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WhatsApp Chatbot Implementation of New Student Admission Information Service in Universitas Nahdlatul Ulama Sidoarjo

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A B S T R A CT

University of Nahdlatul Ulama Sidoarjo (UNUSIDA) experienced problems in the service of new student admission information (PMB) fast and efficient. The high volume of inquiries, limited human resources, and the need for instant response are major challenges. This study aims to implement WhatsApp chatbot technology to improve services at Nahdlatul Ulama University Sidoarjo. Using Agile methods, chatbot development is carried out iteratively and incrementally to ensure that the resulting solution is in accordance with user needs. The methods used in this study include the development of chatbot systems using an appropriate programming platform, followed by testing the functionality and effectiveness in providing information. The test results showed that the WhatsApp chatbot was able to provide accurate and relevant responses within an average of 3 seconds. Prior to the implementation of the chatbot, the response time to prospective students ' questions ranged between 15-30 minutes. The implementation of WhatsApp chatbot significantly improves the efficiency of information services, reduces the workload of PMB staff, and increases the satisfaction of prospective students. This study proves the effectiveness of chatbot in improving the quality of Information Services PMB UNUSIDA. This research is an example for other institutions in utilizing chatbot technology to improve public services effectively and make a significant contribution to the development of service technology in the higher education environment.

Keywords: Chatbot WhatsApp; PMB information Service; Agile Method; user Satisfaction

1. Introduction

Information is an important instrument in life to help humans make decisions [1]. Technology has an important role in the dissemination of information so that the need for interactive and simple delivery tools to users can certainly help in translating data in the information technology era [2]. In today's digital age, where technology is growing rapidly, chatbots have become one of the interesting solutions in providing interactive experiences to users [3], [4].

In today's digital era, the use of technology in various aspects of life has become a major need, including in the world of Education. The university as an institution of Higher Education has a great responsibility in providing optimal services to students , lecturers, and the entire academic community. One of the technological innovations that can be applied to improve service quality is the implementation of WhatsApp-based chatbot. This Chatbot is able to provide automatic responses to various questions from prospective students and reduce the burden on the pmb team officers. Currently, communication media has undergone many changes and transformed into various new forms in accordance with the era of technological progress. Chatbot has various benefits in communication media, both in chat applications and other digital platform [5].

Chatbot technology is growing along with the increasing need for fast and responsive systems. Whatsapp as one of the most widely used instant messaging applications in Indonesia is an ideal

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platform for integrating chatbots. The implementation of WhatsApp chatbot at Nahdlatul Ulama University Sidoarjo is expected to be a solution in improving the effectiveness of communication and pmb services. Chatbots can deliver consistent information and guidance to all users. This helps ensure that the message conveyed is always the same and accurate, reducing, the potential for errors or differences in Interpretation [5].

According to Bariah,et al (2022) [6] in their research, they use python programming with the integration of the twilio, dialogflow, and heroku platforms, and use the Extreme Programing (XP) method and this research is more targeted at active students to get lecture information without having to go to campus. In contrast to this study, it focuses more on New Student Admission information services (PMB) so here the target is prospective students. This study provides more information on registration and provide a quick response.

Prospective new students of a college will want to get registration information that is easy, fast and accurate. Of course, getting information that is easy and clear will affect prospective new students in making decisions. The new student admission system of Nahdlatul Ulama University Sidoarjo (UNUSIDA) utilizes the website and whatsapp. In general, the information on the website is complete and easy to understand. However, there are some prospective new students who still contact the registration committee or PMB via whatsapp. The use of whatsapp still requires a very high human role to reply to questions asked by prospective new students of UNUSIDA. In practice, there is no registration committee that specifically manages whatsapp so that prospective new students who are looking for information have to wait a long time to get a response from the committee. To shorten the waiting time related to registration submitted by prospective new students via whatsapp, an information technology system is needed that can help to respond to questions accurately and quickly. With the development of technology, many applications are made that facilitate the process of searching for material or information. One of the information search technology that is widely used today is chatbot technology [7]. Chatbot offers interactive solutions that can help to answer the registration procedure quickly and accurately prospective new students [8].

