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Implementation of a Website-Based Training Helpdesk Chatbot Using Dialogflow (Case Study: Thematic Academy)

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Abstract

Human Resource Development (HRD) is one of the key factors in facing global challenges in the era of digital transformation. The Thematic Academy plays a role in organizing training to equip the community with skills that meet industry needs. As the number of training participants increases, the challenge of managing information services becomes greater. To overcome this problem, the Thematic Academy implemented a website-based chatbot integrated with the Dialogflow platform. By utilizing Natural Language Processing (NLP), the chatbot can provide relevant responses tailored to the needs of participants. This research aims to improve the efficiency of training information services and provide a responsive user experience. The research methods used include literature study, data collection, system design, implementation and testing, and conclusion drawing. The results of this research show that the implemented chatbot can answer general questions appropriately, provide training-related information, and help participants resolve technical issues effectively. The implementation of this chatbot has successfully improved service efficiency and provided a better interaction experience for training participants.

Keywords: *Chatbot, Dialogflow, Natural Language Processing, Helpdesk, Website*

1. Introduction

Human Resource Development (HRD) is one of the important aspects in facing global challenges in the era of digital transformation. Competence and quality of human resources are the keys to the success of an organization or nation in increasing competitiveness in various sectors. One way to increase human resource capacity is through structured training and education oriented towards the needs of the job market.

In supporting HR development, Thematic Academy is present as a training program provider specifically designed to provide skills and knowledge to the community. This academy offers various thematic training programs that focus on specific fields, such as information technology, entrepreneurship, and career development. With an industry-based approach, Thematic Academy plays an important role in creating competent HR who are ready to compete in the world of work.

As the number of training participants increases, the challenges in managing information services also increase. Participants need quick and accurate access to information regarding schedules, registration procedures, training modules, and technical implementation. The manual system used previously was often inefficient, especially when faced with a high volume of questions, which affected participant satisfaction.

To overcome these challenges, Thematic Academy adopted technology through the implementation of a Website-Based Training Helpdesk Chatbot using Dialogflow. This chatbot is designed to provide automated, responsive information services that are accessible to participants at any time. By utilizing Dialogflow as an artificial intelligence (AI) platform, this chatbot is able to understand and respond to participants' questions naturally. In addition, integration with the website allows for greater accessibility and flexibility for users.

The implementation of this website-based chatbot not only aims to improve service quality but also to optimize the academy's operational management. The chatbot can instantly answer frequently asked questions (FAQs), help participants find the information they need, and reduce the workload of helpdesk staff. With its interaction data analysis feature, the chatbot can also provide useful insights to identify participant needs and continuously improve the quality of training services.

Through this step, Thematic Academy demonstrates its commitment to utilizing modern technology to support sustainable human resource development. The implementation of a website-based training helpdesk chatbot using Dialogflow is one of the strategic innovations in

responding to challenges in the digital era while strengthening its role as an adaptive and responsive provider of thematic training that meets the needs of the community.

2. Theoritical Basic

2.1. Chatbot

A chatbot is an application that enables conversations between machines and humans using natural human language. Chatbots are often described as a way to simulate interactions between machines and humans. To understand natural human language, chatbots use NLP (Natural Language Processing) approaches to learn and process every word spoken by humans in the form of text messages [1].

2.2. Dialogflow

Dialogflow is an NLP (Natural Language Processing) platform that facilitates the design and integration of conversational interfaces into mobile applications, websites, devices, bots, interactive voice response systems, and more. By using Dialogflow, users can interact with products in new and exciting ways. This platform is capable of analyzing various types of input, both text and audio (such as phone calls or voice recordings), and providing responses to customers via text or synthetic speech [2].

Dialogflow is a Google framework that provides Natural Language Processing (NLP) and Natural Language Understanding (NLU) services, which are often used to create chatbots. In addition, Dialogflow has a one-click integration feature with various popular messenger platforms such as Line, Facebook Messenger, Telegram, as well as other services such as Google Assistant and Amazon Alexa [3].

2.3. Natural Language Processing

Natural language processing, or NLP, is a computational language that enables computers or robots to understand human language [4]. In this research, the NLP method will be used to search for root words from messages sent by users, then send responses that match the requests. This NLP process will be developed using the Google Dialogflow platform.

2.4. Helpdesk

A helpdesk is a system that can be used to assist an organization in responding to user needs related to questions, technical services, or complaints by using a numbering system (tickets) [5].

