DEVELOPING OF THESIS GUIDANCE LEARNING MEDIA USING THE FIVE STAGE MODEL (*MANTAP*) IN FRENCH LANGUAGE STUDY PROGRAM

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Abstract. The COVID-19 pandemic has been proven to have a significant impact on changes in various aspects of human life, including education. One group that is specifically affected is final semester students who face challenges in the thesis preparation process due to the large-scale social restriction (PSBB) policy in Indonesia. With limited social interaction and face- to-face learning, the thesis guidance process becomes more complex, increasing the psychological and academic burden for students. including the thesis supervision process for French Language Students at Medan State University. As an alternative solution, research was carried out by examining the use of GitHub as a cloud storage medium and Telegram as a communication platform to speed up the thesis guidance process, where when students make corrective changes to the thesis files contained in Github, the lecturer will automatically get the information via notification on Telegram. This research uses the MANTAP model in system development, where the results of each stage will become input for the next stage so that the process of improving each other occurs. The test results of the real-time notification system show that the notification messages to lecturers and students are completely accurate, namely 100%, meaning that every change made to the thesis file on Github will be notified automatically by Telegram. Apart from that, from measuring the system response time with 2 scenarios, it was found that the average response time was very good based on QoS (Quality of Service) standards, namely 0.47 ms for scenario 1 and 0.82 ms for scenario 2, this difference is the average response time for scenario 1 and scenario 2 This occurs due to differences in internet speed for each collabator which has an impact on differences in response time obtained.

Keywords**:** MANTAP Model, Learning Media, Thesis, Github, Bot Telegram

I. INTRODUCTION

COVID-19 has impacted the entire world, including Indonesia, and has had a significant effect on many fields, including education. Then, as a prevention to reduce the spread of the COVID-19 virus. The government established a restriction policy called PSBB (Fadilah et al., 2022). PSBB regulates all activities including education, which includes education from early childhood to higher education (Astuti Nurfa et al., 2022).

Final semester students are one of those affected, especially during the thesis preparation process (Amalia, L., & Ekohariadi, E. (2022). One of the educational processes that must be carried out by every student before completing the thesis is participating in thesis counseling (Indah Pramita et al., 2023). In the process, students feel burdened when

doing their final project because of the difficulties they experience. On the other hand, they are required to complete the thesis in the middle of the PSBB process. The final project is difficult, but it must be considered a challenge that must be passed to get a bachelor's degree (Aprilia Putri Kartikasari & Rudangta Arianti, 2023). Along with this condition, it is important to understand that the pandemic does not only have an impact on the academic aspects of students, but also on their mental and physical well-being. The psychological burden borne by final semester students becomes more complex due to limited social interaction and direct support from the campus environment. Therefore, maintaining a balance between academic demands and students' psychological well-being is something that cannot be ignored. Online learning media has once again become important in the learning process, especially during the Covid-19 pandemic (Christianti Ari, 2021). In response to

this, the Ministry of Education and Culture has actually also appealed to universities to facilitate and not complicate student theses during this pandemic (Fadilah et al., 2022). In situations where face-to-face meetings are limited or impossible, it is important to find alternative solutions that can facilitate thesis guidance effectively. In today's digital era, information and communication technology plays a crucial role in facilitating distance learning. To realize an easy and fast system, it requires a platform that is close to social interaction and communication, such as short message service or chat (Mantik et al., 2022). By considering the above problems, digital technology is needed such as applications that can help students and thesis supervisors in conducting online counseling (Christianti Ari, 2021).

GitHub, as an easily accessible platform. It can be used as a cloud storage media for document management and sharing, including thesis documents. Another advantage is that GitHub allows for collaboration among many parties based on their capacity and duties. Support file sharing activities in a variety of ways so that they can be developed collaboratively and more broadly (Alvin Adi Soetrisno et al., 2022). Furthermore, the open-source platform advantage of GitHub allows open access to thesis projects, expanding collaboration networks among students and lecturers, and facilitating the efficient exchange of ideas and problem solving. Students and supervisors can directly comment, revise, and update thesis documents by utilizing GitHub's collaborative features, providing a more dynamic and responsive collaboration experience amidst the distance learning challenges presented by the COVID-19 pandemic.