The application of agile methods in the development of whatsapp chatbot is also one of the important aspects in this study. Agile methods enable the development of systems that are flexible, adaptive, and oriented to user needs. With this approach, the chatbot can be developed in stages with continuous evaluation to ensure its effectiveness and efficiency in supporting services at the University.

According to Dimas Fajar Ramadhan, et al (2020) [9] this chatbot is able to analyze practicum value data via whatsapp. The technology used is a combination of Artificial Intelligence Markup Language (AIML), Natural Language Processing (NLP), and using php, javascript, and phython programming languages, for its method based on direct systems. the difference from this study is more emphasis on Information Services admissions (PMB) and the development of systems using agile methods.

In the context of pmb services, whatsapp chatbot can be used to answer questions related to new student registration flow, faculty and study program information. This will reduce the burden on pmb officers and speed up the service process that was previously done manually. the chatbot will combine keywords from each question and provide answers automatically to prospective new students who enroll in Nahdlatul Ulama University Sidoarjo. The Chatbot can function for 24 hours without human supervision and can handle multiple users at once. Chatbot that will be designed in this study using agile methods diaman I chatbot can only provide answers when the user enters the correct input . This Chatbot was built so that it can answer questions about the information on new student registration flow and faculty and Study Program Information [8].

As artificial intelligence and machine learning advance, chatbots are becoming more sophisticated and capable of delivering more accurate and relevant responses. Neural network models, such as GPT (Generative Pretrained Tranformer), are becoming popular to improve the ability of chatbots to understand human language in order to provide a more natural and contextual response.

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At the moment, chatbots are used in various industries and areas of customer service, marketing, finance, health, education, and others. Chatbots are constantly evolving and becoming an integral part of our daily digital experience, helping us with a variety of tasks and online interactions [5].

According to Pratama and Kristiana (2023) [10] development is carried out by agile methods and scrum frameworks, and uses machine learning and API technology to respond to customer questions automatically and in real-time. His approach is highly relevant to this research, particularly in terms of development methodology and strategy.

With this innovation, Nahdlatul Ulama University of Sidoarjo is expected to be an example for other educational institutions in utilizing technology to improve service quality. In addition, this implementation is also in line with Islamic principles that encourage ease, speed, and clarity in providing information and services to the community.

Based on the advantages obtained from previous research, a registration system was created that utilizes the whatsapp application and chatbot as a registration platform for prospective new students at UNUSIDA. This system is expected to facilitate prospective new students in the registration process, making it easier for the committee to manage the information of prospective new students [11].

2. Methods

The method used in this study is an agile method or often referred to as a framework. This method is a project management approach that emphasizes flexibility, team collaboration, and iterative product delivery.Agile focuses on keeping processes streamlined and creating minimum Viable Products (MVPs) that go through a number of iterations before everything is final [12]. Agile methodology is a practice that promotes continuous iteration of development and testing throughout the software development cycle of a project [13]. Development and testing activities simultaneously, unlike the waterfall model. In this agile method has 7 (seven) stages, which can be seen in the picture below.