2.5. Website

A website or site can be defined as a collection of pages that present information in various formats, including text, images, animations, sounds, and videos, both static and dynamic. This creates an interconnected network, where each page is linked through a network of pages or hyperlinks. [6]

2.6. React JS

React.js is a JavaScript library for building fast and interactive user interfaces (UI), with a component-based approach and virtual DOM for efficiency [7]. The Thematic Academy website was built using React.js because it has the ability to support the development of dynamic, responsive, and easy-to-manage website applications through a component-based approach.

3. Research Methods

3.1. Literature Review

Literature Review. One commonly used research approach for gathering data is a literature review. This method involves reading, taking notes, and reviewing existing material. Conducting a literature review involves searching for information from various sources, including scientific publications, books, journals, and other relevant sources.

3.2. Data Collection

Data is collected through analysis of questions frequently asked by training participants in the WhatsApp Group, such as LMS access, certificate downloads, viewing assessments, and others. This data is then used to design chatbot conversation flows, so that it can provide relevant and effective answers according to the participants' needs.

3.3. System Design

The system will be designed based on the flowchart that has been created, including the development of an artificial intelligence-based chatbot using the Natural Language Processing (NLP) method on the Dialogflow platform, as well as its integration into the website.

3.4. Implementation and Testing

After the chatbot is designed, it will be implemented and then tested. The results of the testing will be analyzed to ensure that the system performs as expected.

3.5. Conclusion

This research will conclude with conclusions based on the results obtained in the previous stages.

4. Result and Discussion

At this stage, the results and discussion covering the system design, implementation, and testing of the chatbot will be explained.

4.1 System Design

Fig. 1: Flowchart Chatbot

Figure 1 is a flowchart of a chatbot designed to assist users in training helpdesk services. The process begins with the user inputting a question or request. The question is then processed by the system to match it with the intent that has been trained in Dialogflow. If the intent is successfully recognized, the chatbot will provide a response that matches the user's question. However, if the intent is not recognized, the chatbot will display a default fallback intent message to inform the user that the question cannot be understood. Finally, the chatbot provides an answer to the user before the process is terminated.

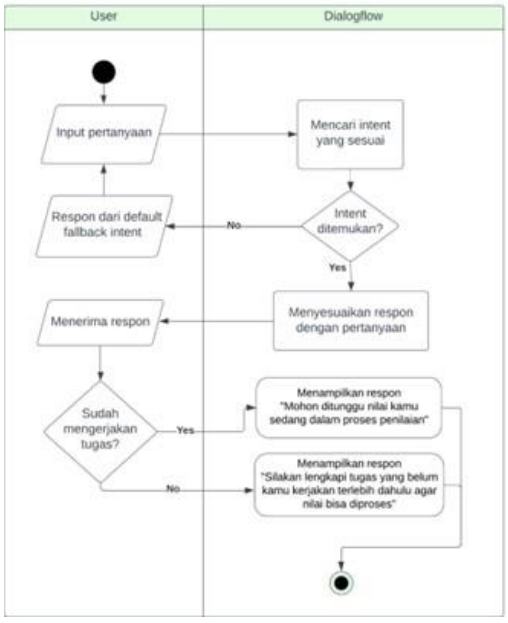

Fig. 2: Diagram Activity

The system will start when there is text or input sent by the user to start a conversation. This input will be studied by Dialogflow and then entered into intents. If the text or input is successfully recognized as one of the trained intents, the chatbot will provide a relevant response according to the user's question. For example, if the user asks about a rating that is not yet available, the chatbot will provide a dynamic response based on the user's situation.

However, if the user input is not recognized, for example, because the intent is not in the trained list or there is a typo, the system will display the Default Fallback Intent. This default response is designed to handle cases where the chatbot cannot understand the input. After

the response is given to the user, whether it is from the found intent or from the Default Fallback Intent, the system will complete the process and return to being ready to receive new input from the user.

Fig. 3: Intent download-sertifikat

The user expression in the download-certificate intent is a question that will be used to train the chatbot to recognize questions related to how to download training certificates, such as “Download sertifikat dimana?”

Fig. 4: Action and parameter intent download-sertifikat

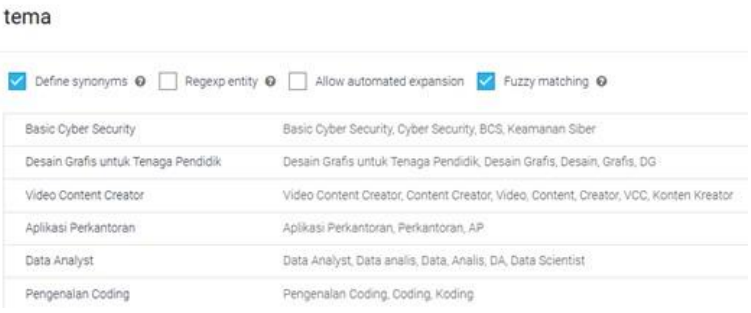

Fig. 5: Entity tema pelatihan

An entity is an element used to extract specific information from user input, such as keywords, names, or certain terms relevant to the conversation. The entity created, “theme,” is used to recognize the names of training themes entered by users and link them to specific data in the system.

