Development of Digital Reporting System Using WhatsApp Chatbot SIGAP E-POL (Police Service Frontline Integration System) to Accelerate Police Response to Public Complaints

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Abstract

In today's digital age, the need for fast and efficient reporting systems is increasing, especially for the police who must respond immediately to public complaints. WhatsApp, as a popular instant messaging application, offers a potential platform for developing a digital reporting system that is accessible to the wider community. This study aims to develop and test the effectiveness of a digital reporting system using WhatsApp chatbots in speeding up police responses to public complaints. The research method includes stages of needs analysis, system design, implementation, and evaluation. Data was collected through surveys, interviews with potential users, and system testing in a police environment. Data analysis was conducted qualitatively and quantitatively to evaluate performance and user satisfaction. The results of the study show that the digital reporting system using WhatsApp chatbots can increase the speed of police response to public complaints. These results were obtained based on a validation test with a score of 91% (very valid category) by media technology experts and a practicality questionnaire of 90.6% (very practical category) from 67 public respondents. This study also discusses important considerations for real-world implementation, including cost-benefit analysis, system scalability, data security, and ethical implications

Keywords: *chatbot, digital reporting, police response, public services, system security*

INTRODUCTION

In the increasingly advanced digital era, information and communication technology has become an important part of various aspects of human life. This technology not only affects the business and education sectors, but also plays an important role in the public service sector, including the police. According to research conducted by [1], the adoption of digital technology in public services can significantly improve service efficiency and responsiveness [2]. However, although the technology has been widely adopted, there are still various challenges in its implementation, especially in terms of reporting and handling public complaints. Based on data from the Ministry of Communication and Information Technology (2021), around 60% of public complaints received through conventional channels are not handled quickly and effectively. This shows the urgent need to develop a more efficient and responsive reporting system [3]. One potential solution is the use of WhatsApp chatbots in a digital reporting system. WhatsApp is an instant messaging application that is very popular and used by various circles of society. By using chatbots on WhatsApp, people can easily report incidents or problems without the need to download additional applications [4]. The chatbot can provide

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automatic and instant responses to the reporter, ensuring that the report is received and processed promptly. Research by L.Zhang [5]. shows that the use of chatbots in public services can increase user satisfaction by up to 30% [6].

In addition, chatbots can guide users to provide the necessary information in a structured manner, so that the reports received are more complete and clear [7]. The system can also be integrated with police databases to facilitate tracking and handling cases. The incoming data can be directly processed and forwarded to the relevant unit for further action. According to research conducted by [7], the integration of data in a digital reporting system can increase the efficiency of case handling by up to 40% [8]. With this background, this study aims to develop and implement SIGAP E- POL (Police Service Vanguard Integration System) using a WhatsApp chatbot. This system is expected to speed up the police response to public complaints, improve the efficiency of case handling, and ultimately increase public trust in police institutions. This research will also evaluate the effectiveness of the system developed through trials and feedback from users, as well as analyze the collected data for future service improvements [9]. Beyond mere initial effectiveness, this paper recognises the need for a comprehensive analysis of the financial implications, scalability, security, and ethical considerations of the system to ensure its sustainable and responsible implementation in the real world.

METHOD

This research is research and development or what in English is commonly referred to as Research and Development (RnD). The researcher focuses on developing the WhatsApp chatbot system SIGAP E-POL in improving police efficiency and compliance as well as managing public complaints. Then for the approach used, the researcher used the ADDIE model approach. The ADDIE model is used as a guideline in the development process to test the effectiveness of the WhatsApp chatbot system SIGAP E-POL. The model was chosen because it can represent a systematic approach in instructional development. In addition, the model is general and suitable for use in the classroom. The implementation of the ADDIE Model takes place in a systematic but interactive manner because revisions at each stage can affect the other stages. The research and development flow of the WhatsApp chatbot system SIGAP E-POL following the ADDIE model is as follows.