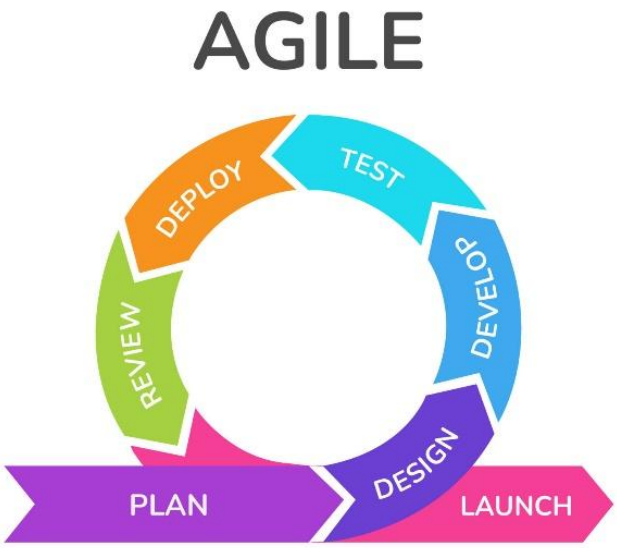

Fig. 1.Stages in agile methods

1. **Plan**(planning): this stage is the initial stage of the agile method in the WhatsApp chatbot implementation project for the new student admission information service at nahdlatul ulama University sidoarjo. To carry out such planning, it is necessary to search for information through the PMB official website. At this stage, the design of the planning system is made for reference / prefix such as making use cases, activity diagrams, flowcharts, and mockups.

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2. **Design**: this stage focuses on designing a solution or service. Design in agile is done in stages. The WhatsApp chatbot design stage consists of components and templates to make the system run as expected.
3. **Development**: this stage is the implementation of the approved design. The development team works in short cycles (sprints) to produce a working and testable product.
4. **Test**: the testing phase is carried out continuously during the process. The aim is to ensure the quality of the chatbot and identify potential problems early on.
5. **Deploy**: this stage involves launching a product or service to users. Deployments in agile are gradual and continuous, allowing immediate feedback from users.
6. **Review**: this stage is an evaluation of the chatbot that has been launched. Its purpose is to identify areas of improvement and plan the next development cycle.
7. **Launch**: the launch stage is a crucial moment in the agile cycle. This is where the whatsapp chatbot that has gone through a series of iterations of development, testing, and improvement is finally introduced to prospective new students / users and new student services (PMB) who act as admins.

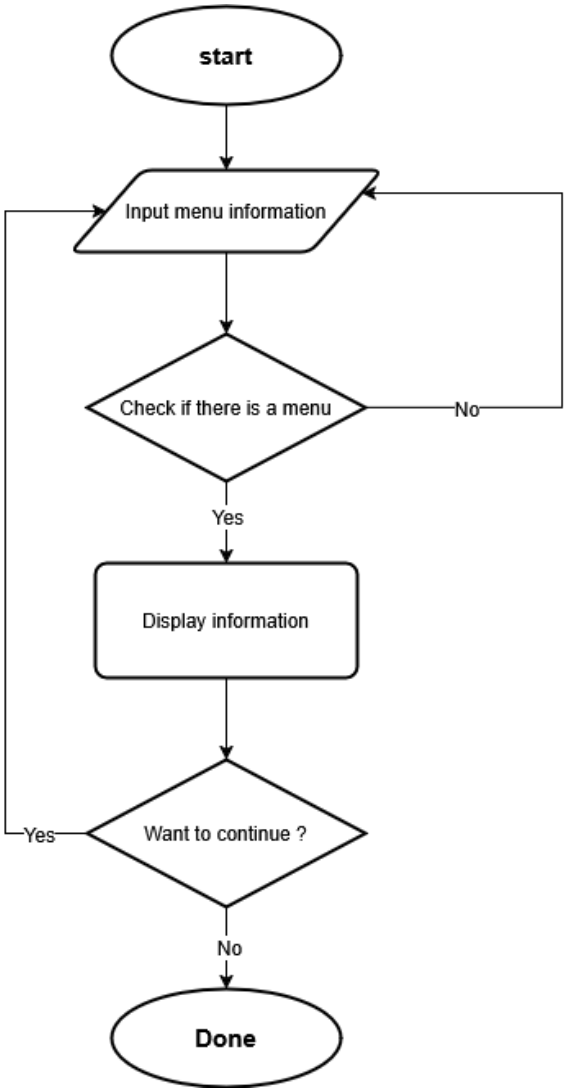

Fig. 2.Flowchart user

This Flowchart illustrates how users / users in the use of WhatsApp chatbot. This Flowchart describes the flow of user interaction with the chatbot system. The process starts when the user enters

