

Training and Implementation of an SMS Gateway For Village Information and Announcements in The Indonesia–Timor Leste Border Region

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Abstract.

Napan Village, located in the RI–RDTL border area, faces communication challenges due to limited internet access and the community's reliance on basic mobile phones. This condition slows down the dissemination of village information, which is still carried out manually. This community service program aims to provide a practical solution through the implementation of an SMS Gateway system using Gammu and MySQL. Village officials received outreach and training on system installation, resident database management, and mass message delivery. Evaluation results showed a positive response: 92% of participants found the training easy to follow, 88% experienced the benefits of faster information delivery, and 90% stated that the application was easy to use. The implementation of the SMS Gateway has proven to enhance communication efficiency and strengthen the digital capacity of village officials. The program is expected to be further developed by integrating the system with other administrative services to ensure its long-term sustainability.

Keywords: *Bivalvia; bray-curtis; canonical correspondence analysis; density and gastropoda.*

I. INTRODUCTION

The border region between the Republic of Indonesia (RI) and the Democratic Republic of Timor-Leste (RDTL) represents a strategically important area that plays a vital role in maintaining national sovereignty and territorial integrity. Geographically, RDTL is divided into eastern and western regions. The eastern region borders Indonesia's Belu Regency, while the western part, known as the Oecusse District, directly adjoins North Central Timor (TTU) Regency in Indonesia. One of the border areas on the western side of the RI–RDTL boundary is Napan Village, which shares a border with the Oesilo Subdistrict of Timor-Leste. In terms of communication infrastructure, both Napan Village and Oesilo Subdistrict continue to face significant challenges. Limited internet connectivity, the considerable distance between hamlets, and restricted access to modern communication technologies such as smartphones hinder the rapid and equitable dissemination of information among residents. Most of the local population, particularly those with limited technological literacy, still rely on basic mobile phones, which further constrains the flow of information and the adoption of digital services. In daily community life, village information and announcements—such as event notifications, administrative services, aid distribution updates, and early disaster warnings—play a crucial role in supporting local activities. However, the current methods of disseminating such information remain largely manual.

Messages are typically conveyed through WhatsApp groups or by phone calls from neighborhood and community leaders (RT and RW), who then relay the information to residents. Additionally, announcements are often posted on public notice boards or delivered verbally through church pulpits. These traditional communication methods are frequently ineffective and time-consuming, creating the potential for information gaps, particularly among residents living in remote hamlets. To address these various limitations, SMS Gateway technology offers a practical solution capable of reaching a wide community even in the absence of internet access. An SMS Gateway is a system that enables the efficient transmission of short messages to multiple recipients simultaneously [1]. This technology can be utilized by village governments to disseminate information rapidly, efficiently, and in a structured manner [2]. Since SMS services are widely used, universally accessible, and supported even by the most basic mobile phones, all residents with

mobile devices can benefit from this communication medium [3]. SMS technology has long been adopted as a broadcasting medium due to its low cost and ability to support real-time data acquisition [4, 5]. Moreover, SMS remains a reliable communication technology; SMS Gateways are capable of automatically sending and receiving messages and can be integrated with digital storage systems [6], making them highly suitable for use in public service delivery at the village level [7].

The application of SMS Gateway systems has been widely explored in various contexts, such as student attendance notifications sent to parents or guardians [8], internet service billing reminders in customer management systems [9], and vehicle security systems integrated with fingerprint sensors, GPS trackers, and web-based interfaces [10]. However, another challenge that arises is the limited understanding and technical skills of village officials in operating this technology. To overcome this issue, a community engagement program was conducted through training on the utilization of the SMS Gateway system for the administrative staff of Napan Village and the Oecusse Subdistrict. Through this training, village officials were not only able to operate the system effectively but also improve the quality of public service delivery. This community service initiative aims to highlight the significance of adopting and training in SMS Gateway technology as an innovative solution to support communication and information dissemination in the RI-RDTL border area. The program empowers local governments to enhance the efficiency of public services and accelerate information delivery to the community, thereby contributing to sustainable development in border regions.

II. METHODS

The implementation method of this community service activity was carried out through socialization and training sessions, which were completed in several sequential stages as illustrated in Figure 1.

