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## Analysis and Potential of Mlese Village in Realising Digital Literacy through the Smart Village Application in the Context of Implementing Educational Innovation

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### ABSTRACT

**Background:** This community service program addresses rising socio-political issues in Klaten Regency, characterised by increasing violence and anarchic behaviour. The focus is on Village Officials and the Youth Association of Mlese Village, as non-productive groups and pioneer agents of social change. The purpose is to strengthen the community's capacity to manage socio-cultural conflicts and promote social harmony.

**Purpose of the Study:** The program aims to enhance digital literacy skills to help the target community filter information and manage socio-cultural conflicts, thereby fostering social harmony.

**Methods:** The CIPP evaluation model (Context, Input, Process, Product) was employed, supported by the integration of the Smart Village Application (ASV) as an innovative digital platform aligned with Pancasila values. Activities included digital training workshops, mentoring, and collaborative village-based digital utilisation practices.

**Results:** Participants show an 80% increase in digital literacy, indicating a significant improvement in their ability to respond to online socio-cultural challenges. This initiative successfully reinforces sustainable community empowerment through technology and positions Mlese Village as a model for smart village development in Klaten Regency.

### Keywords

Digital Literacy; Smart Village Application; Education Innovation

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## Introduction

Educational innovation is closely linked to digital literacy, as the latter can represent a form of innovation within the learning landscape. Digital literacy involves an individual's understanding and management of information through digital technologies. (Akayoğlu et al., 2020). Effective digital literacy can enhance learning quality and better prepare students for the digital era. (Fajri & Irwan Padli Nasution, 2023). The educational advantages of digital literacy include the ability to identify and leverage digital learning resources; the skills to plan, document, and collaborate in educational settings; the enhancement of creativity and problem-solving skills; access to online educational resources and e-learning; improved capabilities in using digital devices and applications; and the ability to participate effectively in digital environments. (Fitrah Arya Ramadhan et al., 2024).

Digital literacy can yield both beneficial and detrimental outcomes. The beneficial outcomes encompass enhancements in cognitive abilities, greater access to information, and more efficient work processes. Conversely, the detrimental outcomes involve internet addiction, cyberbullying, and exposure to harmful content. Technology is one of the numerous facets of advancement in today's digital age.

By January 2023, Indonesia's internet user base had grown to 213 million, representing 77% of the total population of 276.4 million at the onset of the year. (Kateryna et al., 2020). Even in previous years, online learning became one of the learning methods due to the pandemic. In earlier years, the shift to online learning became a significant educational approach due to the pandemic, leading to notable changes in children's learning. A study on digital literacy in Indonesia indicates that the population's level of digital literacy is moderate. The 2022 digital literacy study reported a digital literacy index of 3.54, which is an increase of 0.05 from the previous year. While the pillars of digital skills, digital ethics, and digital safety showed improvement compared to the prior year, the pillar of digital culture saw a decline in its performance. (Jacob et al., 2023).

To navigate the swift and widespread advances in technology, digital literacy has become a vital skill that everyone, particularly students, must possess. However, many people find it difficult to distinguish between truth and falsehood, which can lead to adverse consequences. (Munawar et al., 2022). This issue arises from a general deficiency in digital literacy among the population. Conversely, individuals who possess strong digital literacy skills are less likely to be influenced by negative factors and are instead guided towards positive outcomes. These individuals will derive numerous inspirations and insights from their digital literacy.

Since 2022, Mlese Village has been identified as the target community and a partner village of the Community Service and Research Institute (LPPM) at Slamet Riyadi University, Surakarta, showcasing untapped potential for collaboration with various community empowerment programs that are integral to the university's Tri Darma initiatives. The Smart Village concept fuses information technology with village community activities.

When considering village development, several key elements should be noted. (Ni Made Wahyuni et al., 2024), such as: (1) Mapping Village Potential. The initial phase of village development involves mapping the potential of the village; (2) establishing a Village Development Plan; (3) Strengthening Human Resources; (4) Infrastructure Development; (5) expanding the Village's Economic Potential. This community service endeavour plays a significant role in shaping the Smart Village concept, a community empowerment initiative in the digital era committed to the principles of Pancasila.

