
Development of Chatbot Learning Media on Earth Rotation and Revolution Materials for Grade 6 Elementary School Students

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Abstract. Difficulties are often found during the learning process. Therefore, learning media is very crucial in learning activities. With the existence of learning media can support teachers when providing learning to students. Chatbot learning media is one of the media that can help improve student learning outcomes. The purpose of this study was to find out and then describe the characteristics and analyze the truth of increasing learning outcomes of grade VI students through the development of interactive print media in the material rotation and revolution of earth. Researchers used the research and development (R&D) method in this study. The 4D (four-D) development model previously described by Thiagarajan became the procedural model chosen by the researcher. The final score obtained in this study was 4.15 from media experts, 4.56 material experts, 4.8 teacher responses, and 4.58 student trial results. The overall validation score and trial of chatbot learning media is 4.58 which is included in the very good category and is very feasible to use as a learning media tool in grade 6 "earth rotation and revolution" material in elementary schools.

Keywords: *media learning, chatbot, learning outcomes*

Introduction

Teachers and students are the most important thing in the occurrence of the learning process. Teachers have the duty to teach their students, meanwhile students are in charge of learning. Teaching is conveying things to a person or a group of people with the intention that they understand what the educator conveyed to them (Depdikbud, 1982). The meaning of "learn" itself is a method of changing nature by doing activities with the surrounding environment (Hamalik, 1990). While learning is usually considered as the method, which has various components that are related in order to achieve the expected thing. Some of the components include: objectives, teaching material, method, tools/medium, and evaluation (Ali, 1992). Therefore, each interaction of these systems determines the effectiveness of learning.

Learning media is very crucial in learning activities. With the existence of learning media, it can support teachers when providing learning to students. Difficulties encountered when implementing the learning process will also be assisted through the existence of learning media, learning media can also be utilised by students when carrying out the learning process. It is intended that students can find it easy during the learning process and achieve the purpose of learning itself, in this case it is cognitive learning

outcomes. Students who have problems or difficulties during learning can be simplified by getting help through the media (Astuti, et al., 2019). Thus, learning media is really needed to facilitate the learning process of students.

This 21st century education requires a teacher who has synchronised skills, namely using the development of information and communication technology in accordance with developments in this digital era. Due to this, an educator or teacher must always be able to adapt to the times, in terms of the development of technology in the world of education. Nowadays, computer learning media acts as an intermediary for teachers or educators with students in building understanding related to learning material more effectively and efficiently than before as expressed by Yusuf & Subaer (2013). Therefore, to use learning materials effectively and efficiently, teachers need excellent skills to adapt to technology development and have the ability to create and use learning media very well.

Based on data obtained by researchers on Thursday, November 10, 2022 sourced from 6th grade students at one of the elementary schools in Sumedang, it shows that there are still students who face difficulties when learning the material of "earth rotation and revolution" in science subjects. Students consider the lesson difficult and boring because the learning media used is not varied. Books tend to be utilised by teachers and students to become learning media. In fact, utilising varied learning media during the learning process can help the implementation of learning to the fullest. The lack of motivation from students when learning also makes students experience obstacles to understanding learning, in this case the material of "earth rotation and revolution". conveyed that the difficulties felt cause the results of student learning to be less than optimal and can cause some indicators to be difficult to achieve which is one of the objective components of the basic component or KD.

Chatbot learning media is one of the media that can help improve student learning outcomes. (Sekarwati, et al., 2021) explains that the chatbot itself is a computer program that was developed in order to display dialog with users using a website via the internet network. This chatbot is a computer program intended to make users feel as if they are communicating with humans. Even though in reality the user is communicating using a machine. The word chatbot refers to a bot that works in a web application combined with other external structures. This chatbot is one of the forms of intelligence created based on natural language processing (NLP), one of the branches of artificial intelligence (AI). There are 2 main elements that form the basis of this chatbot, namely the word "chat" which means chats and bot which consists of data which is then combined to form an intelligence program. Chatbot will answer based on questions or text typed by the user.

A number of previous studies were found that were in accordance with the research that the researchers were doing, including those conducted (Parina, et al., 2022), the research that has been carried out shows that chatbots can help elementary school students to carry out learning more interactively and adapt to digital developments at this time. It is evident from the validation results that those who answered strongly agreed amounted to 53%, agreed 26%, disagreed 14%, and those who answered disagree amounted to 14% with a total of 26 respondents. Based on the research that has been done, it can be concluded that 79% of respondents said that this chatbot is suitable for use as a learning medium. Based on research conducted by He & Xin (2021) was found that out of a total of 29 students, 79.5% agreed that the chatbot was easy to use, 89.6% agreed that the chatbot was user-friendly, 89.7% agreed that the chatbot functioned well, 75.9% enjoyed using the chatbot, and overall 82.8% were satisfied with the chatbot. The use of chatbot learning media has a positive impact on the learning process, including providing an increase in student learning outcomes (Vanichvasin, 2021). Chatbot learning media is a new learning media that is in accordance with current technological developments aimed at supporting students in the learning process (Tamayo, et al., 2020). After the implementation of a chatbot-based learning approach, the results show the potential that

can be generated for teachers and students (Burkhard, et al., 2022). After attending training in digital chatbot training activities, chatbot media can help increase creativity from teachers to support the learning process (Dewi, et al., 2022). A study conducted by Jain (2019) states that chatbots that are built with a certain topic can answer various kinds of questions about that topic so that it can make human work easier.

