DEVELOPMENT OF THE CHATBOT EINSTEIN APPLICATION AS A VIRTUAL TEACHER OF PHYSICAL LEARNING IN THE HOUSE USING ANDROID BASED GOOGLE DIALOGFLOW API

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ABSTRACT

The study entitled "chatbot application development einstein as a virtual teacher teaching physics at Home" aims to explain about the use of technology as a medium of learning physics chatbot for class X (ten) in SMK Yapari - Aktripa Bandung. The method used to collect data in this study is by interview, questionnaire and literature study and observation. As for software development using the Multimedia Development Life Cycle seligmen Wijer and soles. Tahpan contained in this MDLC is the analysis, design, development, implementation and assessment. Based on the results of data collection, there are obstacles, such as lack of students' understanding of the material when students do not have problems with learning teachers do therefore needed media that can help students understand the material as a supplementary understanding beyond the learning that has been done in the school. Most of the students use the smartphone to communicate media. Media created can be used anywhere, practical and able to communicate properly friend or teacher who provides assistance when the time to learn. Pembelajara-based mobile media can be a solution for smartphones become the communication tool that is always taken by the student and the chatbot tekologi enable students acquire more communicative communication Most of the students use the smartphone to communicate media. Media created can be used anywhere, practical and able to communicate properly friend or teacher who provides assistance when the time to learn. Pembelajara-based mobile media can be a solution for smartphones become the communication tool that is always taken by the student and the chatbot tekologi enable students acquire more communicative communication Most of the students use the smartphone to communicate media. Media created can be used anywhere, practical and able to communicate properly friend or teacher who provides assistance when the time to learn. Pembelajara-based mobile media can be a solution for smartphones become the communication tool that is always taken by the student and the chatbot tekologi enable students acquire more communicative communication

Keywords: Chatbot, Materials Physics, Media Education, smartphone, Education communicative

1. PRELIMINARY

1.1 Background

SMK Yapari Aktripa is one of the vocational schools are located in the city of Bandung was founded in 2008.sama as other high school SMK smk yapari there are three departments that focus on the field of tourism, namely the Department of hospitality, multimedia and culinary, in every department there are subjects compulsory and one of them is the subject of physics. Physics is one of the general subjects that are mandatory or normative given to students in vocational high schools, outside the field of expertise of each of its departments

Learning physics in vocational Yapari learned only when the student sitting in class 10 with the goal of becoming the basis of common knowledge to support subjects of productive, At SMK Yapari physics learning in teaching using inquiry learning that encourages students to collaborate to solve the problem is not simply to receive instruction with course but students can understand the lessons under the guidance of a teacher without the teacher becomes the answer is it's own method of inquiry learning is where the students follow the education strategy methods and practices similar to professional users such as scientists to build knowledge (Keselman, 2003).

From the results of interviews conducted with physics teachers at SMK Yapari says teachers find it difficult to help students who still lack an understanding of the material because students during classroom learning does not actively ask for materials that do not understand. Students only use notebook and modules provided in the teacher while studying at home so for students who do not actively ask and record will find it difficult when studying at home due to not understanding the material.,

Based on previous studies conducted by debasatwa (debasatwa, 2017) states increased their awareness of students in the use of mobile phones for

educational purposes and Patrick bii that says chat bots can play a useful role for the purpose of education because they are interactive mechanism compared with e-learning traditional system , Students can continue to interact with the bot any questions related to a specific field (patrick bii, 2013)

Based on the above problems, it dibuthkan an interactive learning media is expected to be one of the tools that can help students and teachers in learning activities. chatbot built will be a virtual assisting that will help students to learn at home and also can help teachers evaluate students through the existing logs and any student can practice the material that has been studied by the form of question answering quiz to make learning become more leverage

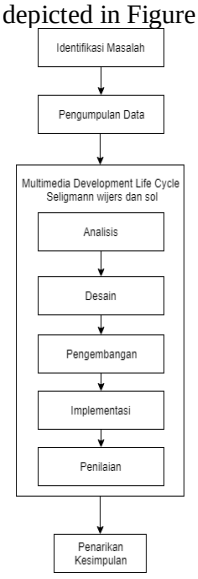
1.2 Purpose and objectives

The purpose of this study was to establish the chatbot application as teaching aids to help students learn independently at home-based android. The objectives to be achieved through this research are as follows:

1. Facilitate student asked to material that is not understood by a conversation with a bot that can be accessed via android.
2. Providing alternative media that can be used to help students learn outside of school hours
3. Allows teachers to determine the level of student understanding through question answering student in chatbot
4. Make it easy for students to be able to find out the errors with the correction features and the teacher can evaluate students' mistakes

1.3 Research methodology

In this study, the research method used is descriptive method descriptive research which is a method that is used to describe the subject or object in the study fit the facts or phenomena that exist (Mohammad Nazir, 2005) .As for research groove that runs depicted in Figure 1 below



Picture 1, Flow Research

Based on the research workflow overview in Figure 1 below is the flow of research conducted

1. Identification of problems

Stages of problem identification, is to look for the problems that exist in the school smk yapari aktripa

2. Data collection

data collection needed to help identify the problem. The data collection itself is divided into four ways:

a. Interview

The interview is a technique of data collection by way of question and answer with the subject teachers of physics in vocational Yapari Aktripa Bandung.

b. Study of literature

The study of literature is a data collection techniques to collect literature that originates from the articles relating to the chatbot, research and development methodology perangkatlunak and also books, journals, papers, and research-related bacaanyang.

c. Observation

Collecting data by directly involved in the learning process that takes place in vocational Yapari Aktripa, by observing everything that happens in the learning activities by adapting to the existing problems.

d. questionnaires

The questionnaire was carried out by distributing flyers to students which questions the questionnaire will be processed in order to obtain information dibutuhkan.metode used in making the number of sampling method and the method of calculating the data slovin kesioner with Likert Scale

3. analysis

The first stage is the stage of the analysis: this phase establishes Einstein chatbot application development purposes involving the purpose of teaching and learning, students, teachers and the environment in vocational Yapari Aktripa. This analysis was conducted with the cooperation between the physics teacher with application developers in researching the needs of the application by referring to curriculum objectives berasaskan

4. Design

In kedual stage is the design phase: This phase includes the elements that need to be loaded in the application to be developed based on a model of teaching and learning that exist in school or so-called ID (Instructional Design).

5. Development

In this third stage is: berasaskan development stage model of ID and storyboards that have been provided for the purpose of realizing a teaching and learning application prototaip

6. Implementation

The fourth stage is the implementation stage: This stage which makes testing units have been developed in the process of teaching and learning and also prototaip which has been prepared

7. appraisal

Five stages to this will know exactly the strengths and weaknesses of applications that have been built so that it can make customizations and penghalusian applications developed for application development more perfect.

2. LITERATURE REVIEW

2.1. Theoretical basis

The theoretical basis is intended to be a guide at the time of the study in order to research done into line moved at the facts on the ground. Besides being the theoretical basis is also used as a way to give a general idea of the background research as well as a discussion of research findings. Where researchers take the theories that need to be used in conducting the research.

2.2. Artificial Intelligence (Artificial Intelligence)

Artificial intelligence is a new effort to dance to make the computer think, machines with minds, in the full meaning and literal (Haugeland, 1985), or on another definition of his said artificial intelligence (Artificial Intelligence) is a branch of science which deals with the use of the machine to solve more complicated problems in a more humane [6]. AI utilize computational agents to be given knowledge while the agent is something that acts in an environment, an agent can in katakana as a component of the reservoir of knowledge that is given, directly and agents have the ability to act intelligently, namely when:

1. What was done in accordance with the circumstances and objectives, taking into account the short and long term consequences of his actions
2. Flexible state to change the environment and change destination
3. He learned from the experience and make the right choice considering the limited perceptive and computation

2.3. Natural language (Natural Language)

Language itself is a special capacity in humans to meperoleh and use complex communication system and a language is a specific example of such a system. Basically the language is divided into two (1) Natural Language, and (2) natural buatan.Bahasa language is a language that humans learned from the environment that is used to communicate with humans or in another sense if linked to natural language is the language of artificial intelligence created by humans to communicate with computer technology using artificial manusia.Bahasa language is the language in stacking based reasoning for for menyampaiikan a particular concept. In the made-up language, symbols applicable as meaning pengandung called "term" while contained by the term is a concept.