Actions determine what the system needs to do after receiving input from the user, while parameters provide the data needed to process the request correctly. If a user asks in general how to download a certificate, the chatbot will ask the question, “Sertifikat dari pelatihan apa yang kamu ikuti?” This question aims to request more specific information from the user regarding the training topic they participated in, so that the chatbot can match the user's answer with the ‘topic’ entity that has been defined previously. For example, if the user responds with “Video Content Creator,” the chatbot will recognize the words as part of the “theme” entity and provide instructions and relevant links

to guide them in downloading the Video Content Creator training certificate. This process ensures that the chatbot can handle user requests efficiently and provide responses that meet their needs.

Fig. 6: Default Fallback Intent

A default fallback intent occurs when the chatbot does not understand or recognize the user's input. The input cannot be recognized from the training phrases or there is a typo when the user types. Examples of default fallback intents are “p”, “oi”, ‘test’, “haha” and others that are not found in the intent.

Fig. 7: Response Default Fallback Intent

The chatbot will respond that the input provided is not recognized or is not compatible with what the system can handle, with the response “Maaf, saya tidak memahami apa yang kamu maksud.”

Fig. 8: Intent tema-pelatihan

The user expression in the training-theme intent is a question that will be used to train the chatbot to recognize questions related to available training themes, such as “Ada tema pelatihan apa saja?”. By training the chatbot using a variety of questions, the chatbot can more accurately recognize and respond to user requests regarding training themes.

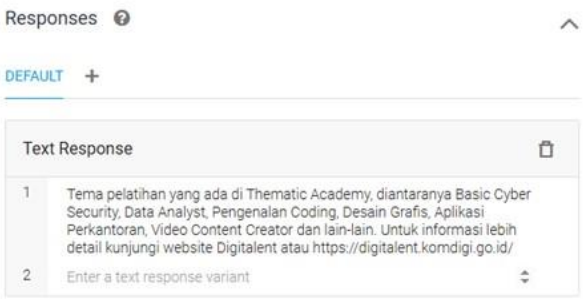

Fig. 9: Response Intent tema-pelatihan

When users ask about training topics, the chatbot will respond by providing information about available training topics. This text response can be customized to provide quick and relevant answers, helping users obtain information efficiently.

4.2 Implementation

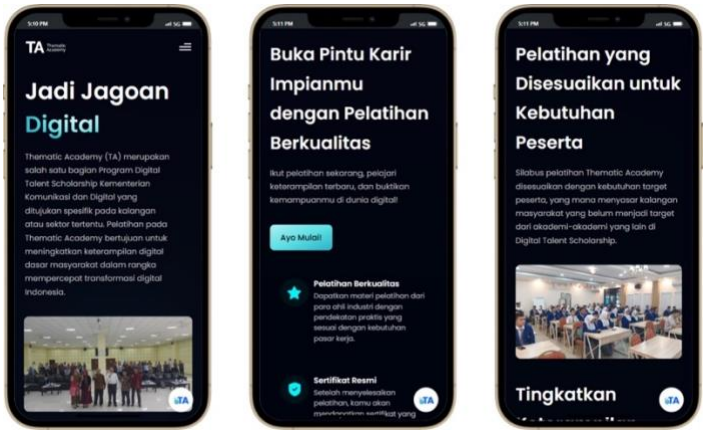

Fig. 10: Thematic Academy Website Interface Display

Figure 10 shows the interface of the Thematic Academy website that has been created and will be used for chatbot implementation. It can be accessed via Thematic Academy or https://thematic-academy.vercel.app. This website will be the main platform for user interaction with the chatbot, providing easy access to information related to digital training programs provided by Thematic Academy.