The research discussed above has a match with the research that researchers are currently carrying out. These matches include a) Research conducted in the world of education and b) Developing chatbot media as a learning medium. Meanwhile, these two studies have differences, including: a) The learning material in the research conducted by the researcher focuses on science subjects on earth rotation and revolution, b) the target research object focuses on all students in the elementary school, while the researcher focuses on teachers and grade 6 elementary school students adjusted to the material of the chatbot created, and c) the chatbot media that we developed is a technology-based learning media that is bite-size, measurable, and fun with an attractive chatbot display and interesting features so that students can carry out fun learning activities. Interesting images, animations, and videos are part of the features in the chatbot to attract students' attention in using this chatbot where it did not exist in the research that had been carried out before this research. The purpose of this study was to find out and then describe the characteristics and analyze the truth of increasing learning outcomes of grade VI students through the development of interactive print media in the material rotation and revolution of earth.

Methods

Research Methods and Development Model

1. Research Methods

Researchers used the research and development (R&D) method in this study. Hanafi (2017) revealed that the R&D is a method to produce a product and then tested the effectiveness of the method. The objects examined in this study include the characteristics of students in learning science material learning resources teaching materials and learning media used by elementary school students in grade VI for the 2022/2023 academic year in one of the elementary school in Sumedang, West Java.

2. Development Model

The 4D (four-D) development model previously described by Thiagarajan became the procedural model chosen by the researcher. The four stages contained in this development model include define, design, development and dissemination. The final result of this study is a chatbot that is used as a learning medium in the science subject rotation and revolution of earth for grade 6 elementary school students.

The following are the stages of the 4D development model.

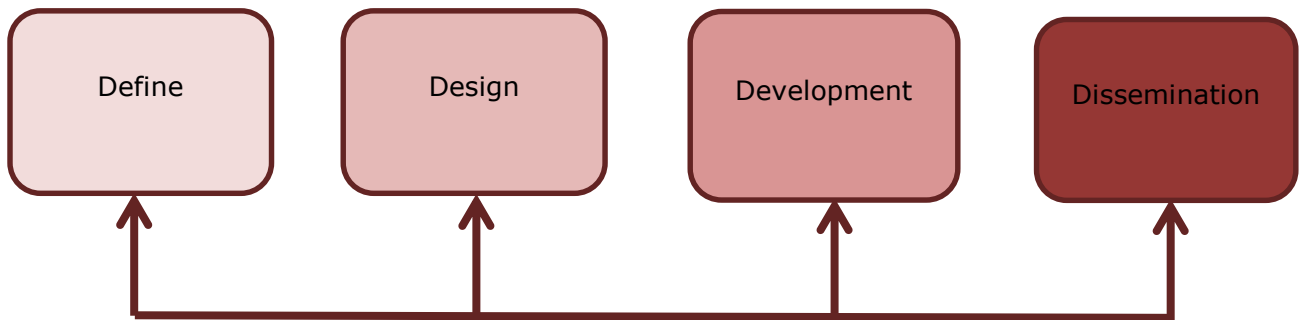


Figure 1. The 4D development model (four-D)

1. Define

This defining part is done in order to determine and define what things are needed during the implementation of learning and combine various information related to the product to be made. In this defining part, analysis is carried out as a way to find out what is needed for the learning media that will be developed. Data collection is carried out as the basis for making learning media to be developed. The goal is that the results of the development of learning media will be suitable or in accordance with the needs of users.

2. Design

The design carried out at this stage is intended to determine the design of the media to be made. Starting from the preparation of what content will be included in the media, designing the content of the material, and other things that must be adjusted to the defining stage that has been done before.

3. Development

Based on the planning that has been carried out, the development process is utilised based on the study of needs and theoretical research, this has the aim that the media produced can meet the interests of users. The purpose of doing these stages is to be able to produce chatbot learning media that has been designed before. At this stage, the learning media must go through the stages of revision and validation from experts and have been tested on students who are the target of this research.

At this stage, media trials that have been made and observations to teachers and grade 6 elementary school students are carried out to determine the success of the products produced. The purpose of carrying out this stage is so that the results of the assessment and response from teachers and students in the media can be known. The resulting data will be processed and then used as material for improvement of the products made.

4. Dissemination

After revising the development of learning media that has been made, the next stage is the dissemination of chatbot learning media by socialising to the target of making this chatbot learning media. However, in this study, the dissemination stage was carried out simultaneously when research was carried out in elementary schools. Because this chatbot learning media is in the form of a website so that the link that has previously been distributed to the School when revised does not need to change the link. However, the content in it will change according to the revisions that have been carried out.

This research was conducted in two elementary schools. The two elementary schools chosen were SDN Cikole and SDN Sukalerang 1 which are located in the Cimalaka area, Sumedang. The time used in this study ranged from 2 months starting on November 29, 2022 after the issuance of the decree until January 25, 2023. In this study, the techniques used were interviews, observations, questionnaires and documentation. While observation guidelines, interview guidelines, material expert validation surveys, media expert validation surveys and limited field-test instruments are used as research instruments in this study.