Chomsky is a person who contributed a great deal to represent language as a symbol for the first series. Linguistics Chomsky's major contributions is widely regarded as a mathematical syntactic theory, which was later expanded to describe the semantic structure. Chomsky proposed an abstract, mathematical theory of generative models introduced language that says (infinitely many) sentences in the language. The model consists of production rules Postlike, formally changing the sequence of symbols, and the shape is not limited computing Turing similar manner, although similar restrictions with simpler automata. Formalism containing a non-terminal symbol associated with syntactic phrases, such as verb phrases, and terminals are usually words, letters,

2.4. Natural Language Processing (Natural Language Processing)

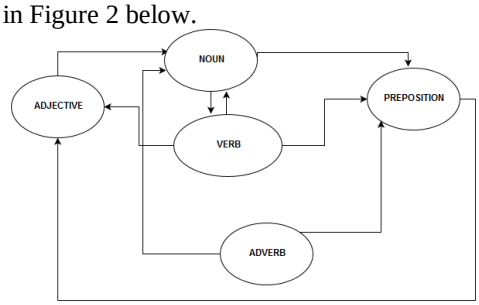
Natural language processing is the field of research and applications that explore how computers can be used to understand and manipulate text or natural language speech to do things that are beneficial [7]. NLP does not care how a sentence is inserted into the computer but copy information from the sentence, Below this is a way for the machine to absorb information from a sentence that approaches in NLP. The essence of NLP is a parser, which the parser reads every sentence, word for word, to define what is meant .PARSER itself consists of 3 types :.

1. Parser State-Machine
2. ParserContext-Free Recursive-Descent
3. Disposal Noise Parser

The most difficult aspect in the establishment of control systems and the complexity of NLP is pengakomodasian The flexibility of human language in the system, the following is a discussion of each type of parser.

a. Parser State Machine

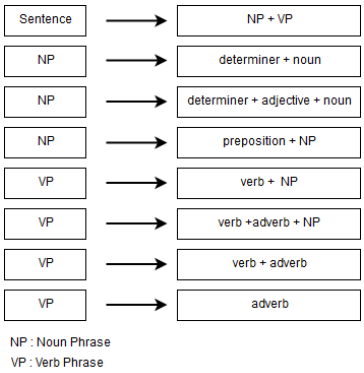
Parser State-Machine to use the real condition of the sentence to predict what type of berlaku.State-Machine.Directed graph which shows how the valid transition from one state to the lain.contoh grammar G1 in Figure 2 below.



Picture 2, State Machine Grammar G1

b. Parser Context Free Recursive

This approach menggunajan merge right items sanmpe in pieces into the element-elemenya his example: a sentence is a combination of various items and these items are a combination of other items and so on until the cut (divided) into elements such as Noun, Adjective, and as nya.Aturan rules that exist in every part of which has been formed called the production rule of context free grammar parser while using the production rule for analyzing a kalimat.Production rule for grammar G1 as shown below:



Picture 3, production rule

c. Disposal Noise Parser

Type parser is actually very common in database-type applications, such as command processor. Command processor is a program that is on the call monitor terminal (TMP) when the user terminal enter the command name while TMP is a program that receives and interprets the command, and that makes the command processor in accordance with the scheduled and run in addition to the TMP also communicates with the user terminal, in response abnormal termination and process interruptions.

Examples of such a database consisting of names of companies and the prices of stocks and assume database receives a query like this:

- My Unhide all companies with stock> 100
- My Unhide all
- I Unhide xyz
- I am one with the inventory Unhide <100

The query type that occurs is: Command <modified> <name> <operator> <value>, therefore the order should always be present, but four other elements are optional though so when the operator is used, the value should still be used.

2.5. text Mining

Text Mining,Sometimes called "text analytics" is one way to make qualitative data or "unstructured" that can be used in text mining komputer.Sehingga there are terms of data preprocessing, the precursor process applied to the text data that aims to generate numerical data. in the preprocessing process is the stage where the description in the handle to be ready to process entered the stage of text mining. Ersebut stages are:

1. *Parsing / tokenizing*
2. *Stopwords Removal / Filtering*
3. *stemming*
4. *Tagging*
5. *Analyzing*

2.6. chatbot

Implementation of AI (artificial intelligence) one of them in the form of chat bot. Chat bot is a computer program that is programmed to be able to communicate with humans using human language was sendiri.Salah only concrete example is the Help Bot on Yahoo messenger and ALICE (Artificial Linguistic Internet Computer Entity) developed by researcher named Dr. Richard S. Wallace. [8]

2.7. Dialogflow API

Dialogflow.com is a platform for developing a chat-bots based on natural language conversation. Important concepts such as Intents and Contexts are used to model the behavior of chat-bot. The point is what the user mapping between input and response or action to be taken by the bot.

