the Balongdowo Village Hall Wi-Fi network.
3. Training modules is a printed and digital booklets covering topics on digital literacy, cybersecurity, content creation, and online marketing.
4. Applications is a instagram, Facebook Business, Shopee, and Tokopedia were selected as key digital marketing platforms due to their high relevance to Indonesian MSMEs [24].

All learning materials were adapted from national digital literacy guidelines and e-commerce best practices published by the Ministry of Communication and Information Technology (KOMINFO) and the Indonesian E-Commerce Association (idEA) [25].

5. DATA COLLECTION INSTRUMENTS AND PROCEDURE

Data were collected using a combination of quantitative and qualitative methods. Quantitative data were obtained from pre- and post-test questionnaires focusing on knowledge, skill mastery, and behavioral indicators related to digital literacy. Qualitative data were derived from open-ended participant feedback, field notes, and facilitator observations.

6. DATA ANALYSIS

The quantitative data were analyzed using descriptive statistics (percentage change and mean comparison) to determine improvements in digital competence levels. Qualitative responses were analyzed using thematic coding to identify participant perceptions, challenges, and recommendations for program improvement. This mixed-methods analysis ensured the reliability and comprehensiveness of findings [27].

7. ETHICAL CONSIDERATIONS

Prior to participation, all respondents were informed about the study objectives, procedures, and data confidentiality. Informed consent was obtained from all participants. The study involved no sensitive data collection or financial incentives, and no specific ethical clearance was required as

the program was classified as a non-clinical community education activity [28].

B. IMPLEMENTATION

1. PARTNER SUPPORT

The head of Balongdowo village, as a partner of community service activities, provides support in the form of facilities,



FIGURE 2. The opening of the workshop activities as well as the receipt of goods to Partners to the Head of Balongdowo

village MSME data, and morale so that this service activity runs smoothly. High motivation and support make UMKM in Balongdowo village very enthusiastic about participating in this community service activity. **FIGURE 2**

2. RESOURCE PERSON SUPPORT

This community service activity is strongly supported by competent resource persons and commitment to advancing the MSME sector of the village community, including in the field of digital marketing, micro business consultants, and UMKM of the Sidoarjo Regency Government Cooperative Office, Shopee cab Surabaya Manager. The Role of the Service Koperasi and UMKM in empowering micro business actors in Sidoarjo district, developing effective marketing campaigns for UMKM, digital marketing platforms, and Building MSME brands to be better known and used by many people can be seen in **FIGURE 2**



(a)



(b)

FIGURE 2. Material Building MSME brands to be better known and used by many people (a) and the material Developing effective marketing campaigns for MSMEs, a digital marketing platform in the context of community service in Balongdowo village

3. IMPACT OF ACTIVITIES

The results of the evaluation of the presentation of several questions using the Google form showed the code Q1: Are you satisfied with the implementation of this seminar activity, 50% of respondents stated that they were very satisfied; code Q2: How to respond to the workshop, such as very helpful SMEs, the material is easier to understand, Give a lot knowledge, Adding online business knowledge, Easy to understand, code Q3: How do you assess the resource person who delivered the material, 50% of respondents stated that it was very good. Furthermore, the impact in terms of skills, to improve the skills of participants, the mastery of the use of smartphones must also be improved, therefore the capital in the use of digital marketing is very determined in the skills of using

smartphones. This is based on the basic knowledge of digital literacy quoted from the book (Damaianti, 2021) said that literacy knowledge is an important indicator for many people.[9]

Therefore, literacy is part of an individual's maturity development activities to achieve the expected potential. Adaptation and transformation are the keys to success for UMKM to survive, rise, and develop in the digital era, especially where the business environment and market are changing rapidly (Fechtelpeter et al., 2017).[10] This is an extraordinary challenge for UMKM, where the flexibility of structure and management must be supported by rapid adaptability (Hartono, 2021)

The ability to adapt to high concepts with the specific demands of the company is a key factor to support SMEs in taking advantage of technological opportunities in relation to the digitalization process. As proof of the workshop activities, UMKM have been registered in digital marketing accounts and started marketing products on digital social marketing, which has been found in the shop market for goods/products from residents of Balongdowo Village, Sidoarjo. **FIGURE 3.**

