JURNAL INSTEK
INFORMATIKA SAINS DAN TEKNOLOGI
Volume 9, Nomor. 2, Oktober 2024
P –ISSN : 2541-1179, E-ISSN : 2581-1711
OJS :http://journal.uin-alauddin.ac.id/index.php/instek/index
Email : instek@uin-alauddin.ac.id

IMPLEMENTATION OF HELPDESK CHATBOT APPLICATION FOR INFORMATION SYSTEM SERVICES IN HIGHER EDUCATION

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ABSTRACT

This study implements a helpdesk chatbot application for information system services in higher education. The background is the students' need for quick and accurate academic information, especially during the Covid-19 pandemic. The method used is the waterfall model, with data collection stages through questionnaires, observation, and literature study. The development result is a web-based chatbot application that can automatically answer student questions related to academic information systems. Testing shows that this application successfully improves information service efficiency, reduces the workload of helpdesk admins, and increases user satisfaction. In conclusion, this helpdesk chatbot is effective in providing information to students anytime and anywhere, with recommendations for further development in the future.

Keywords: Service, Chatbot, Helpdesk, Higher Education, Covid-19

I. INTRODUCTION

The use of applications in higher education is needed by students in finding lecture information, currently the college where we conduct research has utilized information technology in several business processes. All of these technologies are incorporated into the academic information system. Various applications and the

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number of existing applications, causing users to need time to adapt in order to use these features correctly, especially for new students. Although there is already a written guidebook that can be downloaded, it does not guarantee that students can immediately understand the explanation in the guidebook. When students want to get information about the information system, they must come to campus to ask questions and can only be done during office hours. The lack of information about using the academic information system causes students to ask other students so that the information they get may not be correct.

The University also wants information that is circulated or conveyed to reach all academicians, so we try to make tools so that the information conveyed can be faster and more effective. The use of web-based academic information systems and social media is one of the facilities that is often used to meet needs. An application is a supporting medium in an object that has several instructions arranged in such a way as to produce information. The college where we conduct

research is currently using information technology in the form of an academic information system to facilitate the activities of the academic community. One that plays an important role at this time (covid 19) is the helpdesk service that overcomes and answers student problems and complaints related to the Academic Information System (student desk). However, the place we observed currently uses WhatsApp as an information system service and does not yet have a helpdesk service application to provide services to users (students). Therefore, researchers propose a helpdesk chatbot application that can answer and add the role of WhatsApp so that it can help facilitate service.

Researchers made direct observations to students by sending questionnaires via WhatsApp and from the results of the questionnaire it can be concluded that many students do not know the existence of WhatsApp helpdesk services and do not understand the applications contained in the information system (student desk). Therefore, the solution offered in this research is the creation of a system development in the form of a web-based application where in the application is a helpdesk chatbot that can help users find or ask information about using applications on the academic information system (student desk). Chatbot helpdesk

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applications are expected to be able to serve students and can automate answers to student questions and can be accessed anytime and anywhere.

A chatbot is a feature that utilizes artificial intelligence as a natural language that can communicate with its users. Each chatbot is governed by a botmaster, which is the person behind the scenes who has a big role in shaping a bot's personality and chatbot knowledge. Chatbot is a technology that often develops in improving its system. Chatbots have been implemented through social networks, such as Twitter and Windows Live Messenger. Popular online portals such as eBay and PayPal also use multilingual virtual agents to facilitate their users. A chatbot can quickly respond to user queries, but it actually only interprets the input keywords and responds with the most similar keywords from a pre-built database (Ganney et al., 2014).

Later the application system can be used on a website or on an academic information system to make it look more interactive because it can do questions and answers to provide accurate information related to the use of academic information systems.