Collection techniques and Research instruments

1. Collection Techniques

Research conducted by researchers using interview techniques, expert validation, questionnaires, and documentation. Interviews were conducted by researchers with one of the students at an elementary school in Sumedang regarding student activities in learning, access to technology, and the student's preferences. After the interview, the researcher continued with the process of creating a chatbot based on the results of the answers from the previous student interviews. The results of the products that have been made are then validated by material experts and media experts to determine the feasibility of the products made before the dissemination stage is carried out. Product revisions were made based on input from material experts and media experts. Tahapan selanjutnya yakni penyebaran ke sekolah dasar yang menjadi target dari penelitian ini. The researcher explained the product to the elementary school teachers and asked the teachers to fill out a questionnaire and provide input regarding the product which is useful for the data in this study. Apart from teachers, researchers also conducted product trials on students who were the main subjects in this study. After the trial was carried out, students were asked to fill out a questionnaire regarding the product they had tried. Product distribution and questionnaire filling were carried out in two different elementary schools, namely SDN Cikole and SDN Sukalerang 1, with a total of 21 teachers. Meanwhile, the trial was conducted on 20 grade VI elementary school students at SDN Cikole. During research activities, documentation is also carried out that can be used as research evidence which is attached to the research attachment section.

2. Research Instruments

a. Interview

Revealed that in interviews there are two ways that are usually used, namely the structured method and the unstructured method and can be done face to face or telephone (Sugiyono, 2014). In this study, the researcher used an unstructured interview technique, namely only asking an outline by the informant. This is in line with what was conveyed by Arikunto (2013) that unstructured interviews are interview guidelines used to ask only an outline. Most of the results obtained in this interview were obtained from listening to what was conveyed by the informant. Interviews conducted by researchers aimed to find out the responses of students regarding student activities in learning, access to technology, and the preferences of these students.

b. Media validation sheet

This media validation sheet is intended as a tool to determine the feasibility level of the media being developed. This validation is carried out by the lecturer as a validator before the product is distributed and used. In this study, the media developed was stated to be very good and very feasible to use.

c. Material validation sheet

This material validation sheet is intended as a tool to determine the feasibility level of the material used in the product being developed. This validation is carried out by the lecturer as a validator before the product is distributed and used. In this study, the material developed was stated to be very good and very feasible to use.

d. Questionnaire

In this study, the questionnaire was intended for teachers and students who were involved in the research. The purpose of this questionnaire is to find out the response from teachers and students to the product being developed and to find out the effectiveness of using this media after the learning process is carried out.

e. Documentation

Documentation is one technique that can be used to obtain research data. The documentation used in this research is taking pictures during the product distribution process.

Processing Techniques, Analysis and Data Validation

1. Data Processing Techniques

Quantitative and qualitative are combined analysis techniques in this study. (Sugiyono, 2017). Qualitative data can be defined as data obtained after carrying out observation activities, teacher and student interviews, and opinions and input based on questionnaires filled out by expert validators. Meanwhile, quantitative data itself is obtained based on the acquisition of questionnaire filling scores from material experts, media experts, and students as test subjects.

Responses from product validation from material experts, media, teachers and students are in the form of questionnaires with 5 options (Widoyoko, 2016), namely very good (5), good (4), quite good (3), less good (2), and very less (1). Table 1 below shows the analysis of product validation data using a five-scale transformation.

Table 1. The intervals and categories for product validation

No	Intervals	Category
1.	$> 4,2$	Very good
2.	$3,4 < X \leq 4,2$	Good
3.	$2,6 < X \leq 3,4$	Enough
4.	$1,7 < X \leq 2,6$	Not good
5.	$\leq 1,8$	Very less

(Widoyoko, 2016)

2. Data analysis

Sugiyono (2015) revealed that data analysis is a search and compilation of data that is carried out systematically so that later it can be informed. This study uses three stages of the data analysis process, namely data reduction, data presentation and conclusion. Data reduction is the process of data analysis in which there are activities of summarizing, choosing the main things, focusing on what things are considered important. This data reduction was carried out to help researchers carry out the next data collection stage. Next is the presentation of data where this is carried out to understand what happened and continue further activities based on what has been understood. Data inference, namely taking what is the core of the data that has been obtained to then be presented. Sugiyono (2015) revealed that data inference is a short statement but has a broad scope.

3. Validasi Data

Validation carried out by researchers takes various forms, namely as follows:

a. Member check

This member check is a review of data or information that has been obtained. Member check validation in this study was carried out by media expert lecturers and material expert lecturers in this case material on Natural Sciences.

b. Expert opinion

Hanifah (2024) said that expert opinion is asking for advice, opinions from experts in a particular field. In this study, the expert opinion is the supervising lecturer and elementary school teacher.

Using two validations in this study is intended so that researchers obtain valid and accountable data.