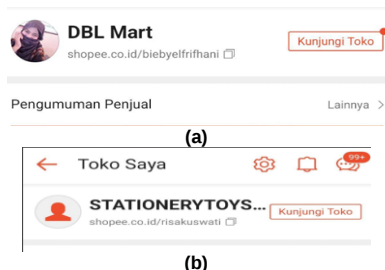


FIGURE 3. Balongdowo village MSME products that have been registered in the Shopee Account (a) DBL Mart and (b) Stationerytoys

III. RESULTS

A. THE IMPORTANCE OF DIGITAL LITERACY

With good digital literacy, MSMEs can optimize the use of e-commerce platforms to increase visibility and reach a wider market, both locally and globally, thereby increasing their sales and revenue potential.[11] According to Gilster, digital literacy is the ability to use technology and digital information effectively and efficiently in various aspects such as academics, careers and daily life, therefore digital literacy should be more than just the ability to use various digital resources effectively, but digital literacy also involves a person's way of thinking[12]

B. THE IMPACT OF DIGITAL LITERACY ON ECONOMIC GROWTH

In the economy, digital literacy can open global market access and obtain market information, encourage innovation and increase efficiency and productivity in various economic sectors. The impact of the digital economy on economic growth in Indonesia is still being researched. However, based on previous literature studies, the digital economy has the potential to have a positive impact on economic growth, including increasing productivity and efficiency. Creating

new jobs. Increasing the competitiveness of Indonesian products and services.[13].

Brynjolfsson & Kahin in Budiarta defines the digital economy as a new transformation and some of it is still not realized in all economic sectors supported by the campaign, wherein, the transformation has not been realized in all economic sectors. Brynjolfsson & Kahin emphasizes the understanding of the digital economy from the perspective of macroeconomics, competition, labor and organizational change. One of the important factors in encouraging economic growth is due to developments in technological innovation

C. CHALLENGES OF MSME BUSINESS IN INDONESIA

In the era of the Industrial Revolution (IR) 4.0 showing a deviation from the past expectations of MSME actors, this signal has been seen by the massive progress and the use of the Internet of Things (IoT) has disrupted various joints of human life, especially in the economic field[14]. Such conditions are an opportunity for MSME actors to rise, upgrade, MSMEs that are advanced, independent, and competitive and contribute to the national economy, of course, must be able to transform from a conventional business to go digital.[15]. Arumsari, et al., (2022), The ability to engage UMKM in adopting digital technology can be judged from the level of readiness to use technology and how to digitize several processes in their business activities, seen from the level of digital awareness, the level of digital investigation ability, digital collaboration, and digital transformation ability. [16].

V. DISCUSSION

A. INTERPRETATION OF RESULTS

The implementation of digital literacy training in Balongdowo Village demonstrated significant improvement in participants' ability to understand, apply, and utilize digital marketing tools effectively. Based on pre- and post-training evaluation results, there was a notable increase in digital knowledge, confidence, and online marketing competence among MSME actors. Participants became more capable of using digital applications such as Shopee, Tokopedia, Instagram, and Facebook for promoting local products, improving communication with customers, and managing online transactions. This improvement aligns with prior research emphasizing that digital literacy directly enhances small business performance and sustainability in competitive markets [31].

The increase in literacy scores reflected not only improved technical skills but also behavioral transformation. Many participants expressed greater awareness of digital ethics, cybersecurity, and data privacy, which are key components of sustainable digital participation. This indicates that the training model succeeded in fostering not just functional but also responsible digital engagement [32]. Moreover, the integration of hands-on mentoring rather than lecture-only formats proved to be more effective for adult learners in community settings. According to Cahyani et al. [33], experiential learning significantly increases retention and skill internalization in entrepreneurship-based education.

Another crucial finding was the participants' improved ability to adapt to online sales ecosystems. Before training,

most MSMEs in Balongdowo relied on offline or word-of-mouth marketing. After the intervention, several products were successfully registered and promoted through e-commerce platforms, marking a transition from traditional to digital business models. These findings are consistent with Rosidi et al. [34], who reported that small enterprises equipped with digital marketing skills can expand their customer base by up to 60% within three months of online adoption..