II. RESEARCH METHOD

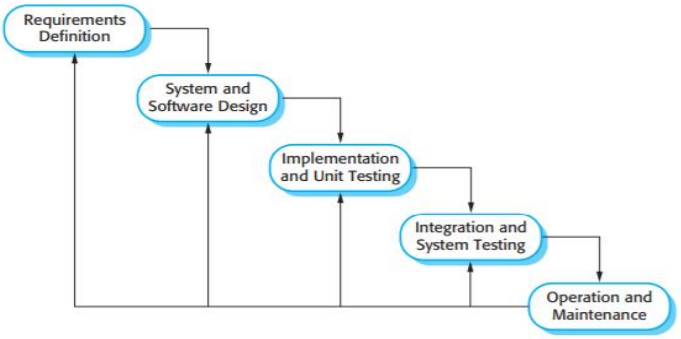

Figure 1. Research Flowchart Software Engineering, 9th Edition (Hormansyah & Utama, 2018)

Research related to this Chatbot feature uses the waterfall method (SDLC). Where this SDLC is a framework that contains the stages that need to be done to develop a software (Dwi et al., 2018).

Data collection is carried out to obtain information so that the data obtained is related to this research. The data collection methods used by researchers include:

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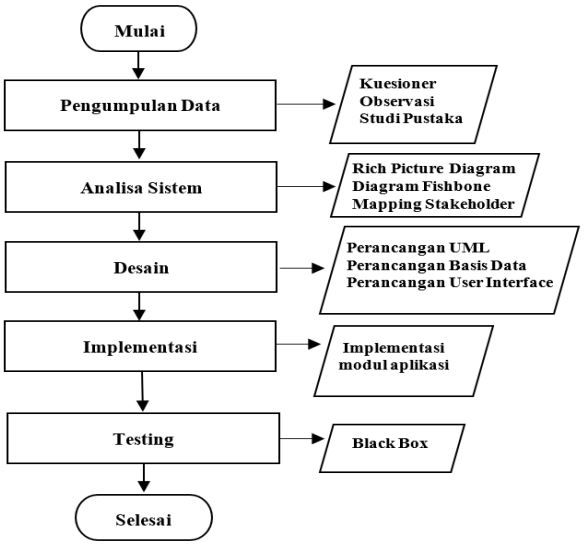

Figure 2. Flowchart of Research Phase

Data collection is carried out to obtain information so that the data obtained is related to this research. The data collection methods used by researchers include questionnaires, observation, and literature study, looking for references to previous research related to chatbot development and the system development method, namely waterfall. Reference materials are taken from the internet, scientific papers, dissertations, journals, theses, papers, and theses.

At the system analysis phase, the researcher analyzes the structure and flow of the system on the College website. The data collection method in this helpdesk chatbot design applies three ways: surveys conducted by sending a questionnaire via WhatsApp, which concluded that some students do not know the existence of WhatsApp helpdesk services and do not understand the function of the applications contained in the information system (student desk); direct observation on related websites, namely the academic information system website (student desk) used by these private universities; and literature study by collecting relevant case studies related to similar information. After the necessary data is collected, the next step is to process all the information obtained for the purpose of analyzing the system to be built. After finding an analysis that matches the current system, the next step is to observe the scope related to the application of chatbot features. At this stage, the scope of the chatbot to be created is determined (Ganney et al., 2014) (Jumardi et

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al., 2020). In this case, the limitations that researchers make on the chatbot feature to be created are that it only covers internal (learning in the lecture environment) and external (organization and information system) activities. In addition, all designs related to the chatbot workflow are carried out at this stage.

During the design stage, the creation of the application framework and UML sketching application design with UML such as use case diagrams, activity diagrams, and sequence diagrams is performed. The process of writing program code for development is done according to the previously created design, using the CodeIgniter framework as the base for writing the program, while the MySQLi database is used to accommodate all the information summarized in the chatbot.

In the testing phase, the function of each helpdesk chatbot feature is tested to ensure it runs according to its function. Initially, researchers conduct the first test stage without any other party's participation to ascertain whether the product results align with the previously expected objectives. When the product passes the first test stage, it enters the field trial stage, aiming to gather direct user responses by asking users to access the completed helpdesk chatbot application and try out the features in the application display.

At the data analysis stage, researchers analyze the data by collecting, selecting, and converting the data into information.