Information technology and communication have grown due to the complexity of Artificial Intelligence (AI) systems. AI systems are dealing with human activities such as making current decisions and performing daily responsibilities (Nur Fitria et al., 2023). The need for professionals who manage information and communication systems consisting of computer and machine components is increasing in the field of computer science. Universities and globalization are interconnected groups (Minhajul Mubarok et al., 2021). With technological advances, the information collaboration process has become more flexible. This is evidenced by the emergence of Instant Messaging (IM) information technology which is currently developing very rapidly (Abidin et al., 2023).

Instant Messaging then quickly evolved with the addition of artificial intelligence. One of the common implementations of artificial intelligence in instant messaging is the development of chatbots. Chatbot is one of the software designed to communicate with humans through a text or voice interface (Nurjanah & Ulfiyani, 2023). Chatbot itself is able to automatically assist communication with humans in the service side (Dadang Iskandar Mulyana et al., 2023). One of the many IMs as a development of communication information technology that can be used to support the learning process is Telegram (Ismawati & Prasetyo, 2020).

Telegram is an opensource IM with many advantages, including Open API and being able to accommodate many users (Alfaiz & Maryam, 2021). Telegram bot itself is one of the features provided by Telegram which can be used or developed using the Telegram BOT API (Rizqi & Amalia, 2021). In the context of education and thesis guidance, Telegram offers the potential to be an effective communication platform between students and supervisors. With its interactive features, Telegram can be used as an intuitive communication tool, facilitate discussions between students and lecturers, and provide convenience in managing thesis guidance online. The existence of Telegram BOT can also provide certain automation to facilitate the administrative process and notifications related to thesis guidance, increasing efficiency and affordability in distance learning situations. In this context, this research aims to develop learning media that utilizes GitHub as a cloud storage media and Telegram as a communication platform to accelerate the thesis guidance process at the Medan State University's (UNIMED) French Language Study Program during COVID-19. Through the use of this technology, it is expected that students and supervisors can stay connected and continue the thesis guidance process effectively, even in situations of social restrictions. This approach is expected to not only provide a practical solution to the COVID-19 pandemic's distance learning challenges, but also to encourage innovation in the use of technology in higher education. It is expected that by utilizing GitHub and Telegram, an adaptive and responsive learning ecosystem can be created, providing an interactive, efficient thesis guidance experience that is tailored to the needs of students and supervisors.

Several previous studies have used chatbots, such as the creation of a chatbot to recommend museums in Jakarta using a knowledge-based recommender system (Rayhan Hakim & A Baizal, 2022); designing other chatbot programs with chatbot features to facilitate the process of buying and selling activities (Febriansyah & Nirmala, 2023) and designing chatbots to investigate how chatbots can be used for overall benefits in foreign language learning (Kovtun et al., 2021). Thus, the use of GitHub and Telegram technology to accelerate the thesis guidance process in the UNIMED's French Language Study Program has the potential to contribute to the development of innovative learning methods. Furthermore, the findings of this study can provide insight and guidance for other study programs that face similar challenges during the thesis or final project guidance process.

II. METHOD

One way to improve educational quality is to have good infrastructure to support the learning process, which is always changing with the times. The facilities and infrastructure in question include not only hardware but also software. Software educational facilities come in a variety of shapes and sizes depending on their development goals, including counseling services. For certain purposes, educators and class participants may interact directly in counseling services (Wiyono B, 2020).

The development of good educational products must go through a good and correct research and development process. There are many models of research and development of educational products for educational development, including the Five Stage research and development model (MANTAP). This model will be a method in developing a thesis guidance model in the French Language Study Program at Medan State University.

Fig. 1 MANTAP Model (Sumarni S., 2019)

The MANTAP model was chosen because it is the most recent model and is simple to understand and implement in the research and development process. Based on this model, it is then organized systematically according to its stages in order to solve the thesis guidance process problem.