In light of the aforementioned analysis, the problem may be expressed as follows:

1. What forms of social engineering, educational innovation models, and technologies would support smart villages in Mlese Village?

## 2. Could training in the utilisation of the Smart Village Application enhance the quality of human resources in implementing smart villages and educational innovation in Mlese Village?

The outcomes of this community service are anticipated to be utilised to address national-level challenges in social engineering, educational innovation, and digital literacy through the Smart Village application. (Trisiana, 2019). Furthermore, it seeks to offer national-level recommendations for effectively empowering communities in the development of smart villages. This community service initiative encourages communities to engage actively as responsible citizens, individuals who are informed, willing, and capable of meeting their rights and obligations, thus becoming adept at tackling national and state issues. (Trisiana, 2020). The results of this community service initiative are expected to be used in resolve national-scale challenges related to Social Engineering and Digital Literacy Models, particularly in the pursuit of smart villages through the Smart Village application.

## Method

The CIPP approach, representing Context, Input, Process, and Product, serves as the framework for evaluating Community Service Activities. In the context phase, evaluators examine existing needs, obstacles, strengths, and opportunities. This stage assists decision-makers in refining objectives and setting priorities, while also helping participants reflect on and assess their intended goals and desired results. (Pratiwi & Pendidikan Teknologi dan Kejuruan, 2019). The input stage focuses on reviewing various strategies, creating action plans, determining staffing needs, and considering financial aspects to measure the practicality and effectiveness of potential resources. This evaluation supports planning by helping to select the best strategies, prepare funding proposals, allocate budgets, assign tasks, arrange schedules, and guide others in managing resources effectively.

The process stage examines how plans are implemented, ensuring activities are carried out as intended. This helps staff monitor progress, adjust where necessary, and understand the broader implications of implementation. It also allows for identifying both anticipated and unanticipated effects, whether immediate or long-term. Through this, teams can remain aligned with essential outcomes while also providing a foundation for others to achieve the set objectives efficiently. By integrating these stages, the CIPP model ensures that each part of the activity is evaluated systematically from planning through execution to measuring results.

CIPP is a framework for evaluating social systems. A social system consists of a series of interrelated activities that operate collectively to accomplish a mission and meet objectives within a particular context.

The CIPP retrospective method seeks to comprehend the advantages, quality, likelihood of success, and relevance of a program. Contrasting objectives and priorities helps achieve this by evaluating existing needs, challenges, resources, and opportunities. Additionally, program strategies, design, and financial considerations are compared with those of relevant competitors to ensure the benefits align with the identified needs.

Subsequently, it offers an extensive overview of the actual processes and funding, in well as a comparison of the original design with its execution and financing. The outcomes and unintended consequences on the targeted requirements are also examined to develop a more competitive program. Furthermore, all these results are interpreted in the context of the program's inputs and processes.

Table 1 shows the implementation of the Student Creativity Programme through the following stages:

Table 1. Implementation Stages and Partner Participations

No	Implementation Stages	Partner Participations
1	Socialisation and Training Stage Focused Group Discussion (FGD) with Village Officials	Becoming a peer tutor in training activities (Reinforcing the concept of Smart Village)
2.	Technology Implementation Stage Installing Signs and Information Sources for Digital Literacy, both Physical and Non-Physical	Integrating technological advances through the creation of training videos that can be accessed via social media ( <i>Digital literacy in the concept of Smart Village</i> )
3.	Mentoring and Evaluation Stage Creating a Training Guidebook	Usage of the <i>Smart Village</i> Application
4.	Sustainability Stage Establishing a reading corner in the village	Digital literacy in the concept of Smart Village
5	Publishing in the Mass Media and Accredited National Journals	Downstreaming the results of partner activities to reduce social conflict and enhance community literacy

The Community Service Team conducted training sessions for members of the Youth Organisation and the Family Welfare Movement (PKK) in Mlese Village, Klaten. This village has been designated as a partner area planned for development into a smart village and a model community that exemplifies Pancasila values, integrated with sustainable cultural growth in Klaten Regency. These efforts also promote educational innovation to improve community literacy. In this context, the creation of a laboratory within the institution is necessary, as it serves as a key facility for learning, research, and academic activities. Such resources are fundamental to advancing scientific knowledge in specialised fields of study.