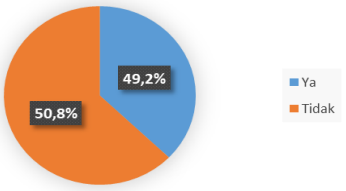

Figure 3. Student Questionnaire Results

We made observations by sending a questionnaire with seven questions via WhatsApp to students from 20 study programs, assisted by the lecturer in charge. From the 191 responses, it was found that 50.8% of students did not know about the WhatsApp helpdesk services and did not understand the functions of the information system (student desk). The research included direct observation of the service during online sessions (COVID-19), reading student questions on the WhatsApp helpdesk, and conducting interviews with helpdesk staff. Researchers

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also conducted direct interviews with the Head of the UPT Center for Computer Data and Information Systems to understand business processes, stages, and systems used, supported by helpdesk staff for necessary data.

The literature study concluded that the Chatbot feature can interact with and connect to the database, providing keywords and answer keys set by the admin. This allows the admin to add or update vocabulary for the chatbot. The chatbot can answer questions from many users simultaneously, ensuring that all messages are handled quickly, so students' questions are answered automatically without long waits. The chatbot also acts as a customer service representative, providing information needed by students efficiently.

III. RESULT AND DISCUSSION

3.1 Stakeholder Mapping

The following is a mapping that describes the ideas or concepts and functions of the organization described in the form of stakeholder mapping:

AKTIVITAS \ STAKEHOLDER	UPT PUSAT DATA KOMPUTER DAN SISTEM INFORMASI	KEPALA BAGIAN SISTEM KOMPUTER	KEPALA SUB BAGIAN SISTEM KOMPUTER	STAFF HELPDESK
AKTIVITAS UTAMA				
Melakukan pengembangan atau penambahan fitur pada sistem informasi	■			
Melakukan testing sistem yang telah dikembangkan	■			
Memastikan sistem yang baru dikembankan kapan bisa digunakan	■			
Melakukan perbaikan jaringan		■		
Melakukan maintenance server		■		
Melakukan Singkronisasi data-data terkait perkuliahan		■		
Melakukan Singkronisasi antara SIA & E-Learning		■		
Melakukan maintenance terkait sistem informasi			■	
Monitoring data terkait dari sistem informasi			■	
Melaporkan kendala-kendala sistem informasi			■	
Menyampaikan perbaikan sistem kepada user atau mahasiswa			■	
Memperbaiki error system			■	
Menjawab Pertanyaan Mahasiswa terkait Sistem Informasi				■
Melakukan Update terhadap website UAI				■
Menjawab Pertanyaan Mahasiswa terkait e-learning				■
Menyampaikan informasi terkait student desk				■

Figure 4. Stakeholder Mapping

3.2 Rich Picture Diagram

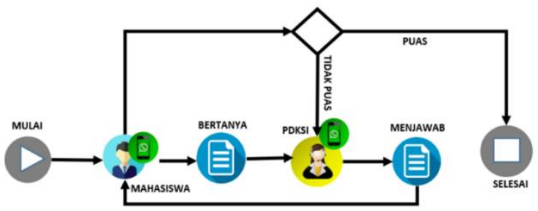

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Figure 5. Rich Picture Diagram (Business Process Analysis)

The analysis stage is carried out to get the needs of the system to be developed. This stage begins with modeling the ongoing business process. This modeling is done to find out the ongoing whatsapp helpdesk service process as well as to find improvements that can be made through the developed system. Currently, information system services related to lectures or helpdesk are only carried out online (online) and to ask questions related to information system problems can only be done through WhatsApp helpdesk. However, services with business WhatsApp and there are weaknesses, namely students cannot ask for information in real time and have to wait because the admin is only 1 (one) person and must answer student questions about 5000 students during the current pandemic (Covid 19) because sometimes the questions asked are not related to the information system. Researchers analyzed several student needs for improving helpdesk services that can cover these weaknesses as follows:

- The helpdesk chatbot development made can be used by students to ask questions related to information system constraints and do not need to come to campus to get information.
- Applications that can make it easier for students to get information from the helpdesk chatbot feature whenever and wherever students access the internet and get information.