- Preliminary Research Stage: Preliminary research is the process of identifying problems and analyzing their causes. Problems will be discovered through a series of identification processes, which will serve as a starting point for the next step.
- The Model Development Stage: Model development is the process of creating a solution model and implementing it based on the findings of problem identification and analysis of the previous problem's causes.
- Model Validation Stage: Model validation is performed using qualitative or quantitative methods, or a combination of both, to make the first revision to the model that has been built.
- Model Trial Stage: During this stage, researchers conduct a limited trial and a broad trial with other parties, after which further revisions are made based on the input obtained.
- Dissemination Stage: at this stage, the trial's findings are socialized and journal publications are published.

III. RESULT AND DISCUSSION

A series of research and development processes that have been carried out based on the stages contained in MANTAP have produced outputs at each step. As follows:

A. Preliminary Research

The preliminary research stage resulted in an output, which was the discovery of problems in the slow thesis guidance process at Medan State University's French

Language Study Program. The difficulty of meeting between students and lecturers to conduct counseling activities related to research as a requirement for obtaining an academic degree is the source of this problem. Furthermore, there are difficulties for lecturers to monitor the progress of the thesis being worked on by students, which is due to the lack of real-time media that can help lecturers know whether students are working on the thesis or not, and all of them rely on one-sided reports from students that thesis improvements have been made.

B. Model Development

Based on the results of previous investigations of problems and causes of problems. So a solution model is developed as an alternative solution to solving the problem, in which a thesis guidance system model is developed with some literature and can be used in real-time using Telegram Bot and Github as follows:
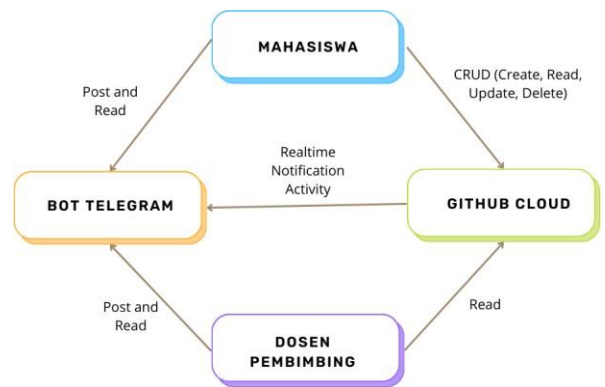

Fig. 2 Thesis guidance realtime system model using Github and Telegram Bot.

In the development of the solution model there will be 4 objects involved with different roles according to their capacity and duties, the four objects are Students, Lecturers, Github and Telegram Bot.

- Students act as the main actors who can perform CRUD (Create, Read, Update, and Delete) activities on thesis files available on Github. Create means that students can create new files on Github, read means that after creating a new file, they are also given the authority to be able to read what the contents of the message from the file are, Update means that students are given the authority to make changes periodically to files that have been created, and Delete means that students are given the authority to delete files that have been created previously. In addition, students also immediately get notifications on Telegram bots as realtime notifications when file changes occur on Github.
- Lecturers act as actors who have the authority to read files that have been previously created by students, so that when there is a notification in the Telegram

Group via Telegram Bot, lecturers can immediately check what changes in improvements made by students to the file.

- Github As a Cloud Storage media that can be used as a file storage area that will be accessed jointly by predetermined actors.
- Telegram Bot functions as social media along with realtime notification messages coming from Github when modifications occur by students.

The next stage is system development, which begins with installing and configuring the Github Cloud Storage from the registration process to the system configuration process on Github. The following step is synchronization with Git Local. Git Local aims to allow students to update thesis files using files available offline, then commit to mengudpate files contained in Github after connecting to the internet network and being able to access the new Github. If there is a private key and a public key, the synchronization process between Github and Git Local can begin. As illustrated in the following diagram:

Fig. 3 Private Key and Public Key.