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the desired information menu. The system then checks if the menu is available. If the menu does not exist, the process will return to the INPUT menu information, allowing the user to enter a different menu. If the menu is present, the system will display the information corresponding to the selected menu. Once the information is displayed, the user will be asked if they want to continue the interaction. If the user wants to continue, the process will return to the information menu input. If the user does not want to continue, the process will be completed. This Flowchart clearly illustrates how users interact with the chatbot system to get the information they need. This Flowchart describes the flow of user interaction with the chatbot systematically. The user can select the information menu, which will be checked for availability by the system. If a menu is available, information is displayed, and the user is given the option to continue or end the interaction. If the menu is not available, the user can try again. This Flowchart prioritizes flexibility and efficiency in meeting user needs. Overall, this flowchart not only reflects the efficiency of the system in providing information, but also emphasizes the importance of an intuitive user experience. With a clear and responsive structure, users can easily navigate and get the information they need without confusion. This is expected to increase user satisfaction and encourage wider use of chatbots, making them a useful tool in meeting information needs in this digital age. As shown in Figure 2.

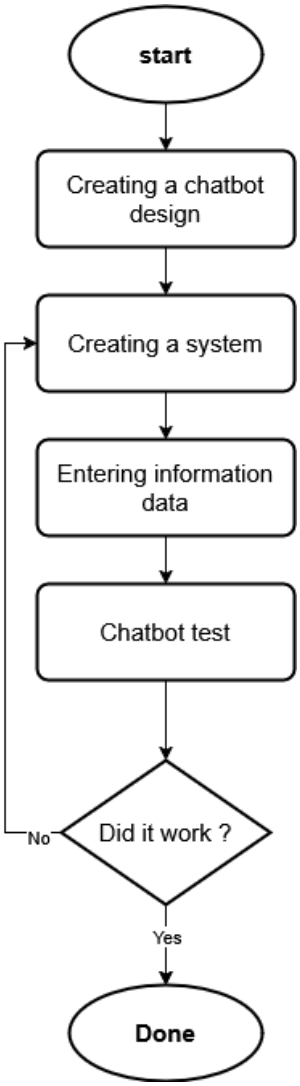

Fig. 3.Flowchart admin

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This Flowchart describes how the flow of an admin in making this whatsapp chatbot. This Flowchart describes the flow of the chatbot system creation process from start to finish. The process starts with the creation of a chatbot design, where the admin plans and designs how the chatbot will interact and respond to users. Next, the creation of a system that includes technical development and infrastructure needed to run a chatbot. After the system is completed, the information data is entered into the system. This Data can be knowledge or information that will be used by the chatbot in interacting. The next stage is the chatbot trial to ensure that the chatbot is working properly and provides the appropriate response. If the trial is successful, the process is complete. However, if the trial is unsuccessful, the process will return to the system creation stage to make the necessary repairs or adjustments. This Flowchart describes the flow of the chatbot creation process that involves the steps of designing, developing, filling in data, and testing. As shown in Figure 3. Each step in this process plays a crucial role in ensuring that the chatbot can function optimally. If there are obstacles or errors in the test, the process will return to the development stage for improvement. This cycle ensures that the resulting chatbot is completely ready for use and is able to provide a response that matches the user's needs.