The Pancasila Laboratory, situated in the Pancasila and Citizenship Education Study Programme at the Faculty of Teacher Training and Education, Slamet Riyadi University, plays an essential role in enhancing citizenship education. Since its creation, the laboratory has engaged in activities across three fundamental areas: research, teaching, and community service. These efforts align with and illustrate the primary obligations of higher education institutions, collectively known as the Tri Dharma of Higher Education.

The Smart Village Application service, through its community empowerment initiatives, aims to elevate community literacy and reduce social conflicts by advancing various forms of digital literacy, supported by the Pancasila Laboratory.

## Result

### *Analysis and Potential of Villages (PODES) in Ceper Subdistrict, Klaten*

In reference to the Village Potential Data (Podes) from the Klaten Regency BPS in 2021, Ceper Subdistrict comprises 12 kindergartens (TK), 12 Raudatul Athfal (RA), 34 elementary schools (SD), 9 Madrasah Ibtidaiyah (MI), 3 Junior High Schools (SMP), 4 Islamic Junior High Schools (MTs), 1 Senior High School (SMA), 4 Vocational High Schools (SMK), and 1 Higher Education Institution. Furthermore, Ceper Sub-district contains 3 clinics/health centres, 2 Community Health Centres without inpatient services, and 5 pharmacies. (Jacob et al., 2023).

In 2021, borewells and pumps were the main sources of drinking water for most households in Ceper Subdistrict. A total of 11 villages utilised borewells or pumps, while 4 villages

accessed tap water, and 3 villages depended on wells for their drinking water supply.

In the Ceper Subdistrict, all 23,892 households depend on electricity as their main source of illumination. Notably, 18 villages have fully adopted electricity for lighting, indicating substantial improvements in family amenities throughout the region. In terms of religious establishments, Ceper Subdistrict comprises 143 mosques, 136 mushollas, 5 Protestant churches, 2 Catholic churches, and 3 temples/viharas.

In 2021, there were 15 mobile phone towers in Ceper Subdistrict. Ceper Village has the highest concentration of mobile phone towers, with 3 in total. Klepu and Pokak Villages are close by, each with 2 towers. Furthermore, 6 villages lack mobile phone towers: Pasungan, Jambukidul, Mlese, Kurung, Jambukulon, and Meger.

In Ceper Subdistrict, there is one active post office located in Ceper Village. Currently, eight private courier service agents operate in Ceper Sub-district, serving eight villages: Pokak, Mlese, Jombor, Cetan, Ceper, Jambukulon, Klepu, and Kuncen. Generally speaking, the wireless telecommunications network in Ceper Sub-district has been progressing steadily. This is apparent from the 4G/LTE signal coverage that has now extended to 18 villages.

### ***Digital Literacy Through the Smart Village Application***

The Smart Village application is a web-based information system designed to support villages and sub-districts in managing data and public services effectively, with a specific emphasis on administrative management and social development. The primary goal of the Smart Village programme is to improve the quality of life in communities by leveraging advancements in technology. This initiative includes comprehensive village development, community empowerment through microdata analysis, and the provision of digital services tailored to the community's needs and relevant stakeholders. (Hasan et al., 2024).

The Smart Village initiative serves as a pivotal centre and an all-encompassing repository of information, granting the community access to a wealth of knowledge crucial for development. It represents a framework that incorporates information technology into diverse village operations to promote advancement. (Azimi et al., 2023). Essential factors in village development consist of: (1) assessing village potential as the initial phase; (2) creating a strategic Village Development Plan; (3) improving human resource capabilities; (4) progressing infrastructure development; and (5) nurturing the economic potential of the village.

