JPPIPA (Jurnal Penelitian Pendidikan IPA)

Vol.10 No.1 2025

http://journal.unesa.ac.id/index.php/jppipa

DEVELOPMENT OF INTERACTIVE LEARNING MEDIA ABOUT THE EARTH AND ITS SATELLITES THROUGH THE GENIALLY PLATFORM TO IMPROVE STUDENTS' COGNITIVE LEARNING RESULTS

Aryanti Yuniarsih[1], *Agung Mulyo Setiawan*[2]
[1,2] Department of Science Education, Universitas Negeri Malang, Indonesia

Abstract

Science learning contains several subjects, one of which is the material of the earth and its satellites. Some students find this material difficult to understand because the material is abstract, which will affect their low cognitive learning outcomes. The purpose this research to produce an interactive learning media which is valid, feasible, effective in improving student cognitive learning outcomes on the material of the earth and its satellites through the genially platform. This research and development with 4D development stages of Thiagarajan. The results media, material, and question validation tests obtained an average 88.75%, 89.75%, 89.5% so very valid. The results teacher and student readability test obtained average 95% and 88.33% so very feasible. The results of effectiveness test using the t test obtained a significance value of 0.000 so that significant difference between pretest average and posttest average, the results N-gain analysis obtained a score of 0.56 so learning media effective improving the learning outcomes of students with a moderate category. The results student response obtained average 91.42% so very good response. Based on validation, readability, effectiveness, the interactive learning media is declared valid, feasible, effective improving student cognitive learning outcomes.

Keywords: Interactive Learning Media, Genially, Earth and Satellites

Article History: Received: January 7th, 2025. Revised: May 29th, 2025. Published: June 30th, 2025

[2]**Correspondence Address:**
Department of Science Education, Universitas Negeri Malang, Indonesia
E-mail: agung.mulyo.fmipa@um.ac.id

p-ISSN: 2527-7537
e-ISSN: 2549-2209

INTRODUCTION

In the development of the 21st century world, the role of students in shaping the nation's generation that is able to keep pace with advances in science and technology is crucial, but data from the World Population Review in 2024 shows that Indonesia is still ranked 67th out of 203 countries, indicating he low quality of education that needs to be improved immediately to ensure the nation's progress (*Education Rankings by World Population Review 2024*, n.d.). Learning is considered successful in Indonesian education if students score above the KKM and the learning process is effective. Teachers have the responsibility of transferring knowledge to students and finding innovative ways to make this happen. Therefore, teachers have an obligation to increase students' interest in learning in order to realize an increase in student learning outcomes. Each school has the authority to determine the value of the KKM, but the reality in practice in the field in the research of Safira et al. (2020) and Amrilizia et al. (2023) show that student learning completeness does not always get good results. Based on research from Safira et al. (2020), student learning outcomes are still relatively low in science lessons with a percentage of learning outcomes completeness of 17% where only 5 out of 30 students scored above the KKM of 65. The results of observations made by Amrilizia et al. (2023) showed that eight students or 33% obtained scores above the KKM, while the other sixteen students or 67% obtained results below the KKM. So, the completeness of cognitive learning outcomes is still not achieved.

Assessment criteria known as learning outcomes serve as a basis for knowing how well students are learning. These learning outcomes show how effectively students understand the subjects presented, so learning outcomes play an important role in learning activities. The results of students' interaction with the environment and learning resources determine the abilities of students. After completing learning, students have cognitive (knowledge), affective (attitude), and psychomotor (skills) skills (Nurrita, 2018). According to Bloom's updated taxonomy, the cognitive domain includes activities that emphasize intellectual qualities including the capacity to remember (C1), understand (C2), apply (C3), analyze (C4), evaluate (C5), and create (C6) (Anderson et al., 2001). The affective domain is related to feelings and emotions, such as morality, behavior, and adaptability. Meanwhile, the psychomotor domain is related to motor skills or actions.