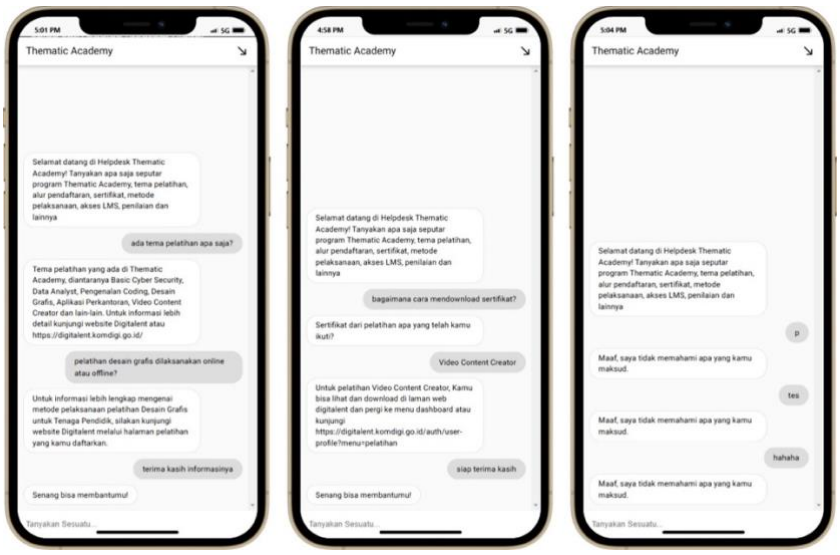

Fig. 11: Chatbot Response Display

In Figure 11 the chatbot interface displays when users ask questions related to training topics available at Thematic Academy, how to download certificates, and scenarios where the conversation is not recognized by the system. Meanwhile, the chatbot automatically displays a default fallback intent as a built-in response to handle inputs that cannot be processed or understood, such as “p”, ‘test’ and “hahaha”. This demonstrates the chatbot's ability to provide relevant answers in recognizable contexts while handling situations that are beyond its scope of understanding.

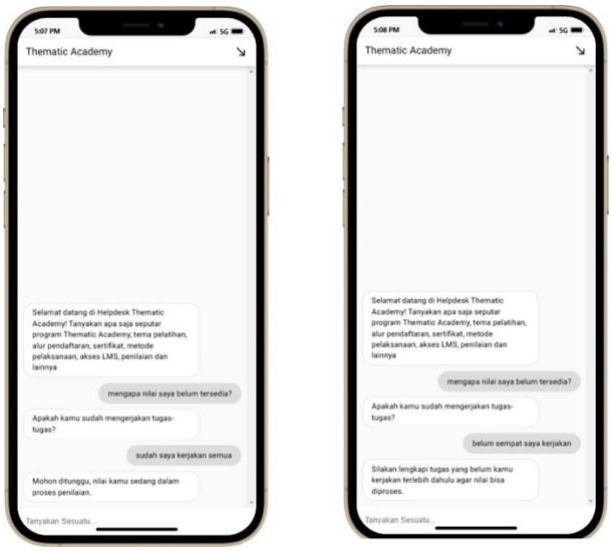

Fig. 12: Chatbot Response Display Related to Assessment

In Figure 12, the chatbot interface displays when the user asks a question related to a value that is not yet available. The chatbot responds dynamically based on the information provided by the user. If the user has not completed the assignment, the chatbot will ask about the status of the assignment and provide instructions for completing the unfinished assignment. Conversely, if the user has completed the assignment, the chatbot will ask the user to wait because the score is still being assessed. These responses demonstrate the chatbot's ability to tailor its answers to the user's circumstances, creating a more relevant and responsive experience.

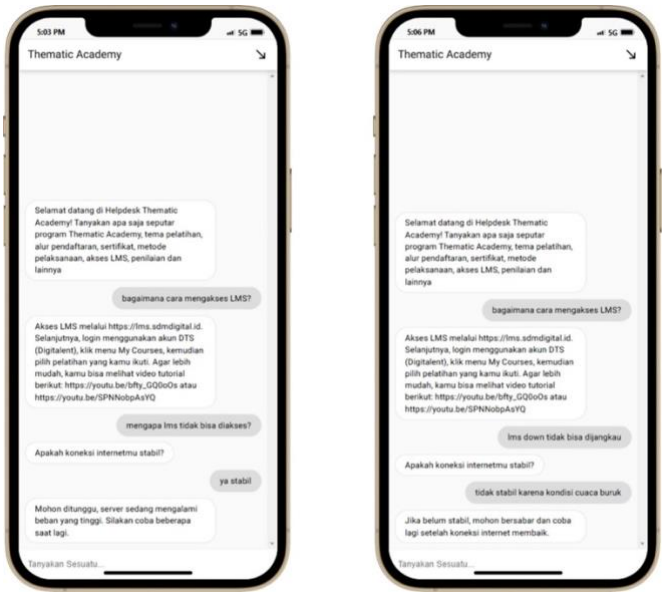

Fig. 13: Chatbot Response Display Related to LMS Access

In Figure 13, the chatbot interface responds to user complaints regarding the inability to access the LMS. The chatbot provides answers tailored to the user's internet connection status. If the user's internet connection is unstable, the chatbot will ask about the connection status and suggest that the user ensure a stable internet connection. Conversely, if the internet connection is stable, the chatbot will inform the

user that the server is experiencing high traffic and ask the user to try again once conditions improve. With this customized response, the chatbot can provide relevant solutions or information based on the user's situation, helping to resolve issues efficiently.