The Smart Village application facilitates improvements in community literacy and fosters the growth of a digital society. This platform enhances digital literacy among community members while simultaneously bolstering the local economy by showcasing Micro, Small, and Medium Enterprises (MSMEs) and highlighting tourist attractions. Additionally, the application strengthens local culture through its Reading Corner feature, which offers cultural articles and relevant information, thereby aiding in the preservation of the village's traditions and identity.

### ***Implementation of Educational Innovation Through Smart Village Application Services (ASV)***

The execution of the Smart Village Application (ASV) signifies a tangible initiative to utilise technology and innovation to improve the quality of public services in Mlese Village. By employing a structured, cooperative methodology, ASV is expected to facilitate significant, beneficial changes, thereby establishing Mlese Village as a more intelligent, efficient, and innovative community.

The implementation of the Smart Village Application (ASV) involves multiple essential phases that demonstrate how technological advancements are provided to the community.

Presented below is a summary of the primary elements necessary for creating a prototype of the ASV:

1. Software: Includes Windows as the operating system, Android or iOS for mobile devices, and Firefox or Google Chrome as the web browsers.
2. Hardware: Comprises computers, smartphones, and interface devices such as a mouse, monitor, and keyboard.
3. Application Users: Must possess an understanding of computer interfaces as well as knowledge of village management and service processes.

The following is the menu display on the Smart Village Application (ASV) as shown in the image below:

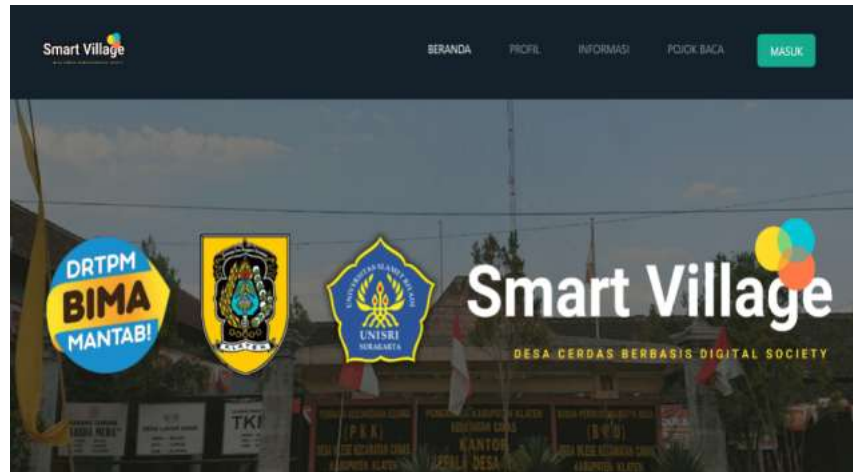


Figure 1. Smart Village Home Page Menu

Mlese Village's Community Service Program focuses on establishing a digital society through the creation of technological products and innovations, divided into two categories: the HARD program and the SOFT program.

The presence of a digital platform for service complaints helps to minimise the potential for social conflict by providing transparent communication channels, which in turn fosters greater public trust in the village government. Overall, this programme has contributed positively to the digital transformation and sustainable development of Mlese Village.



Figure 2. Implementation of Smart Village Application Services (ASV)

The Community Service Program in Mlese Village is an initiative designed to create a digital society (Digital Society) through a five-stage implementation process that actively involves partners, including village officials, youth organisations, and the general public. The stages consist of socialisation, training, technology implementation, mentoring and evaluation, and program sustainability (Agusta, 2023). Each stage is structured to guarantee active community engagement

and the application of technology in enhancing village development, as specified below:

*Table 2.* Implementation Stages and Partner Participation

No	Implementation Stages	Partner Participation
1	Socialization Stage Focused Group Discussion (FGD) with Village Officials	Becoming a peer tutor in training activities (Reinforcing the concept of Smart Village)
2.	Training Stage Character Building Training for the Community	Supporting the synergy between the youth organisation (Karang Taruna) and the community in supporting the Pancasila Pioneer Village (Digital Literacy in the concept of Digital Society and Smart Village)
3.	Technology Implementation Stage Installing Signs and Information Sources for Digital Literacy, both Physical and Non-Physical	Integrating technological advances through the creation of training videos that can be accessed via social media (Digital literacy in the concept of Smart Village)
4.	Mentoring and Evaluation Stage Creating a Training Manual to be used as a Character Building Training Module	Usage of the Smart Village Application
5.	Sustainability Stage Copyright for Training Manual Products	Digital literacy in the concept of Smart Village
6	Publishing in the Mass Media and Accredited National Journals	Downstreaming the results of partner activities to reduce social conflict and enhance community literacy

The data indicate that the different stages of community service reveal that the community in Mlese Village was actively involved in all phases of the activity. In the socialisation stage, the Focus Group Discussion (FGD) engaged village officials who acted as peer tutors in the Character Building Training, focusing on enhancing the concepts of Digital Society and Smart Village. This stage was effective in cultivating initial awareness and commitment among village officials towards the programme, establishing a strong foundation for future implementation. (Voulvoulis et al., 2022).

During the training phase, the community participated in Character Building Training, with partners facilitating synergy between Karang Taruna (The youth organisation) and the community in their efforts to support the Pancasila Pioneer Village. The introduction of digital literacy was framed within the concepts of the Digital Society and the Smart Village, highlighting improved community collaboration and a heightened public understanding of the role of technology in village development. This initiative notably empowered youth by enhancing their negotiation and diplomacy skills, crucial for sustainable tourism and overall community development. (Yuniasih et al., 2021).

Throughout the technology implementation phase, digital literacy signage and information sources were established in both physical and non-physical forms, and training videos were created for accessibility via social media. This technological integration enabled the community to access information more widely and conveniently. During the mentoring and evaluation phase, a training manual was developed and used as a Character Building Training module, leveraging the Smart Village application to enhance the mentoring experience.

### *Achievements of the Community Service Program Assistance in Mlese Village*

The establishment of the Community Service Program in Mlese Village represents an initiative to foster a digital society, which is vital for the creation of a Smart Village, a framework for community empowerment in the digital era. To achieve this, a variety of programs and solutions have been executed within the Mlese Village community, such as training initiatives for the Village IT Team, focused group discussions (FGDs), and training utilising a technology-oriented approach, which can be summarised as follows:

*Table 3.* Achievements of Assistance Results

No	Problem	Proposed Solution	Achievements
1	Low understanding and instilling of Pancasila values in rural communities (Social conflict)	Character Building Training (Improvement of management aspects)	80% increase in understanding, skills and instilling of Pancasila values in rural communities through digital literacy in the Smart Village application
2	The community requires active tutors who pioneer Pancasila-leading villages	Peer Tutor Focus Group Discussion (Social Aspects)	5 (Five) active tutors who pioneer Pancasila-leading villages, collaborating with Pancasila Laboratory Instructors from Unisri
3	Uneven efficiency in village development	FGD on the efficiency of village development as reference material for character development training (Digital Society) (Improvement of Management Aspects)	The efficiency of village development has increased by 75% based on technology
4	Pancasila has not been effectively institutionalised in conjunction with Klaten's local culture.	FGD on the effectiveness of Pancasila values in the study material for Character Building Training (Social Aspects)	Pancasila has been effectively developed institutionally in conjunction with the local culture of Klaten (dance, local cuisine) at a rate of 67%



*Figure 3.* Character Building Training Assistance as an Effort to Improve Social Welfare for Youth Organisations and Peer Tutor Training for IT Personnel in Mlese Village

## Discussion

The findings of this comprehensive study confidently establish that the Smart Village Application (ASV) has proven to be an impactful instrument for fostering educational innovation and enhancing community empowerment. By deliberately integrating advanced technological tools into the fabric of village governance, Mlese Village has undergone a significant transformation. This transformation has enabled the village to evolve into a community characterised by greater transparency, improved efficiency, and a heightened level of participatory engagement among its residents in a robust digital landscape. Such advancements not only facilitate better communication and decision-making within the community but also empower individuals by providing the tools to participate in the governance and development of their village actively.