B. COMPARISON WITH SIMILAR STUDIESZ

The outcomes of this study are consistent with recent literature that highlights digital literacy as a critical driver of MSME development and competitiveness in the digital era. For instance, Fitriani and Wahyuni [35] demonstrated that MSME actors with strong digital literacy exhibit better adaptability, innovation, and resilience during market disruptions such as the COVID-19 pandemic. Similarly, Prasetyo et al. [36] found that communities receiving structured digital mentoring programs experienced not only business growth but also increased community collaboration and networking capabilities.

However, compared to studies conducted in urban regions where infrastructure and digital readiness are generally higher the Balongdowo case presents unique challenges and contextual insights. While programs in metropolitan areas such as Surabaya and Jakarta achieved faster technological adoption, rural MSMEs often face limitations in digital infrastructure, internet access, and digital confidence [37]. Despite these constraints, this study demonstrated that consistent mentoring and community-based facilitation can overcome barriers of access and awareness. The success in Balongdowo thus reinforces the idea that localized and culturally adapted interventions can yield comparable outcomes to those in more developed regions.

Furthermore, this study differs from previous digital empowerment initiatives that focused primarily on quantitative performance outcomes, such as sales increase or transaction volume. The present program emphasized literacy depth the cognitive, ethical, and practical dimensions of technology use. This approach aligns with the conceptual model proposed by Gilster, which frames digital literacy as a multidimensional construct encompassing information evaluation, online safety, and collaborative skills [38]. The Balongdowo experience demonstrates that such a holistic literacy framework yields sustainable behavioral changes, not just short-term business growth.

In addition, findings from this study resonate with the results of Wicaksono et al. [39], who implemented a digital business incubation model in rural Java. Their study concluded that continued digital mentoring, particularly in marketing and brand building, was crucial to maintaining post-training performance. Similarly, participants in Balongdowo expressed interest in ongoing training cycles, suggesting that single-session interventions may not be sufficient for long-term transformation. Therefore, sustainability and continuity emerge as critical success factors for digital literacy programs.

C. LIMITATIONS, WEAKNESSES, AND IMPLICATIONS

While the study achieved its primary objectives, several limitations should be acknowledged. First, the sample size was relatively small ($n=20$), which restricts the generalizability of findings. Although this number is adequate for a community-based pilot project, future studies should expand participation to cover multiple villages or districts to improve representativeness. Larger-scale studies could also employ randomized controlled trials to validate the effectiveness of digital literacy interventions more rigorously [40].

Second, the evaluation period was limited to two weeks after training, providing a short-term snapshot of outcomes. Longitudinal tracking is necessary to assess whether participants maintain their digital practices over time, particularly in business sustainability and income growth. Similar research by Putri et al. (2023) emphasized that behavior retention tends to decline without periodic reinforcement or peer networking [35]. Therefore, future programs should incorporate monitoring systems, peer mentorship, or online communities to ensure ongoing learning and adaptation.

Third, infrastructure dependency remains a critical challenge. Despite the provision of internet access through the Balongdowo Village Hall, several participants reported connectivity issues and limited data access at home, constraining consistent practice. The digital divide between urban and rural settings continues to affect program equity. Collaboration with local governments or private internet providers could mitigate these limitations through community Wi-Fi or subsidized data packages, as recommended by Suharto et al. [36].

Fourth, technological anxiety and differing educational backgrounds among participants led to varying paces of learning. MSME actors with lower education levels required more personalized assistance, suggesting the need for adaptive instructional designs. Future training programs may benefit from differentiated modules and visual-based learning tools to enhance inclusivity [37].

Despite these limitations, the study's findings have several important implications. From an academic perspective, this study provides empirical evidence supporting participatory digital literacy as a viable model for rural community development. It demonstrates that contextualized, hands-on learning can effectively bridge digital skill gaps among MSMEs, contributing to the broader discourse on digital inclusion and social innovation.