Figure 1. ADDIE Model Research Stages
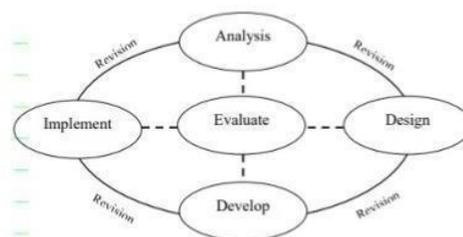
(Source : (Branch, 2009))

As can be seen from the image above, the ADDIE model consists of five stages. The five stages are (a) analysis, (b) design, (c) development, (d) implementation, and € evaluation. At each of these stages, different activities will be carried out according to the procedure. The

following is an elaboration of each stage in the development of the SIGAP E-POL WhatsApp chatbot system in improving police efficiency and compliance as well as managing public complaints using the ADDIE model [10].

A. Analysis

The Analysis stage in the ADDIE model is the first step in system development, including in developing WhatsApp chatbot systems such as SIGAP E-POL to improve police efficiency and compliance as well as the management of public complaints[11]. At this stage, several important points are analyzed to ensure the development of the right system and as needed. The stages of analysis in this study include: 1) Organizational needs: This analysis includes an understanding of the problems or challenges faced by the police, such as the need to improve compliance, manage complaints faster, and reduce slow bureaucracy and 2) Organizational needs: This analysis includes an understanding of the problems or challenges faced by the police, such as the need to improve compliance, manage complaints faster, as well as reduce slow bureaucracy. Based on feedback, this stage has been expanded to include an initial analysis of the financial resources required for development and maintenance, as well as an initial assessment of the data security protocols required to handle sensitive police reports.

B. Design

The design stage or what in Indonesian is referred to as design is the stage to design the product that the researcher wants to develop [12]. At this stage, the researcher designed the content of the service chat, designed the language, presentation and use of chatbot features. Content design is carried out through the process of preparing service materials, *language design* is carried out through script writing, presentation design is carried out through storyboard preparation, and design uses the SIGAP E-POL CHATBOT feature. The design phase explicitly incorporates scalable architecture to handle large volumes of reports and robust security measures to ensure user data privacy and integrity, addressing key implementation concerns.

C. Development

At the development stage , the execution of the plan produced at the design stage is carried out. WhatsApp chatbot systems such as SIGAP E-POL are produced and developed based on the initial plan so that WhatsApp chatbot systems such as SIGAP E-POL are obtained which function to streamline the process of police services to the community [13]. The Development process of the WhatsApp chatbot starts from the stage of creating service materials, chatbot features, editing. After obtaining a product in the form of a WhatsApp chatbot such as SIGAP E- POL, the chatbot is consulted with the supervisor. Products that have undergone revision are then tested by media technology experts [14]. Each expert validates the product through a validation sheet that comes with suggestions. Thus, the results of interpretation from media technology experts are obtained regarding the advantages and disadvantages of learning videos that can be used as a reference in improvement. The prototype of WhatsApp chatbot system products such as SIGAP E-POL which functions to streamline the police service process to the public is as follows:

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Figure 2. Prototype Chatbot WhatsApp SIGAP E-POL

(Source : Research)

D. Implementation

Implementation is carried out by operating products that have been developed in the previous stage. The WhatsApp chatbot SIGAP E-POL is broadcast to the audience according to a predetermined plan. The display of the chatbot is divided into two stages, namely a small- scale trial and a large- scale trial. Small-scale trials to measure response and improvement at a more controlled scale [15]. Meanwhile, large-scale trials to assess performance Across the board in a variety of conditions and environments that are more representative. Thus, the relevance of the interpretation from prospective users regarding the implementation of the WhatsApp chatbot SIGAP E-POL is obtained. The results of the interpretation are used as a basis for determining the validity of the product to be used in daily learning activities [16]. This qualitative data was then analysed thematically to identify key user perceptions and expert opinions.

RESULTS AND DISCUSSION

There are two types of data used in the development of the WhatsApp chatbot SIGAP E- POL. The two data are quantitative data and qualitative data [17]. Quantitative data was obtained from a validation questionnaire of media technology experts. Qualitative data is obtained through observations, interviews, and suggestions and criticisms given by experts and the public regarding the products that have been produced [3]. The two data are used as a reference in the repair process of the WhatsApp chatbot SIGAP E-POL. The following is the presentation of the data from the research results:

Table 1. Recapitulation of Research Results of Media Technology Experts

No	Assessment Aspects	Media & Technology Validator		Value	Percentage
		Member 1	Member 2		
1	Serving	15	13	28	87.5%
2	Content quality	10	14	24	83.3%
3	Construction	11	10	21	77.8%
4	Use	8	6	14	87.5%
Total Interpretation				87	91%

Furthermore, research data was obtained from questionnaires distributed to the public. The distribution of the questionnaire was carried out by providing a number of questions and statements to the respondents. The instrument used was a questionnaire of public response to the use of the Chatbot system, while the questionnaire obtained 67 respondents with the following data results:

Table 2. Recapitulation of the Results of the Community Response Practical Questionnaire

No	Assessment Aspects	Total	Percentage
1	Ease of access	250	93.2%
2	The features provided are interesting	241	89.9%
3	Response speed	262	97.7%
4	Effectiveness in complaints	244	91.0%
5	Highly recommended	239	89.0%
6	Can solve problems	220	82.0%
7	Valid information	234	87.3%
8	Satisfaction	259	96.6%
9	Comfort	243	90.6%
10	Help	237	88.4%
Total		**2429**	**90.6%**

Although quantitative data proves the effectiveness of the system, qualitative data from interviews and observations provides deeper insights and richer nuances about the user experience. Three main themes emerged from the analysis:Improved Accessibility and User Empowerment: Participants often stated that using a familiar application such as WhatsApp felt "less intimidating" and "more direct" than the formal process of visiting a police station. One user noted, 'I can report issues directly from my location, without having to travel and queue.'Value of Structured Information: Experts highlighted that the chatbot's guided menu system was a significant improvement over traditional reporting. An officer involved in the trial stated, 'The reports we receive through the chatbot are more complete and clear from the outset. The system guides users to provide the important information we need, which saves a lot of follow-up time.

The Importance of Human Oversight: Although users praised the chatbot's speed, many also emphasised the importance of knowing that a human officer would ultimately handle their case. This shows that the public sees the chatbot as a highly efficient entry point for reporting, but still values human judgement and intervention, especially for complex or sensitive issues.The combined results show that the SIGAP E-POL chatbot is a valid and practical solution. High scores for response speed and user satisfaction directly address the core issues identified in the introduction. However, a comprehensive analysis requires discussion of broader implementation factors.

Cost and Resource Analysis: Although this study did not conduct a full financial audit, a cost- benefit analysis is an important next step. Initial investment in development and ongoing maintenance must be balanced against long-term benefits, such as reduced administrative

workload for officers, savings in administrative costs, and more efficient resource allocation.Scalability and Security: The system is designed for scalability, but real-world performance under high volume pressure was not part of this initial study. Future research should evaluate its ability to handle thousands of reports simultaneously without a decline in performance. Given the sensitive nature of police data, security is a top priority. The system uses WhatsApp's end-to-end encryption, but further analysis of server-side data protection and compliance with data privacy laws is essential to maintain public trust.

Ethical and Accessibility Considerations: The use of AI-based chatbots for public services has ethical implications. There is a risk of creating a "digital divide," where individuals without smartphones or internet access become marginalised. The system should be viewed as a complementary channel, not a replacement for traditional reporting methods. Additionally, ongoing monitoring is necessary to prevent potential bias in chatbot algorithms. The role of human officers remains important for oversight, context, and empathy elements that cannot be fully replicated by automated systems.Limitations and Long-Term Impact: This study is limited to the initial implementation phase. A comprehensive understanding requires analysis of long-term impacts. Future research should involve longitudinal studies to track metrics over several years, such as changes in case handling times, public trust survey results, and overall crime reporting rates.

CONCLUSION

The development and implementation of the WhatsApp SIGAP E-POL chatbot has proven to be highly successful in its initial phase, demonstrating its ability to accelerate police response to public complaints. The system achieved a 'highly valid' rating of 91% from technology experts and a highly practical rating of 90.6% from the public, with users expressing high satisfaction.

However, successful implementation is about more than just initial effectiveness. This revised analysis underscores that for continued success, institutions must address the financial, security, and ethical dimensions of such systems. The long-term vision for SIGAP E-POL should be a scalable, secure, and ethically managed tool that complements, rather than replaces, human officers. Future research should focus on longitudinal analysis of the system's impact on police efficiency and public trust, to ensure it remains an effective and fair tool in serving the community.

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