The program is designed to align seamlessly with the core values of Pancasila, which emphasise collaboration, equality, and justice for all members of society. By integrating these values into its framework, the initiative effectively reinforces and promotes the essential role of digital literacy as a foundational element in fostering sustainable social harmony within communities. Furthermore, the CIPP (Context, Input, Process, Product) evaluation framework has been implemented as a comprehensive and systematic method that ensures continuous monitoring, assessment, and adaptability of the program. This structured approach not only facilitates ongoing improvement but also underscores the importance of tailoring empowerment initiatives to be both participatory and sensitive to the unique contexts in which they are applied. It has been demonstrated that such initiatives are most successful and impactful when they are deeply rooted in the needs and characteristics of the communities they seek to support ([Damayanti et al., 2022](#); [Trisiana et al., 2022](#)).

The notable success of the ASV model serves to reinforce and validate the findings presented in previous studies by Voulvoulis et al. (2022) and Yuniasih et al. (2021) Both of which underscore the critical role that technology-based community initiatives play in significantly enhancing civic awareness. These studies highlight how such initiatives not only foster greater awareness among citizens of civic duties and opportunities but also substantially enhance youth's capacity in essential areas such as negotiation, diplomacy, and leadership. The emphasis on youth empowerment through these technologically driven programs promotes a deeper understanding of democratic processes and equips young people with the tools to engage effectively in civic discourse.

Moreover, the participatory mentoring model within the ASV framework has proven to be an effective in strengthening participants' digital literacy. This enhancement of digital skills is pivotal in today's technology-driven society, enabling community members to navigate and utilise digital platforms for collaboration and communication. Beyond developing technical abilities, this model has also played a crucial role in cultivating a sense of collective responsibility, encouraging community members to actively participate in local initiatives and take ownership of outcomes that impact their lives and the broader community. By fostering a culture of shared responsibility and engagement, the model helps build resilient communities capable of collaboratively addressing various social challenges.

The Smart Village application's integrated, holistic approach to data management, coupled with its focus on community empowerment, as thoroughly outlined in the comprehensive program design, proved remarkably effective in addressing various socio-administrative challenges that have historically affected the community. This innovative application, through its technology-based structure, not only facilitated the organisation and accessibility of pertinent data but also directly supported the essential process of local capacity building. This approach is notably consistent with the findings presented in the study by [Hasan et al. \(2024\)](#), which underscore the significance of using technology to enhance local governance and community engagement. By fostering an environment of collaboration and resourcefulness, the Smart Village application has the potential

to drive meaningful social and administrative improvements, thus enabling communities to navigate their challenges more effectively.

Ultimately, this innovative initiative serves as a prominent example of how technology-mediated community service can effectively create replicable models for implementation in other villages and communities. By blending the principles of digital innovation with the crucial aspects of civic education, this approach is designed not only to enhance individual skills but also to foster a sense of collective responsibility and involvement among participants. The integration of these two elements aims to achieve holistic and sustainable social progress that benefits the entire community, demonstrating that through collaboration and the strategic use of technology, meaningful change can be achieved in various contexts.

## Conclusion

The community service initiative has effectively enhanced digital literacy by introducing and training the community on the Smart Village Application, which aims to streamline access to information and public services. Beyond its objective of reducing social conflict, the application empowers the community by highlighting the village's distinctive local attributes, including its economy, cuisine, and socio-cultural heritage. Its user-friendly design allows for easy navigation, thereby enhancing community engagement and positively influencing the overall quality of life and the village's digitalisation strategies.

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