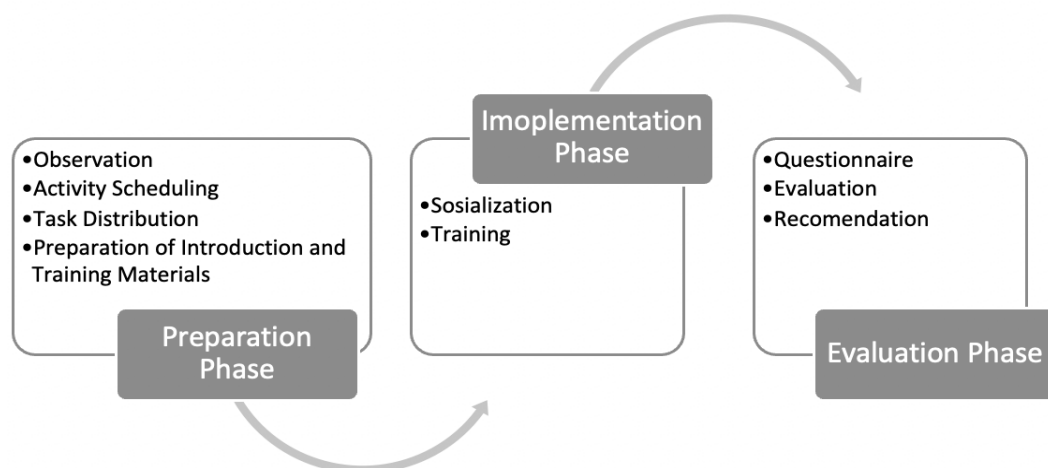


Fig 1. Implementation Stage

1. Preparation Phase

The preparation phase was conducted to organize the outreach and training program effectively. It began with an initial observation to identify the key issues faced by the partner community. During this stage, the work plan and activity schedule were also developed to ensure the program could be implemented in an orderly and well-structured manner. In addition, training modules were prepared, and coordination was carried out to ensure the readiness of both the field and participants.

2. Implementation Phase

a. Socialization / Outreach

This stage was conducted to explain and provide a clear understanding of the SMS Gateway technology that had been developed.

b. Training

The training focused on hands-on practice in operating the developed SMS Gateway application. This activity served as a continuation of the socialization phase, allowing participants to apply the knowledge gained through direct implementation.

3. Evaluation Phase

Evaluation was performed using questionnaires to measure participants' comprehension, the perceived ease of use of the system, and the extent to which the training contributed to achieving the program's goals in communication and reporting. The outcomes of the evaluation demonstrated the effectiveness of the community service initiative and contributed to improving the knowledge and technical competence of the SMS Gateway administrators. Additionally, the insights gained from this process served as valuable feedback for future program development and refinement.

III. RESULT AND DISCUSSION

Socialization

The activity was carried out on November 8, 2025, at the Napan Village Office Hall and began with a socialization session. This session aimed to provide village officials with a conceptual understanding of the benefits, functions, and operational mechanisms of the SMS Gateway technology. The community service team explained how the system can serve as a solution to limited internet connectivity and how its use can accelerate the dissemination of information to the public, especially in border areas. Participants were also presented with real examples of SMS Gateway applications in various public service contexts, such as village activity announcements, social assistance notifications, and early disaster warnings.



Fig 2. Socialization

Implementation and Training

Following the socialization session, the activity continued with hands-on training on the use of the SMS Gateway application based on Gammu and MySQL.

The training covered several practical steps, including:

- Installing and configuring the SMS Gateway software
- Creating a recipient database (list of resident phone numbers)
- Sending mass messages to recipients
- Monitoring message delivery and receipt status through the system