3. SYSTEM PLANNING

3.1. Concept Analysis System

Analysis of the concept of a system built contains the description of the whole system to be constructed, containing 5 items in physics class 10, namely the amount of physicists and measurement, energy fund business, strength of materials perpindahaan surface tension and heat, as well as material changes. The material will be made so that the knowledge base for future bot bot can answer the materials needed. The system will be built is android-based learning media using Dialogflow chatbot technology. Here is an overview of the system built depicted in Figure 4.

Picture 4, Built Systems Analysis

3.2. material analysis

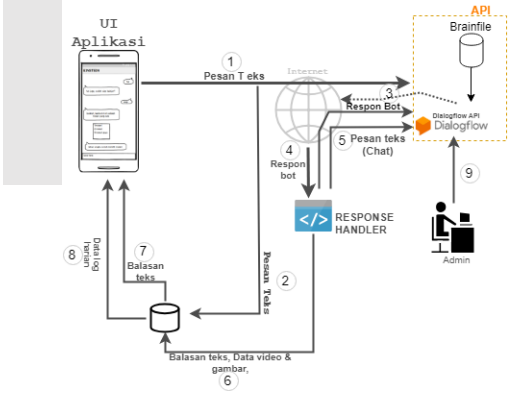
Based on materials refer to the curriculum guide book of 2013, The following is the analysis of the material that will be discussed on the medium of learning physics Einstein chatbot. Analysis of material that will be discussed in the media that will be built can be seen in the tabe 1.

Table 1, Table Material Analysis

No.	Matter	sub material	Explanation
1.	Magnitude Physics and measurement	1.1. Magnitude Magnitude Main and derivatives	Discussing the concept of the principal amount and the measurement
		1.2. unit Standard	Knowing each standard unit and its symbol
		1.3. Unit conversion	Knowing how mongkonversi units and various unit
		1.4. Figures important rules	Measuring the amount of objects related to the long

		1.5. The length measuring instrument mass and time that is around	Knowing the kinds of measuring tools and how to use it
2	Enterprises and Energy	2.1. Style	Understanding the concept of force used in the field of tourism
		2.2. Business	Understand the business concepts used in the field of tourism
		2.3. Business relationships and style	Knowing the business relationship and the style of an object
		2.4. energy change	Knowing the sense of energy, changes in energy and energy forms
		2.5. Law of conservation of energy	Understanding the concept of energy and energy conversion hukumkekelan
3.	Material strength and elasticity of the surface tension	3.1. strength of materials	Describe the strength of materials in the field of tourism
		3.2. Plastic and elastic bodies	Knowing the kinds of objects of plastic and elastic
		3.3. Voltage and Strain	Understanding stress and strain on a body
4.	Temperature Heat and Heat Transfer	4.1. type Heat	Understanding the concepts and types of heat
		4.2. heat transfer	Knowing the heat transfer by conduction
		4.3. Temperature	Knowing the concept of temperature and the type of thermometer and influence
5.	material Changes	5.1. Definition of matter (solid, liquid and gas	Miscellaneous determines the shape of the material and understanding
		5.2. S IFAT-properties of matter	Knowing the properties contained in the various materials
		5.3. material changes	Knowing how to change the material and its calculation

3.3. System Architecture



Picture 5, System Architecture

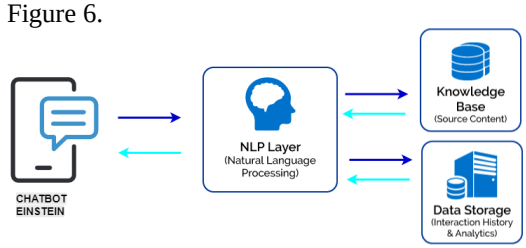
1. Request chat to Dialogflow (chatbot API)
   In this step, when a user sends a message to the chat in the app, the message is sent to Dialogflow API to request a reply to the message, while here the user sends a message in the form of text which is then passed to the API for later use to backlash bot. This process requires the internet
2. Write a message to Database
   User messages obtained when users send a chat message (which has been converted) will be stored into the database.
3. Providing Dialogflow Response
   Upon request a reply is received, then the chatbot, API will provide a response that is stored in the variable data type AIResult (classes in the package Dialogflow API)
4. Parsing response from API
   At this stage each response API (Dialogflow) will parse it into a data in a simple format. There are some objects that work for this process. Will be described in the program architecture. The output of this process is the reward (String).
5. Replies to the user request message to Dialogflow
   Here, after the response of the bot is received, then the next message forwarded to the chatbot API (Dialogflow) to request a reply to a reply message whether it be text.
6. Write a Reply Text, Data Link, and Content to Databases
   After completion responses parsed into a simple format, then the data will be saved to the database.
7. Featuring Reply Text