After the synchronization process is complete, Git Local and Github can be linked. The synchronization process between Github and the Telegram API is then carried out; this process aims to build a real-time notification system that is required in the process of supervisors monitoring student theses.

If there are changes to the Github file, real-time notifications will be sent. Changes made directly through Github as well as changes made to Local Git and committed to Github. The synchronization process between Github and the Telegram API necessitates the use of a token to connect the two and allow them to recognize each other in their workflow. Tokens can be generated on Github, and once generated, the token is registered in the Telegram Bot API.

Fig. 4 Token Generate Github.

Tokens have an active period, so we must always monitor notifications in order to determine if the token is active or not. Inactive tokens prevent real-time notifications from being sent when Github files are changed.

C. Model Validation

Model validation in this product development employs quantitative methods to ensure that the system designed by the model operates correctly and in accordance with its development objectives. The testing procedure is carried out by testing the previously designed system and creating a new document called Repository on Github. This repository will later be used to store thesis documents. The thesis will then be changed and will immediately get a real-time notification on the Telegram Bot.
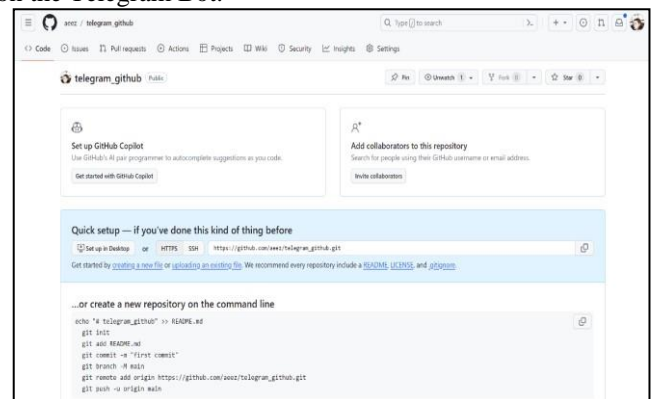

Fig. 5 Create Repository in Github.

After the file update process in the repository is completed, a commit is made to ensure that the changes we make are saved in the repository master file, and a notification message is automatically sent to the Telegram Bot informing that a commit has occurred in the Repository. This message is immediately available to all members of the Telegram Bot Group, including Lecturers and Students. The Lecturer can then immediately verify by opening the file on Github and seeing which parts of the file have been improved by the Student. As a result, the thesis guidance process will improve and become more real-time. The following is a Telegram Bot message notification following a change in the repository file.

Fig. 6 Github CRUD Notification on Telegram Bot.

It can be seen that when a commit or edit is made to a file on Github, a realtime notification is sent to the Telegram Bot. The validation of the model with quantitative methods has succeeded in proving that the realtime thesis guidance system using Telegram Bot and Github is in accordance with the previously developed model design, as evidenced by a notification message on Telegram Bot.

D. Model Testing

After validating the system using quantitative method testing and it was proven successful. Next, system testing is carried out on notification messages and system response time. Notification message testing is a test carried out by ensuring that every change made to the thesis file will immediately appear a notification message in the Telegram group. Meanwhile, response time testing is the testing time to measure how long it takes between committing changes to the thesis file in the repository and the notification message that appears on the Telegram Bot.

There are 2 testing scenarios, the first scenario is collaboration between 1 lecturer and 1 student on a real-time thesis guidance notification system. Ten attempts were made to change the thesis file in the repository and then the notification message was recorded with the results as shown in Table 1.

TABLE 1 NOTIFICATION MESSAGE TEST SCENARIO 1

NO	Experiment	Notification Status
1	First	Successfull
2	Second	Successful
3	Third	Successful
4	Fourth	Successful
5	Fifth	Successfull
6	Sixth	Successfull
7	Seventh	Successful
8	Twelfth	Successful
9	Ninth	Successful
10	Tenth	Successfull

Based on the results of the tests, we can conclude that all changes made will result in the automatic appearance of notification messages on Telegram Bot; as a result, the accuracy of sending notifications reaches 100%, indicating that all notification messages are sent properly. Furthermore, 10 trials of changing the Github repository file and then measuring the time gap between file changes and notification messages that appear were performed.