Results and Discussion

Characteristics of chatbot learning media development design on the earth rotation and revolution material

Define Stage

This stage is carried out with the aim of combining various explanations related to chatbots to assist in the development and identification of problems that usually occur in learning activities which will become the foundation for the development of this chatbot media. Aryani & Nugroho, (2022) revealed that the observation stage is intended to examine more deeply the learning media to be developed. The results of interviews that have been carried out by Arif & Muthoharoh, (2021) show that science teachers have hopes for a device that can help the learning process and support the learning process to be better besides textbooks, besides that students also hope that learning is more interesting so that it is not boring. At this stage, interviews and observations were carried out by researchers to grade 6 students at SDN in Sumedang on November 10, 2022. Mursidi, et

al. (2022) states that there are 6 steps carried out at this stage, namely 1) initial analysis, 2) student analysis, 3) task analysis, 4) concept analysis, 5) specification of learning objectives, and 6) making research guidelines. The steps that have been carried out by researchers at this stage are described as follows:

1. Initial analysis

This is intended so that it can be found and determined what is the main problem at hand. The results of interviews and observations that have been made show that 1) Students tend to use ordinary books as media or learning resources, 2) Students consider lessons difficult and boring because the learning media used are not varied, 3) Low enthusiasm from students when doing learning which causes students to feel obstacles to understanding learning, 4) Students experience obstacles to mastering earth rotation and revolution material. (Wahyuni, et al., 2022) revealed that there is a need for learning media that supports solar system learning so that it can be completed properly. Based on interviews and observations that have been carried out, it is found that student learning is still dominated by lecture methods, discussions, and assignments that are carried out repeatedly so that students experience difficulties in learning (Supriadi, et al., 2022). Lewar & Suhartini, (2023) revealed that books, PowerPoint, and videos alone are still not enough to help improve student learning outcomes. The problem chosen in this study is that grade 6 students still have difficulty mastering the earth rotation and revolution material.

2. Student analysis

This is intended to find out the characteristics of students. According to the researcher's observation, 6th grade students have an average age of 11-12 years. At this age, students are usually in the concrete operational stage, this stage is a stage where a child usually experiences the development of logical thinking, but is still limited by concrete objects, and has the ability to carry out conservation activities. Grade 6 students have varied learning tendencies including visual, auditory, and kinesthetic. This student study is used as a foundation for making interactive chatbot media in terms of colour selection, images, videos, and other media support components used in the development of this chatbot media.

3. Task analysis

Detailing all the tasks required based on the teaching material contained in KI and KD 3.8 regarding the rotation and revolution of the earth. This chatbot development uses the material contained in the science subject KD 3.8 regarding the rotation and revolution of the earth in Theme 8: My Earth, Sub-theme 1: Time differences and their effects.

4. Concept analysis

Carried out in order to determine what material is to be used in the development of chatbot products that are adjusted based on KI.

5. Specification of learning objectives, core competencies and basic competencies

Specification of learning objectives, KI or core competencies and KD or basic competencies in grade 6 science subjects in the 2013 Curriculum are the basis for the specification of these learning objectives. The purpose of doing this is to make it easier for students to carry out the thematic learning process, in this case in KD 3.8 science content regarding the rotation and revolution of the earth.

6. Making research guidelines

Product feasibility validation sheets conducted by media experts and material experts, teachers and student response questionnaires to interactive chat-bots were prepared as instruments of the research to be carried out.

Design Stage

This design stage is carried out by researchers who are adjusted based on the acquisition of a needs assessment. (Mursidi, et al., 2022) said that this design stage is divided into two stages, namely the material design stage and the display design. The preparation of learning objectives must be tailored to the needs of students (Indriaty, 2018). This stage will produce a design of learning stages (Kurniawan & Dewi, 2017). Bungawati & Rahmadani (2023) revealed that the objectives of learning were arranged based on the basic competencies contained in the student book. The following stages carried out by researchers are described in the following activities.

1. Material design

Researchers design what will be used as material in the chatbot. The material is displayed using 1) reading text, 2) images, 3) videos, 4) games, and 5) quizzes as assessment materials in order to help determine the extent of understanding from students after using this chatbot.

The reading material in this chatbot contains all the material about the rotation and revolution of the earth. The material is opened first with questions about the reasons for the occurrence of day and night which are stimulus materials so that students are interested in continuing to enter the learning material stage. In the opening section, the display is accompanied by an opening audio. Then proceed with a short story that is still related to the occurrence of day and night. Only after that learners will know what is the reason for the occurrence of day and night. After this, learners are invited to explore the world of rotation and revolution of the earth, starting from what is rotation and earth to the impacts that result in the rotation and revolution of the earth. Learners are given the freedom to choose to explore the country they want first.

The entire explanation of the material is supported by an attractive display assisted by images so that boredom that can be felt by students can be avoided. Besides that, the images contained in the material are also suitable for use by elementary school students considering the characteristics of students at this age are at the level of concrete thinking (Azwar, 2002). This chatbot strives to help learners experience learning in a fun way. Concrete images and illustrations are used to explain the material. As explained by (Rahmi & Hijriati, 2021) that concrete images and illustrations are utilised as facilities for the developmental stages of elementary school students at the concrete operational stage. Earth rotation material in the form of videos from YouTube is included as opening material for earth rotation before students get a more detailed explanation. Games used in this chatbot are in the form of quizzes that are still related to learning materials related to the rotation and revolution of the earth which is the main discussion of the chatbot. Each quiz that is made is always displayed along with images related to the quiz material, the images used are intended so that students do not feel bored while doing the quiz. The existence of quizzes or practice questions on the chatbot helps to measure the extent of understanding from students.

2. Display design

There are four components in the chatbot that will be made, namely the introduction (chatbot introduction, attendance, chatbot opening, stimulus material), core material, exercises, and fun rooms. In this fun room contains features that are made as entertainment from students while using the chatbot. The contents of the fun room are made fun but still related to the core of the material created. In this fun room, students can listen to songs related to the solar system, then watch short films that are still related to the solar system, see unique facts related to the solar system, and play games in the form of quizzes that are still related to chatbot learning material. This chatbot can be displayed via cellphone or laptop with a display that is not much different, the only difference is the background. The colours used in this chatbot are a combination of brown and green colours with brown dominating.