4.3 Testing

This research involves analysis to evaluate the quality and performance of chatbots. Testing was conducted using the blackbox method. The results of this analysis aim to evaluate the suitability and accuracy of the chatbot's responses.

Table 1: Blackbox Testing

Initial Testing			
Intent Dialogflow	**User Expression**	**Text Response**	**Test Results**
training themes	What training is available?	Thematic Academy offers training topics such as Basic Cyber Security, Data Analysis, Introduction to Coding, Graphic Design, Office Applications, Video Content Creation, and more. For more detailed information, visit the Digitalent website or https://digitalent.komdigi.go.id/	Chatbot can respond correctly
	What training is there?		
	What are the training themes?		
evaluation	Why haven't my grades come out yet?	Have you done your assignments?	Chatbot can respond correctly
	Why haven't my grades appeared?		
	Value not yet displayed		
	My grades are not there yet		
follow up assessment intent - yes	Yes	Please wait, your grades are in the assessment process.	Chatbot can respond correctly
	Already		
	Correct		
follow up intent assessment - no	Not yet	Please complete the assignments you haven't done yet so that your grades can be processed.	Chatbot can respond correctly
	Later		
	No		
	I will do it later		
cost	Is this training free?	This training is free and does not cost a penny.	Chatbot can respond correctly
	Is this training covered by the participants?		
	Is this training paid?		
registration flow	How to register?	First, log in to the Digitalent website or visit https://digitalent.komdigi.go.id, then select the "Registration" menu and choose the training you wish to participate in. Also, prepare the required documents.	Chatbot can respond correctly
	How does the registration process work?		
	How to register?		
certificate download	Where to download the certificate?	For $theme training, you can view and download it on the digitalent website and go to the dashboard menu or visit https://digitalent.komdigi.go.id/auth/user-profile?menu=pelatihan	Chatbot can respond correctly
	Where to download the certificate?		
	How to download certificate?		
certificate issuance	When can I download the certificate?	The certificate will be available 1-2 weeks after the training, pending assessment and other data collection processes. After that, you can download it.	Chatbot can respond correctly
	When will the certificate be available?		
	When can the certificate be downloaded?		
access-lms	I can't log in to lms	Is your internet connection stable?	Chatbot can respond correctly
	My LMS is having problems		
	LMS cannot be accessed		
follow up intent access-lms yes	Stable	Please wait, the server is currently experiencing heavy load. Please try again later.	Chatbot can respond correctly
	Yes		
	My connection is stable		
follow up intent access-LMS no	Unstable	If it is not stable, please be patient and try again after the internet connection improves.	Chatbot can respond correctly
	Bad		
	My connection is unstable		
method	Is it carried out offline or online?	Training at Thematic Academy is available in two methods, namely online and offline, which are tailored to the needs and characteristics of each type of training.	Chatbot can respond correctly
	Is it implemented online or offline?		
	Are the activities held online?		
Default Fallback Intent	P	Sorry, I don't understand what you mean	Chatbot can respond correctly
	Tes		
	Wkwkwk		
	Haha		

After testing the certificate download feature on the Dialogflow Agent, the chatbot was found to be 100% accurate in responding to certificate downloads or how to download certificates that were inputted.

In the initial testing phase, which focused on testing responses and measuring the accuracy of the chatbot before it was finally released to users, after many trials, it can be concluded that the results of testing the training helpdesk chatbot at Thematic Academy can be considered successful. The chatbot runs according to the initial design and responds correctly to all responses.

5. Conclusion

The implementation of a chatbot for the training helpdesk using the Dialogflow platform integrated into the website has been successful. The chatbot is designed to handle tasks such as answering general questions from training participants, providing information related to available training topics, explaining the steps to download certificates, and helping users resolve technical issues such as LMS access problems and others.

This chatbot is able to understand user input through Natural Language Processing (NLP) and provide relevant responses based on pre-set intents and entities. In addition, the chatbot functions as an effective, efficient, and reliable helpdesk system in supporting the information needs of training participants quickly and accurately.

By utilizing the Dialogflow platform, the chatbot can provide relevant responses and make it easier for training participants to obtain information about online training registration. The more data used in the training phrase, the more responsive the chatbot is in providing more varied answers according to the context of the conversation.In this section you should present the conclusion of the paper.

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