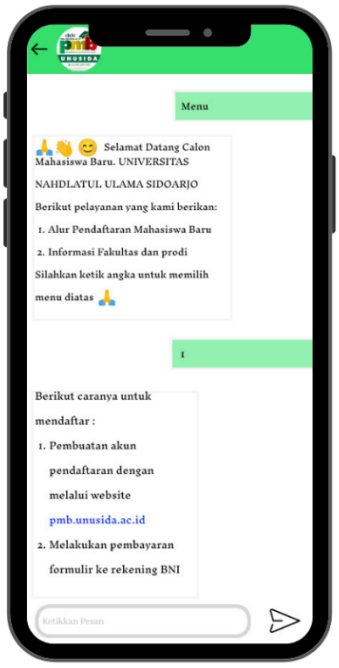

Fig. 4.WhatsApp chatbot interface design mockup

In this mockup depicts the WhatsApp chatbot screen when used by a user or users. In the display on the top left there is a PMB profile photo and a back arrow, after that the user asks a question " menu " to enter the main page, the main menu of the chatbot feature which contains a new student registration flow menu and faculty and study program information there is also a user asking by typing " 1 " means he wants to open the 1st menu, namely how to register new students .

3. Results and discussion

This research produces a WhatsApp chatbot for new student admission services the services provided by this chatbot are in the form of new student registration flow and faculty and study program

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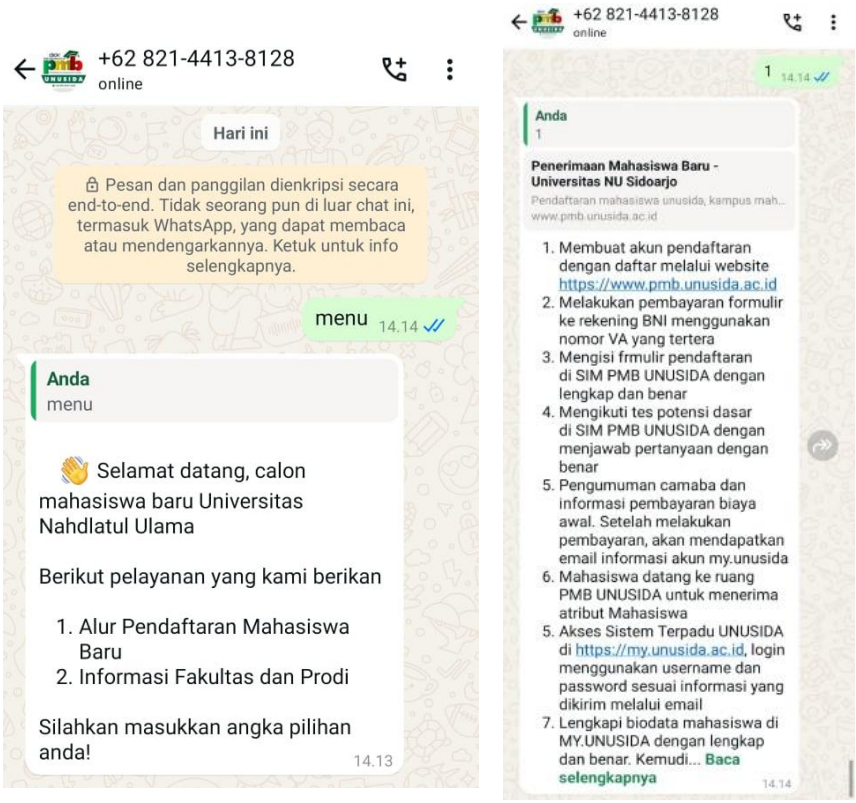
information at Nahdlatul Ulama University Sidoarjo. This study uses the Nodejs and Javascript programming languages.

In the use of whatsapp chatbots, it has been seen that the response to messages from prospective new students has become faster and more consistent. New student admissions service (PMB) officers no longer need to respond to messages one by one to automatically provide answers that have been programmed in this chatbot [8]. At the results and discussion stage, it was obtained that the WhatsApp chatbot creation process follows the flow that has been designed in the flowchart. Every stage, from designing, developing, filling in data, to testing, is systematically carried out to ensure the chatbot is functioning as expected. The test results show that the chatbot is able to respond well to users according to the data that has been entered.