Once the data is in the dust was added to the database, data / reply message is sent to the interface interaction and then displayed to the user

8. Read the Daily Log from the Database
   This process will be undertaken when users view the daily logs, daily log data in the form of a lot of requests, long time to learn and the captured material will be read from the database to display the interface to the daily log.
9. Knowledge Base Bot train Dialogflow by admin
   Admin will regularly update to the API through Dialogflow Dialogflow knowledgebase developer console.

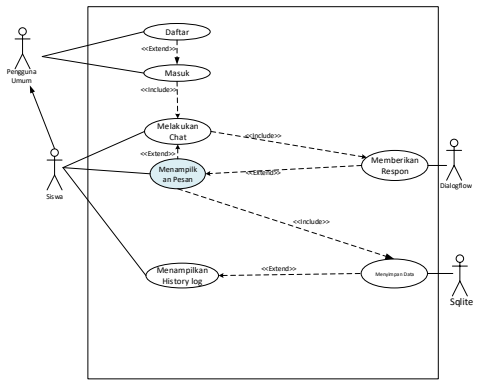
3.4. Analysis Model chatbot

Chatbot model analysis contains modeling used in the chatbot to suit the needs of the chatbot, later, on the model of the chatbot, there are some models that are applied, one of which is the pattern matches the model pattern match bot uses to classify text generate text corresponding to brainfile. In the chatbot that will be built will use Artificial Intelligence Markup Language (AIML) that uses pattern-based. Here is a picture of a model chatbot that will be used is depicted in Figure 6.



Picture 6, Model chatbot

*3.5. Use Case*Diagram



Picture 7, Model chatbot

4. IMPLEMENTATION AND TESTING

4.1. Testing plan

This program testing using black box method. Black box testing is a test program based on the functions of the program. The purpose of this black box method is to find a malfunction in the program. Tests with this method is also done through providing a number of inputs in the application program will then be processed in accordance with the functional needs to see whether the application has been built in accordance with the functional needs of its generating output according to functional needs, if appropriate then the applications that have been built have absolutely appropriate, but if the output produced is not in accordance with the functional, it is still an error in an application program. Here is a table testing

Table 2, Table Test Plan

Komponen yang diuji	Skenario Pengujian	Jenis Pengujian
UI *Walkthrough*	Menampilkan *walkthrough*	*Black Box*
Login	Verifikasi Username	*Black Box*
	Verifikasi Password	
Daftar	Menambah akun siswa	*Black Box*
Fitur percakapan dengan *bot*	Menguji *flow* percakapan untuk menanyakan tentang materi	*Black Box*
	Menguji *flow* percakpaan untuk menanyakan tentang rumus	*Black Box*
	Menguji *flow* percakapan untuk menanyakan contoh soal	*Black Box*
Fitur quis	Memberikan soal dan memvalidasi salah dan benar dari dari jawaban yang di berikan oleh pengguna, materi yang uji coba (Besaran fisika dan pengukuran)	*Black Box*
UI Log	Menguji aplikasi menampilkan UI Log	*Black Box*

4.2. Testing UI Walkthrough

UI Walkthrough testing is functionality testing by sliding the display guide / walkthrough and see whether the display is shifted or not. UI Walkthrough testing can be seen in Table 3.

Table 3, Table Testing Walkthrough

Cases and Test Results			
Data Input	**Which are expected**	**Observation**	**Conclusion**
Shifts Views	The display changes to the next display	Views shift and change to the next display	[√] Received [ ]Rejected

4.3. testing Login

Testing is testing functionality login by entering your username and password correct a student account, enter your username and password wrong student accounts, and emptying the username and login password.Pengujian (normal) can be seen in Table 4, the test log (one) can be seen in table 5 and the test log (empty data) can be seen in table 6.