Development Stage

The prototype development method was chosen in this development stage which was then carried out in the assessment stage by expert validators and then tested on students. After the product trials were carried out by students, then students were asked to fill out a questionnaire. Questionnaires are used to find out students' opinions after using the product (Rezeki & Kamaludin, 2023). Prototype itself is a software development method in the form of a physical model of system work intended as an early version of a system (Ogedebe & Jacob, 2012). Prototype development that is useful for students is considered as important for good learning activities (Asy'ari, et al., 2019). The prototype that has been developed will then go through a validation process by experts. This is carried out to determine the level of validity of the prototype. The creation of this chatbot is carried out on the website <https://smojo.ai/editor> after previously registering on the website that has been provided. In developing this learning media, the canva application is used to create animations and learning materials needed as materials in making this product. Interactive chatbot media as a result of the development that has been done can be accessed through <https://app.smojo.org/seftiani11/romi>. The chatbot learning media that researchers have developed can be observed in the display below.

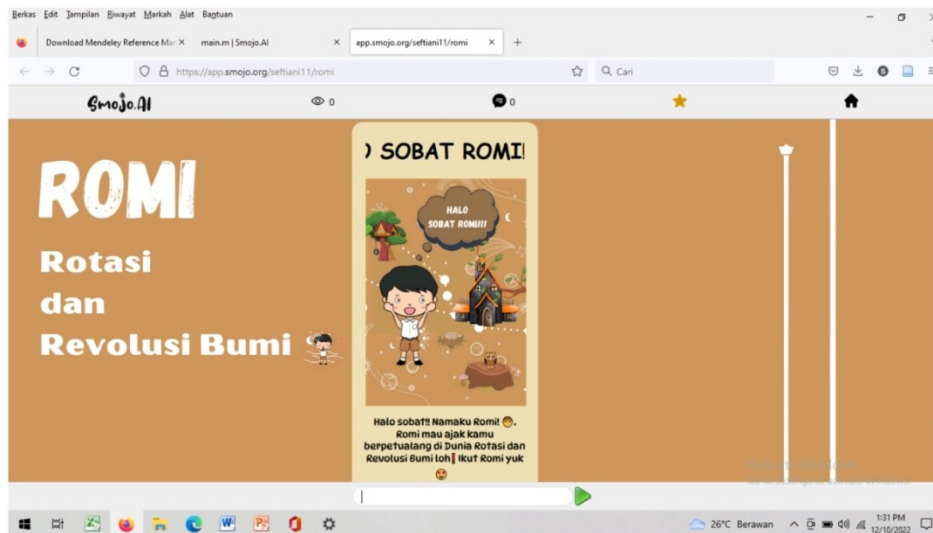


Figure 2. ROMI (Earth rotation and rotation) chatbot on laptop display

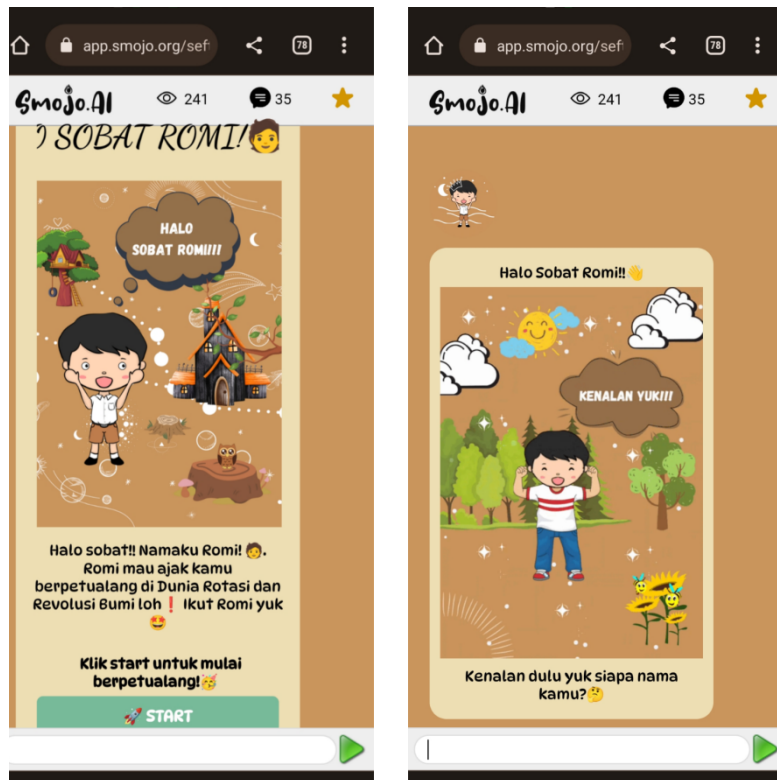


Figure 3. ROMI (Earth rotation and rotation) chatbot on mobile display

The process in making ROMI (Earth Rotation and Revolution) chatbot is as follows:

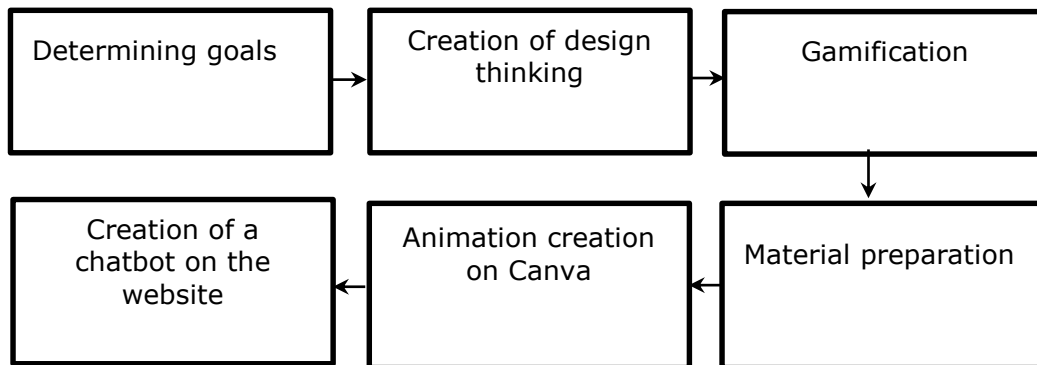


Figure 4. ROMI (Earth Rotation and Revolution) chatbot creation process

The process of making the ROMI chatbot is divided into 6 stages, the following is the explanation:

1. Determining goals
The first stage that is done first is setting goals. The purpose of doing this stage is to help achieve what is the goal of the product to be made. Through this stage, the compatibility between products and goals can be realised.
2. Creation of design thinking

Design thinking is part of the stages for making this chatbot learning media. There are three stages in making this design thinking, including the creation of learner personas, making effective learning flows and making effective conversation patterns for effective learning.

Identification of student personas, this stage is carried out in order to better understand the mindset of students or users of the chatbot learning media to be created. This will be the basic foundation for designing the learning flow.

Designing an effective learning flow, this is the learning flow of students to know, understand, and master learning materials. The goal is to facilitate the design of student learning paths from zero to awareness, literacy, and mastery.



Figure 5. Components of an effective learning pathway

In this stage, the researcher already has a clear picture of the effective learning flow, what needs to be done next is to create a conversation flow according to the learning flow and learner personas that have been owned.

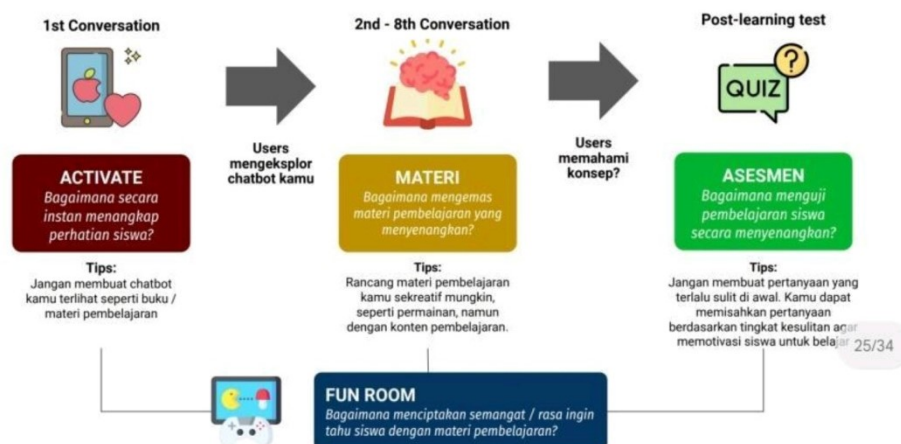


Figure 6. Effective conversation flow

3. Gamification

Gamification is a design methodology based on human motivation in the development of a process. It usually focuses on the strategy of using fun and engaging elements found in games into the application's user journey. Gamification aims to make the chatbot interesting and viral.

4. Material preparation

The next stage is the preparation of learning materials that contain materials that are in accordance with the material that researchers have previously taken, namely the rotation and revolution of the earth. The material is adjusted to the abilities of the students and it is hoped that the objectives of learning can be realized through the learning process carried out (Nurrita, 2018).

5. Animation creation on Canva

Through this Canva application, researchers create animations in the form of images and gifs that will later be used in the chatbot. The animations made include the avatar that will be used by the chatbot, the background or background that will be used in the chatbot, the opening and closing of the chatbot, the content of the chatbot material, and other things that are needed as a complement to the chatbot.



Figure 7. The editing process of chatbot material

6. Creation of a chatbot on the website

After all the materials are ready, the next step is to start the process of making chatbots through the existing website.