(a) (b)

Fig. 5.(a)chatbot start screen (b)menu information 1

Figure 5 (a) shows the first interface or initial view of the whatsapp chatbot. In this view, the user must select the word" menu" to open or display the first menu between the user and the chatbot, after that the chatbot will open the message quickly and display the main menu with as much information as 2 menu options and in Figure 5 (b) the user will select the menu by selecting the number " 1 " will be confirmed by the chatbot by providing new student learning flow information. Which can be seen in Figure 5 below and continued with the analysis in the black box testing table.

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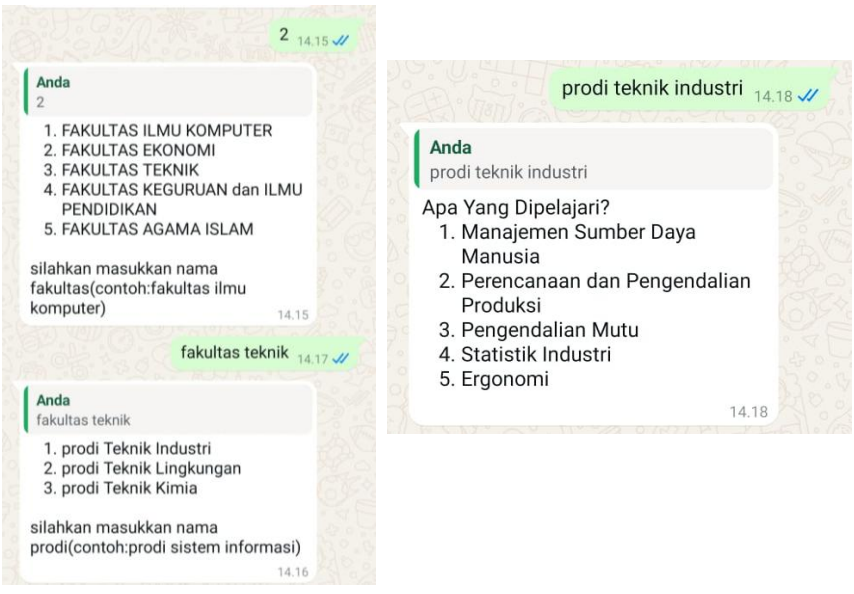
Table 1. Black box testing

Testing Activities	Realization expected	Test Results	Conclusion
Scan QR code	The code was successfully scanned	Connect with a chatbot	Accepted
Typing The Word " Menu"	Chatbot can respond quickly	Chatbot displays main menu information	Accepted
Select Menu "1"	Successfully display menu information "1"	Displays information on the registration flow of prospective new students	Accepted

Figure 6 (a) shows the user has selected the number 2, the faculty and program information menu when the user types the number "2" the chatbot will automatically provide information on several faculty names at Nahdlatul Ulama Sidoarjo University. And the user wants to continue by knowing what study programs in the faculty want to know by typing the phrase" Faculty of engineering", then the chatbot system will display the study program in the Faculty of engineering . in Figure 6 (b) shows after the user types "prodi teknik industri" and the result displays a list of information about what will be studied in prodi teknik industri. Which can be seen in Figure 6 below after that there is a black box testing as shown in Table 2.



(a) (b)

Fig. 6. (a) Faculty and study program information menu; (b) information learned in industrial engineering study program

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Table 2. Black box testing

Testing Activities	Realization expected	Test Results	Conclusion
Select menu "2"	Successfully display information	Display faculty selection information	Accepted
Selecting faculty information	Successfully display information	Display information within the faculty study program in the selected	Accepted
Choosing prodi information	Successfully display information	Showing what information is learned in the study program	Accepted