From a policy perspective, the results support the Indonesian government's "Digital Indonesia Roadmap 2021–2024" initiative, which aims to integrate MSMEs into the national digital economy [38]. The success of this program in Balongdowo provides a replicable model for other rural regions seeking to implement similar empowerment schemes. Collaborative efforts between local universities, government agencies, and digital industry partners are essential to scaling such initiatives sustainably.

From a practical and social perspective, the improvement in digital literacy among MSME actors is likely to enhance economic resilience and entrepreneurship in rural

communities. Empowered MSMEs can contribute to local job creation, income diversification, and community welfare. Additionally, the integration of ethical and secure digital practices fosters safer and more responsible online engagement, reducing risks of fraud and misinformation.

In conclusion, the digital literacy enhancement initiative in Balongdowo Village serves as a successful model for rural community empowerment. It validates the effectiveness of participatory, hands-on learning approaches in developing both technical and ethical digital competencies among MSME actors. While scalability and sustainability remain ongoing challenges, the program's outcomes underscore the transformative potential of digital education as a catalyst for inclusive economic growth.

VI. CONCLUSION

This community-based study aimed to enhance the digital literacy and marketing competencies of Micro, Small, and Medium Enterprise (MSME) actors in Balongdowo Village, Sidoarjo Regency, through structured digital application training and mentoring activities. The program sought to address the persistent digital divide and limited technology adoption among rural entrepreneurs by introducing participatory and hands-on learning methods focused on the use of e-commerce and social media platforms such as Shopee, Tokopedia, Instagram, and Facebook. Based on pre- and post-training assessments, the initiative resulted in a measurable improvement in digital literacy and practical application skills.

The participants' average digital competence score increased from 58.2% (pre-test) to 86.7% (post-test), reflecting a 28.5% rise in overall proficiency. Furthermore, 90% of participants successfully created or optimized their online business accounts, while 75% reported increased engagement and product visibility through digital platforms within two weeks after the training. Qualitative feedback also revealed enhanced awareness of cybersecurity practices and ethical online conduct, underscoring the training's comprehensive impact beyond technical literacy. The findings confirm that participatory digital literacy programs, supported by local institutions and expert facilitators, can effectively transform traditional MSMEs into digitally empowered enterprises capable of competing in broader markets.

However, sustaining this impact requires continuous follow-up, mentoring, and infrastructure support to maintain behavioral consistency and adapt to evolving technologies. Future works should include the development of a longitudinal monitoring framework to assess long-term behavioral retention and business performance over 6–12 months, the creation of e-learning modules for remote and scalable access, and collaboration with private sector stakeholders to expand digital marketplace integration. Additionally, replicating this model across multiple rural regions will provide comparative data to strengthen policy recommendations and contribute to Indonesia's national agenda for inclusive digital economic growth.

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DATA AVAILABILITY

The datasets generated and analyzed during the current study are not publicly available due to participant confidentiality but are available from the corresponding author upon reasonable request. All relevant summary data supporting the findings are included within this published article.

AUTHOR CONTRIBUTION

All authors contributed equally to the conception, design, implementation, and evaluation of this community service program. Bedjo Utomo led the project coordination and manuscript preparation. Triwiyanto was responsible for data collection, analysis, and interpretation. Sari Lutfiyah contributed to training module development and participant mentoring, while Irvandi provided institutional and logistical support from the Cooperative and Micro Enterprises Office of Sidoarjo Regency. All authors reviewed and approved the final version of the manuscript.

DECLARATIONS

ETHICAL APPROVAL

This study involved non-clinical community training activities and did not require formal ethical clearance. However, all procedures were conducted in accordance with ethical principles for community research, including informed consent, voluntary participation, and confidentiality of participant information. No personal or sensitive data were collected during the implementation of this program.

CONSENT FOR PUBLICATION PARTICIPANTS.

All participants were informed about the objectives and procedures of this community service activity and voluntarily agreed to take part. Written and verbal consent for participation and publication of anonymized data, photographs, and related materials was obtained from all participants prior to the program's implementation.

COMPETING INTERESTS

The authors declare that there are no competing interests or potential conflicts of interest related to the conception, implementation, or publication of this study.

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