Table 4, Table Testing Login

Cases and Test Results (DataNormal)			
Data Input	**Which are expected**	**Observation**	**Conclusion**
Username: rizkyaditya	Username text box filled in accordance with the username you entered	The contents of the text box Username accordance with username entered	[√] Received [ ]Rejected
Password: 12345678	Password text box filled in accordance with the entered password	The contents of the text box in accordance with the password password is entered	[√] Received [ ]Rejected

4.4. testing List

Table 5, Table Testing List

Cases and Test Results (DataNormal)

Data Input	Which are expected	Observation	Conclusion
NISN:	Text box NISN are charged according to the incorporated NISN	The contents of the text box NISN according to the incorporated NISN	[√] Received [ ]Rejected
class:	Text box Grades Grades are charged according to the incorporated	The contents of the text box in accordance with Class Class inserted	[√] Received [ ]Rejected
username:	Username text box filled in accordance with the username you entered	The contents of the text box Username accordance with username entered	[√] Received [ ]Rejected
password:	Password text box filled in accordance with the password is entered	The contents of the Password text box according to the entered password	[√] Received [ ]Rejected

4.5. Testing conversation bot

Table 6, Testing Table Conversation bot

Cases and Test Results (true cases)			
Data Input	**are expected**	**pengngamatan**	**kesiimpulan**
message:"Comprehensive formula on the magnitude of the derivative"	reply correctly, among others: "The formula is a derivative magnitude Size in Size: length x width"	*bot* reply correctly	[√] Received []Rejected
*Message: "*The formula used to measure speed? "	Replying to the right: The formula used to measure the velocity is distance / time	*bot* reply correctly	[√] Received []Rejected
*Message: "*formula to convert Celsius to kelvin "	The formula to convert Celsius to kelvin is centigrade + 273.15	*bot* reply correctly	[√] Received []Rejected

4.1. Testing Features Quis

Table 7, Table Testing Features Quis

Cases and Test Results			
Data Input	**be expected**	**observation**	**kesiimpulan**
message:"I want to exercise quis"	reply correctly, among others: "You have entered into a quiz mode, the following is the first question that you must answer:" The speed / velocity is derived scaled magnitude of the principal amount?	*bot* reply correctly	[√] Received []Rejected

4.1. testing Log

Table 8, Table Testing Logs

Cases and Test Results			
Data Input	**Which are expected**	**Observation**	**Conclusion**
user choose the Log menu indicated by the icon 'more'	The application displays a user history se	The application displays a user history	[√] Received []Rejected

4.1. Conclusion Testing Results

Based on the results of tests that have been carried out with the alpha testing as a whole, it can take the conclusion that the application is built can be said to have fulfilled the prerequisites are functional, although there are some cases that can not be accepted, it is caused by a limitation of API in use today, but these limits will be reduced in line with the still active maintenance carried out by a team of developers API. In addition, the application that was built in the process still allows for its maintenance and development for its future that need the maintenance process to determine the deficiencies of the application.

Table 9, Table Testing Results

No	Pertanyaan	Penilaian				
		TS	KS	CS	S	SS
1	Saat pertamakali membuka aplikasi, apakah pengguna mengerti apa yang harus dilakukan?	2	4	5	14	4
2	Apakah pengguna sudah familiar dengan istilah *chatbot*?	2	3	5	12	7
3	Apakah aplikasi *chatbot* Einstein dapat menjadi lawan bicara yang baik?	1	2	6	15	5
4	Apakah aplikasi *chatbot* Einstein dapat menjadi alternatif pembelajaran fisika , khususnya memahami materi fisika?	0	3	10	13	3
5	Apakah media pembelajaran einstein mudah untuk digunakan?	2	0	4	16	7
6	Perlu pembaruan untuk menyempurnakan sistem	0	1	2	8	18

5. COVER

5.1. Conclusion

We make Einstein chatbot pembelajara media to become an alternative media in studying the physics of matter by using the technology of Dialogflow, it can be concluded that:

1. Chatbot technology can be interactive learning solutions, is conducting debriefing with students
2. By means of student questions can make the students become a means for students to ask
3. Log feature enables students to evaluate learning
4. Chatbot can be made utilizing the API Dialogflow

5.2. Suggestion

Einstein chatbot learning media is still far from perfect and there are still many shortcomings. Therefore, the development of instructional media that can be better lagi.Berikut are some suggestions for further development, as follows:

1. UI of the application is too simple, so it can be redeveloped.
2. Flowchat of API Dialogflow still be developed so that later conversation with the bot can be categorized by material.
3. Log data will be better placed online so that teachers can know the activity of the student

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