From Table 2, the average response time is 0.47 ms based on ten trials. The Quality of Service (QoS) measurement standard is then applied to the delay parameter to determine whether the achievement of the response time value is good or bad. Delay is defined as the time it takes to send packets from the source to the destination (Restu P.U, 2020). The average notification response time from Github to Bot Teleram in Kateri is very good, with an index of 4, based on the delay category.

TABLE 2 NOTIFICATION RESPONSE TIME TEST SCENARIO 1.

NO	Experiment	Respontime (ms)
1	First	0.3 ms
2	Second	0.7 ms
3	Third	0.5 ms
4	Fourth	0.4 ms
5	Fifth	0.4 ms
6	Sixth	0.5 ms
7	Seventh	0.2 ms
8	Twelfth	0.6 ms
9	Ninth	0.3 ms
10	Tenth	0.8 ms
	Average Respontime	0.47ms

TABLE 3 NOTIFICATION RESPONSE TIME TEST SCENARIO 1.

Delay Category	Large Delay	Index
Very Good	<150 ms	4
Good	150 – 300 ms	3
Medium	300 – 450 ms	2
Poor	>450 ms	1

The second scenario is collaboration between 1 lecturer and 9 students on the thesis guidance notification system. An experiment was carried out to change the thesis file in the repository and then the notification message was recorded to all collaborators with the results as shown in Table 4

TABLE 4 NOTIFICATION MESSAGE TEST SCENARIO 2.

Number	Experiment	Notification Status
1	Collaborator 1	Successfull
2	Collaborator 2	Successful
3	Collaborator 3	Successful
4	Collaborator 4	Successful
5	Collaborator 5	Successfull
6	Collaborator 6	Successfull
7	Collaborator 7	Successful
8	Collaborator 8	Successful
9	Collaborator 9	Successful
10	Collaborator 10	Successfull

Table 4 shows that all notification messages can be sent correctly from Github to Telegram Bot with a successful status and accuracy of 100%, indicating that this guidance system can serve many students at the same time without any significant obstacles. Following that, we measured the response time of all computers that made changes to the Github file and recorded it in the table below.

From Table 5, the average response time with ten collaborators is 0.82 ms, which is still very good in the QoS category, indicating that the system is capable of providing the best service in providing notification messages via Telegram Bot.

TABLE 5 NOTIFICATION RESPONSE TIME TEST SCENARIO 2.

NO	Experiment	Respontime (ms)
1	Collaborator 1	0.4 ms
2	Collaborator 2	1.1 ms
3	Collaborator 3	0.9 ms
4	Collaborator 4	0.2 ms
5	Collaborator 5	1.5 ms
6	Collaborator 6	0.5 ms
7	Collaborator 7	1.2 ms
8	Collaborator 8	0.7 ms
9	Collaborator 9	0.1 ms
10	Collaborator 10	0.8 ms
	Average Respontime	0.82 ms

By comparing Scenarios 1 and 2, we can observe that the average response time value has increased from 0.47 ms to 0.82 ms. This occurs due to differences in the internet speed of each collaborator and differences in traffic density in the network, so it can be concluded that the user's internet speed when changes and commits occur to the thesis file will also have an impact on how fast or slow message notifications are received by the Telegram bot and received. by each collaborator.

IV. CONCLUSIONS

From the results of this research, there are several conclusions obtained as follows:

- Github and Telegram Bot can create a realtime notification system that can be used to monitor the thesis guidance process as part of the development of a learning model in the French Language Study Program at Medan State University.
- Delivery accuracy reaches 100%, meaning that whenever a change is made to the Github file, a notification message is automatically sent to the Telegram Bot.
- The speed of notification delivery or response time is greatly influenced by the user's internet speed

The next suggestion for the thesis guidance system using Gituhub and Telegram is to develop other integrations on other social media platforms, such as WhatsApp, because WhatsApp has a larger user base today in the world.

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