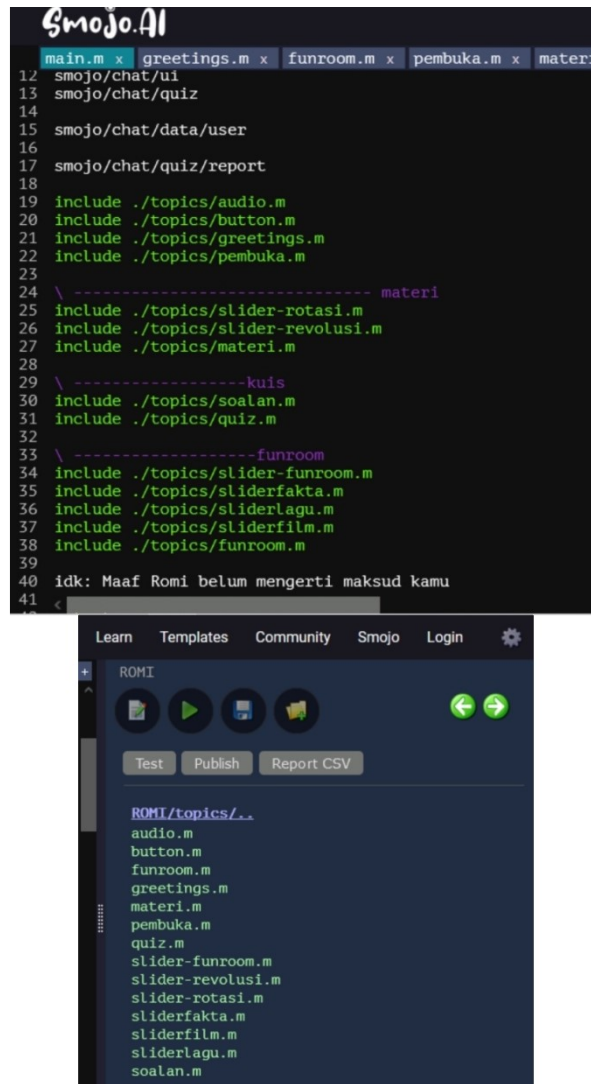


Figure 8. The editing process of ROMI chatbot

Dissemination Stage

1. Media validation of ROMI Chatbot

Media expert validation was conducted on January 2, 2023. Giving value by the validator to the chatbot was carried out through filling out a questionnaire that had been prepared by the researcher beforehand. Validators assess aspects of design, material, neatness and usability of the chatbot that has been developed. The results obtained from media validation obtained an average score of 4.2 where the value is included in the very good category in accordance with those contained in the criteria for feasibility of value by (Widoyoko, 2016). Media experts stated that this Chatbot is suitable for use with notes.

2. Material validation of ROMI Chatbot

Material expert validation was conducted on January 18, 2023. The validator gave value to the chatbot through filling out a questionnaire that had been prepared by the

researcher beforehand. Validators assess aspects of content eligibility, material accuracy, linguistic feasibility, and encouraging curiosity. The acquisition obtained from the validator is an average score of 4.45 where the value is included in the very good category adjusted to those contained in the criteria for feasibility of value by (Widoyoko, 2016). The material expert stated that this chatbot is suitable for use with notes.

3. Validation of teacher responses

21 teachers from two different elementary schools, SDN Cikole and SDN Sukalerang 1, validated the chatbot. Validation at the two elementary schools was carried out on different days. On Friday, January 13, 2023 and Tuesday, January 17, 2023. The product aspects to be evaluated are appearance, language use, and usefulness in learning. Based on the validation conducted by the teacher, the average score is 4.8 where the value is included in the very good category according to the score eligibility criteria by (Widoyoko, 2016). states that this chatbot learning media is suitable for use.

4. Product trials

Trials were carried out related to chatbot product made to 20 grade 6 elementary school students who were the targets of this research. This trial was carried out only to test the readability of the media. Students use the chatbot learning media that has been made for further filling out the questionnaire. The score obtained from this trial was 4.82 which stated that students could understand the material well through the use of chatbot media. This shows that this chatbot is included in the very feasible category for students to use in learning according to the eligibility criteria scored by (Widoyoko, 2016).

After researchers conducted validation and trials to media experts, material, teachers, and elementary school students, there were inputs that could be used as material for improving the media chatbot of earth rotation and revolution which are shown in the Table 3.

Table 2. The validator’s response as revision material

Validator	Response
Media expert	This chatbot is suitable for use with a note: it is better to use a cellphone, for computers/laptops the menu size becomes small (100), when the display is zoomed 150% it becomes clear. The chatbot is interactive enough to get students involved in learning, supported by explanations in the form of varied images and videos. The icon for the next material is too small so it's a little hard to click, can be slightly enlarged.
Material expert	This chatbot is suitable for use with notes regarding some of the writing in the chatbot.
Teachers	The writing font of the material is too small, so some are clearly visible and some are less clear when reading. Especially in the material.

Table 3. Comparison before and after revision

No.	Before	After
1.	The size of the menu on a laptop is smaller.	The menu size is deliberately adjusted to the size of a cell phone because it will be used by elementary school students who mostly use cell phones. So the size is adjusted to the cell phone screen. For

		laptops, you can use the screen zoom feature to enlarge the chatbot display.
2.	The icons for the next material are too small.	The icon size for the next material is enlarged.
3.	The materials are too small so some are clearly visible and some are not.	Materials whose display is not clear because the size is too small are then edited to be enlarged so that the display becomes clearer.