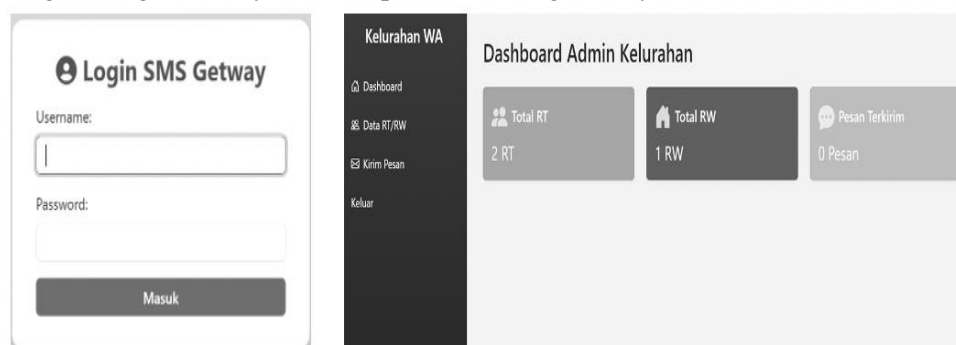


Fig 3. User Login Page and Dashboard View

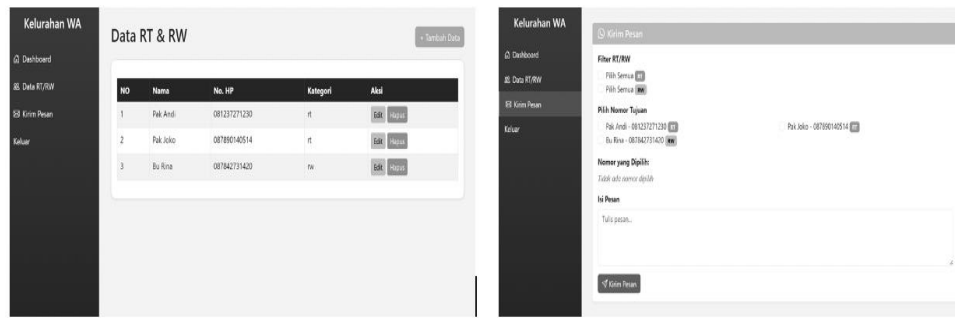


Fig 4. Kontak page and Message send page

The training participants consisted of village officials and administrative staff who would later serve as the primary operators of the application. Through this activity, participants gained practical skills in operating the system and understanding how to integrate it with the village's information service needs. The training also provided participants with the opportunity to directly send test messages to several residents. The results showed that the messages were received quickly and accurately without requiring an internet connection.



Fig 4. Training admin

Evaluation

The evaluation phase was carried out to assess the overall success of the community service activity, both in terms of the technical implementation of the system and the enhancement of the human resource capacity involved. This evaluation was designed to ensure that the training not only provided new knowledge but also equipped village officials with practical skills that can be applied directly in their daily operations.

The evaluation was conducted by distributing questionnaires to all training participants. The questionnaire encompassed several key indicators, including:

- The participants' level of understanding of the concepts and operational mechanisms of the SMS Gateway application.
- Their perception of ease of use, covering aspects such as installation, application operation, and management of the recipient database.
- The perceived benefits, particularly the extent to which the technology supports effective information dissemination and enhances public service delivery in the village.

The results of the questionnaire analysis indicated highly positive feedback:

- 92% of participants stated that the training was easy to follow, the material was clearly delivered, and the hands-on practice greatly helped them understand the application's workflow.
- 88% of participants reported that the SMS Gateway technology provided significant benefits in accelerating information dissemination to the community, especially for residents in areas with limited internet access.
- 90% of participants felt that the application was easy to use, even for those without a strong technical background, due to its simple interface and intuitive operational process.

Overall, the evaluation results indicate that the community service activity produced a significant positive impact. Participants not only gained an understanding of the technology but also demonstrated the ability to operate the system independently. These findings serve as an important foundation for planning future follow-up initiatives and further program development.

Discussion

Based on the results of the activity, it can be concluded that the implementation of the SMS Gateway has had a positive impact on improving communication efficiency in border areas. Previously, information dissemination required considerable time because it was done manually. With the SMS Gateway, however, information can be sent simultaneously to all residents without relying on an internet connection. In addition, the training activities significantly enhanced the digital competencies of the village officials. They were able to operate the application independently and gained an understanding of a simple yet effective technology-based communication system. Overall, the activity demonstrated that the adoption of appropriate technologies such as the SMS Gateway can serve as an innovative solution for improving the quality of public services in areas with limited digital infrastructure. It is expected that this initiative will continue through the development of an SMS Gateway system integrated with other village service data—such as population information, finance, and public administration—so that its benefits can be sustained over the long term.

IV. CONCLUSION

The community service activities conducted in Napan Village demonstrate that the implementation of SMS Gateway technology is an effective solution for addressing communication limitations in the RI–RDTL border area. Through socialization and hands-on training, village officials gained both a conceptual understanding and practical skills in operating the system, including installation, database management, and mass message delivery. The evaluation results showed highly positive responses, with most participants indicating that the training was easy to follow, the technology was beneficial, and the application was user-friendly despite their limited technical background. Overall, the program successfully enhanced the digital capacity of village officials and significantly improved the speed and efficiency of public information dissemination, particularly for residents in remote areas. The SMS Gateway has proven effective in strengthening village communication management without relying on internet connectivity. Moving forward, the system has the potential to be further developed and integrated with other village services, ensuring long-term benefits and contributing to improved public service quality in border regions.

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