Table 3. Black box testing

Questions For Respondents	Respondent's Answer			
	Yes	No	Very Good	Good Enough
How easy is it for you to access this WhatsApp chatbot?			48,57%	51,42%
How quickly does the chatbot respond to your questions?			62,85%	37,14%
How often do chatbots crash or fail to respond to your questions?	40%	60%		
Are you having trouble using a chatbot?	25,71%	74,28%		
How helpful are chatbots in providing the information you need?			48,57%	51,42%
Can a chatbot answer all your questions?	51,42%	48,57%		
Do you still need to ask the admin after using the chatbot?	28,57%	71,42%		
Does the chatbot help you in making the decision to enroll in Nahdlatul Ulama University Sidoarjo?	100%	0%		
How satisfied are you with the overall chatbot service?			82,85%	17,14%
Would you recommend this chatbot to other prospective students?	97,14%	2,85%		
Does the chatbot understand your question?			40%	60%
If the chatbot gets an error or can't answer your question, Do you have an alternative solution?	88,57%	11,42%		

The table above is the result of a survey of respondents who have used whatsapp chatbot for new student admission information services (PMB) especially related to Nahdlatul Ulama University Sidoarjo.

1. Ease of access and response barriers.

the majority of respondents stated that the whatsapp chatbot is easy to access, the assessment obtained from very good 48.47% and quite good 51.42%. In a very fast assessment 62,85% while 37,14% felt quite fast.

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2. Chatbot technical performance.

In the stability of the system, 60% of respondents received a score stating that chatbots often fail or crush, while 40% indicated that there was room for improvement from the technical side.

3. Difficulty level and help of chatbots.

As many as 72.28% of respondents admitted that they never had difficulty using chatbots. The ability of chatbots to provide information is very helpful, with a value of 48.57% very good and quite good 51.42%.

4. Ability to answer questions.

51.42% of respondents felt that the chatbot could answer all their questions. while 48.57% said no.

5. Dependence on admin.

Most respondents still feel the need to contact the admin after using the chatbot with a score of 71.42%.

6. Influence on decisions.

Interestingly, 100% of respondents stated that chatbots helped them get information on how to register at Nahdlatul Ulama University Sidoarjo. This shows that chatbots have a positive impact on prospective students.

7. Level of satisfaction and recommendation.

The level of satisfaction of respondents towards the chatbot information service is very high with 82.85% stating very satisfied and 17.14% quite satisfied. In addition, respondents recommended this chatbot to other prospective students with 97.14%.

8. Understanding and alternative solutions.

The chatbot is considered to understand user questions well enough with 60% understanding and 40% understanding very well. If the chatbot has an error, 88.57% of respondents have an alternative solution.

4. Conclusion

This study aims to understand the constraints in the new student empowerment information services (PMB) at the University of Nahdlatul Ulama Sidoarjo (UNUSIDA) by applying WhatsApp chatbot technology. Using Agile methods, the WhatsApp chatbot was successfully developed and was able to provide an accurate and relevant response in an average of 3 seconds, making it faster than the previous manual response which took 15-30 minutes. The implementation of this chatbot not only improves the efficiency of information services and reduces the workload of PMB staff, but also has a positive impact on the decision of prospective students. The results of black box testing showed that the chatbot works according to the design used. The survey found that chatbots are easy to use and provide a quick response. Although as respondents (60%) reported technical problems such as crashes, mayor users find it helpful with the information provided. As a result, all respondents (100%) stated that the chatbot helped them in making the decision to register with UNUSIDA. The overall level of customer satisfaction with the chatbot service is very high (82.85% very satisfied), and the mayor of users (97.14%) against other prospective students. Although there is still a need to change admins after using a chatbot (71.42%), this finds room to improve the chatbot's ability to answer questions more comprehensively. Overall, this study aims to determine the effectiveness of chatbot in improving the quality of Information Services PMB Nahdlatul Ulama University Sidoarjo and can be an example for other

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institutions that want to utilize the technology, focusing on improving the stability of the system and the ability of chatbot in understanding and answering various questions of interest to users independently.

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