Figure 9. ROMI chatbot view on mobile phone

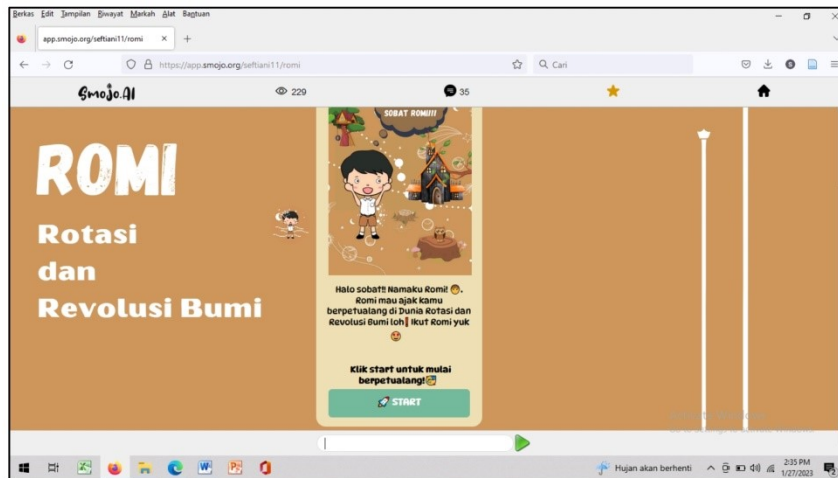


Figure 10. ROMI chatbot view on laptop

The following is the chatbot display on mobile phones and laptops as well as the chatbot display before the revision stage (Figure 11 and 13) and after the revision stage (Figure 12 and 14).



Figure 11. Before revision icon view



Figure 12. After revision icon view



Figure 11. Before revision of material font-size view

Figure 12. After revision of material font-size view

The Overall Validity of ROMI Chatbot Media

Based on the information obtained from the initial analysis stage, it was found that learning media is a media that is needed in the learning process. (Wahyuni, 2022) revealed that there is a need for learning media that supports solar system learning so that it can be completed properly. Based on interviews and observations that have been carried out, it is found that student learning is still dominated by lecture methods, discussions, and assignments that are carried out repeatedly so that students experience difficulties in learning (Supriadi, 2022). Lewar (2023) revealed that books, PowerPoint, and videos alone are still not enough to help improve student learning outcomes.

The learning media created must be in accordance with the characteristics of the students. According to the researcher's observation, 6th grade students have an average age of 11-12 years. At this age, students are usually in the concrete operational stage, this stage is a stage where a child usually experiences the development of logical thinking, but is still limited by concrete objects. This student study will become the foundation for creating interactive chatbot media in terms of choosing colors, images, videos, and other supporting media components that will be used in the development of this chatbot media.

Everything related to assignments and materials is adapted to the material chosen, namely the material for rotation and revolution of the earth contained in KI and KD 3.8 concerning rotation and revolution of the earth on theme 8 My Earth, Sub theme 1 Differences in time and its influence. This learning media is intended to assist teachers in facilitating and supporting the student learning process. Preparation of research guidelines, product feasibility validation sheets carried out by media experts and material experts and response questionnaires from teachers and students to interactive chatbots were prepared as instruments of the research to be carried out.

The planning stage is carried out by researchers who are adjusted based on the acquisition of the needs study. (Mursidi, et al., 2022) said that this design stage is divided into two stages, namely the material design stage and the display design. The preparation of learning objectives must be tailored to the needs of students (Indriaty & Setyoko, 2018). The design of materials and materials is adjusted to KI and KD and the appearance design is planned to be as attractive as possible and according to the needs of students.

The prototype development method was chosen in this development stage which was then carried out in the assessment stage by expert validators and then tested on students. After the product trials were carried out by students, then students were asked to fill out a questionnaire. Questionnaires are used to find out students' opinions after using the product (Rezeki & Kamaluddin, 2023). The prototype that has been developed will then go through a validation process by experts. This is carried out to determine the level of validity of the prototype (Apriani, et al., 2021). Prototype itself is a software development method in the form of a physical model of system work intended as an early version of a system (Ogedebe & Jacobs, 2012).

Based on the research stages that have been carried out, data is obtained from media validation that the ROMI chatbot is in the good category according to the feasibility value by (Widoyoko, 2016) with a score of 4.2. material validation with a score of 4.45 which is included in the very good category, validation was carried out by 21 teachers with an average score of 4.8 in the very good category, and student questionnaire results 4.82 with very good category. Based on these overall results, data is generated that this chatbot has an overall average score of 4.56 where the score is categorized into a very good category. Therefore, the learning media developed in this research activity is very feasible to be used as a learning media for 6th grade earth rotation and revolution material in elementary schools. The development of chatbots helps students to more easily understand the concept of the existing material. This statement can be seen from the good responses shown by students and teachers after using this chatbot as a learning medium. This is in line with the opinion of Wahyuni, et al. (2022) that with the help of media in the learning process can have a positive impact and improve the learning ability of students.

Conclusion

The analysis and discussion stages are carried out aimed at obtaining answers related to the formulation of the problem and conclusions can be drawn which can be the characteristics possessed by this chatbot learning media including Chatbot can be used via cellphone or computer/laptop and there are explanations of material using images and videos, exercises in the form of quizzes with scores that can be displayed right after the quiz is completed by the student. There are games, songs, movies and unique facts related to the discussion of the material that researchers have chosen.

Chatbot learning media for earth rotation and revolution material for grade 6 elementary school students is included in the category of very feasible as learning media. The development of chatbot learning media that has been carried out produces a final score of media experts of 4.15, material experts of 4.56, teacher responses of 4.8, and the results of trials to students of 4.82. The overall validation score and trial of chatbot learning media is 4.58 which is included in the very good category and is very feasible to be used as a learning media for the material "Earth Rotation and Revolution" grade 6 in Elementary School.

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