3.3 Fishbone Diagram

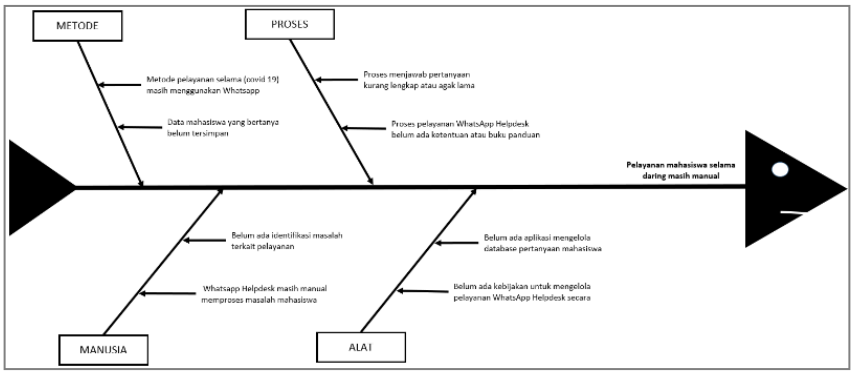

Figure 6. Fishbone Diagram

Based on the analysis of the current business process that has been described in the Rich Picture Diagram, the author describes the identification of problems

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with the Fishbone Diagram method.

Based on the fishbone diagram, it is known that the factors causing the problem are Methods, Processes, People, and Tools. Here are the details of the fishbone diagram:

1. Methods

   Student service methods during the pandemic (covid 19) are carried out using WhatsApp business. There is no database of student questions so student questions must be answered repeatedly.

2. Process

   The process of answering questions is incomplete or takes a while because many students ask questions at the same time. The WhatsApp helpdesk service process has no provisions or guidebooks related to student questions and answers.

3. People

   There is no problem identification related to services. Currently, student questions have not been identified and questions are answered based on the current policy and there is no one-stop policy related to student services (helpdesk center). WhatsApp staff still manually process student problems. This has an impact on the slow pace of information system services received by students.

4. Tools

   There is no application to manage the database of student questions. Currently there is no special application for helpdesk services that can ask questions directly such as online chat that can be answered systematically. There is no policy to manage helpdesk services centrally.

3.4 Use Case

The use case in the picture below has 2 actors, namely admin and students. Admin is someone who has access to various kinds of data processing such as input, update and delete questions. Meanwhile, students are only given access to use and view information available in this application.

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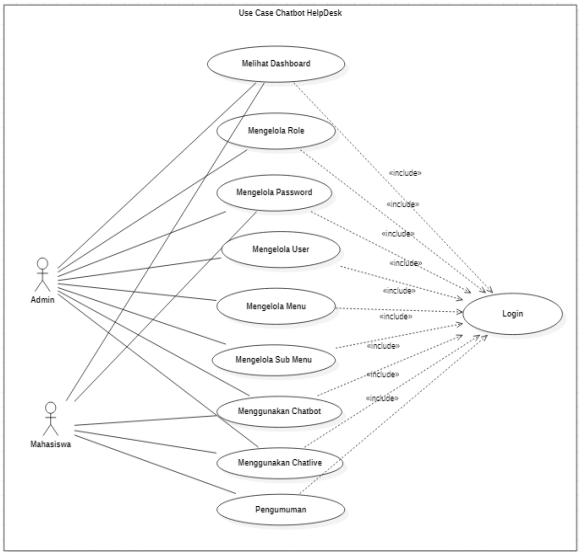

Figure 7. Use Case Diagram

3.5 System Implementation

System implementation is the stage of implementing software that has been implemented, applied and designed and designed to then run fully. The following is the appearance of the program or coding produced, among others:

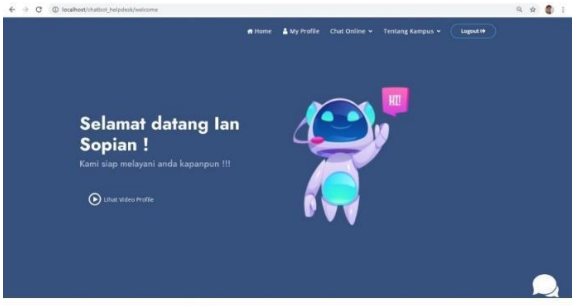

Figure 8. Login Page

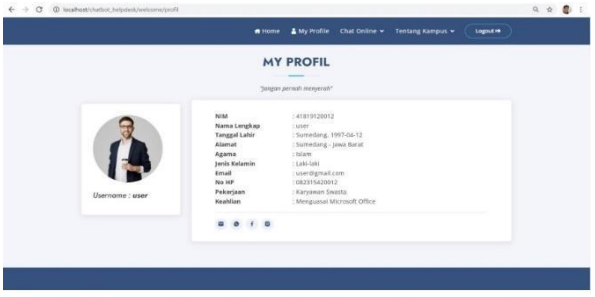

Figure 9. My Profile Page

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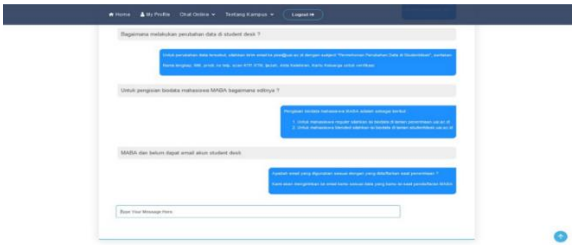

Figure 10. Chatbot Page

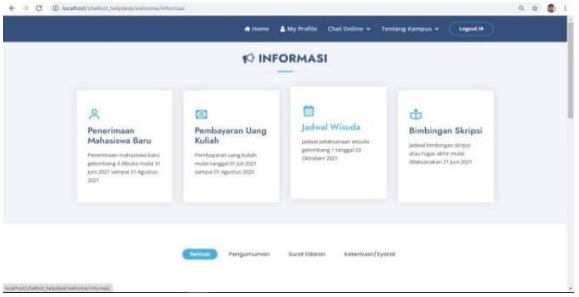

Figure 11. Information Page

Figure 12. About Campus Page

3.6 Application Testing

At this stage of application testing, the tester is the head of the unit at our research site by running the program from http://localhost/chatbot-helpdesk/ to ensure that the helpdesk chatbot application is suitable for use. Testing of this application is done with Black Box testing, which is testing that focuses on the suitability of the output displayed after filling in the input form according to the scenario to be tested. The test scenario that will be carried out on this system is by asking questions about information systems and seeing the responses generated by the helpdesk chatbot. Does the helpdesk chatbot work according to a predetermined conversation flow that begins with an opening message then the user can ask the question as desired and the helpdesk chatbot will provide a response according to the keywords that have been previously formed.

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3.7 Discussion

The research reveals that the new helpdesk chatbot greatly improves how colleges handle student questions about their information systems. The chatbot quickly answers students' queries, which saves time for staff and lets students get help whenever they need it. This makes students happier with the school's services. While the study did a good job of looking at the problem from different angles, it only tested the chatbot at one school with a small number of students. Surprisingly, many students didn't know about the old help system on WhatsApp, which shows schools need to do a better job of telling students about available help. This study shows how useful chatbots can be for helping students in colleges, but there's still more to learn. Future studies could test the chatbot at more schools and make it do more things to help students. They could also look at how the chatbot affects schools in the long run and how it can work with other computer systems schools use.

IV. CONCLUSION

Based on research conducted according to analysis, design, implementation and testing and observation, the authors conclude that the helpdesk chatbot created so that students can ask questions related to information system problems and do not need to come to campus to get information and applications that can make it easier for students to get information from the Chatbot helpdesk application whenever and wherever students access the internet and get information. For the next author proposes to develop the helpdesk chatbot application so that it can be implemented in all units and directorates and can be used by the entire academic community because currently researchers only conduct research on one unit.

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