Science learning contains several materials, one of which is the earth and solar system, which includes studying the concept of the earth and its satellites with the subject matter of the earth's movement in the solar system, the moon as a satellite of the earth, and the earth's satellites other than the moon. According to Historyani's research (2020), students who study material about the movement of the earth and the moon have an average daily test score of 58.60, the lowest score is 20, the highest score is 88. Meanwhile, the percentage of completeness is only 16%. The difficulty level of earth and moon movement material which is abstract and cannot be seen directly is the cause of low learning outcomes. In addition, low learning outcomes are due to the lack of use of learning media which is also one of the factors.

Human activities are influenced by rapid technological advances, and education is no exception (Budiman, 2017). Education is now strongly influenced by technological advances. The utilization of appropriate and high-quality technology can improve the quality of learning activities. Making interactive learning media is one form of utilizing technology. The use of appropriate learning media allows teachers and students to benefit from technological advances in the teaching and learning process (Moto, 2019). Learning media is becoming increasingly varied along with technological developments. Based on research by Halidi et al. (2015) showed that the use of information and communication technology-based media has a positive impact on learning outcomes.

One of the problems in education that needs to be studied during the learning process is low learning outcomes (Molstad & Karseth, 2016). The use of interactive and interesting learning media is an alternative in overcoming this problem. Improving student learning outcomes is possible from increasing student motivation and desire to learn through the use of interesting and interactive media (Putri & Ardi, 2021). Ispring Suite, Adobe Flash, and Articulate Storyline software have been used in previous studies to create interactive learning media on science materials (Ulayya, 2023; Hotimah & Muhtadi, 2018; Nadzif et al., 2022). The research findings show that using interactive media causes an increase in interest in learning.

The results of interviews with science teachers at MTsN 2 Kota Malang show that some students still associate abstract concepts, such as the concept of the earth and its satellites, with material that is difficult to understand. This is indicated by the percentage of students' cognitive learning outcomes of 60% not reaching the KKM. Based on the needs analysis questionnaire of seventh grade students at MTsN 2 Kota Malang also shows that 67% of students obtained low

science learning outcomes. The cause of the achievement of low student completeness is because the learning process uses conventional methods and the use of learning media that is less than optimal and still minimal, namely only using power point media. However, in practice, the use of learning media is less interactive and interesting so that students do not respond to the learning media, and as a result 70% of students do not fully understand science material well. The results of interviews and student needs questionnaires agree with the research of Khasanah et al. (2018) who found that material related to the solar system is abstract as a result students need a variety of learning media to fully understand the topics taught.

One of the important factors in achieving the objectives of a lesson is the use of learning media. The application of learning media on abstract material such as the earth and its satellites should look attractive, interactive, and communicative. One of the learning media that has these characteristics is interactive learning media (Tambunan et al., 2023). Interactive learning media can display images and videos and animations that can help students absorb topics more easily, abstract material can be presented in the classroom audiovisually and not only verbally. Students and interactive learning media create two-way interaction (Hartanto et al., 2023). Learning activities are more fun, interesting when students can actively participate in the use of interactive learning media. Some of the advantages of interactive media can help students understand the material so that there will be an increase in learning outcomes. Harsiwi & Arini's (2020) research also shows that students are motivated to use interactive media during the teaching and learning process so that it has an impact on improved learning outcomes.

Interactive learning media through the genially platform which has advantages and a number of interesting features is an alternative to choosing learning media in the current millennial era. This genially platform allows users to create interesting learning media as needed such as presentations, courses, infographics, games and quizzes. In addition, the genially platform can add text, images, audio, video, interactive elements and interactive questions to make learning media more interesting. However, currently there is still no research that develops learning media using the genially platform on the material of the earth and its satellites. The use of learning media through the genially platform has been developed by previous research on newton's law material, impulse momentum, and energy saving (Febrina et al., 2023; Ratniati & Harahap, 2022: Septianingsih et al., 2023).

Based on the above problems, the researcher raised the research title "Development of Interactive Learning Media on Earth and Satellite Material through the Genially Platform to Improve Students' Cognitive Learning Outcomes" aims to produce interactive learning media on earth and satellite material that is valid, feasible and effective in improving students' cognitive learning outcomes. The resulting media has material limitations, which are only limited to the material of the earth and its satellites in class VII science lessons SMP / MTs. The novelty of the resulting product is the material of the earth and its satellites and the media is equipped with interactive features, the material is displayed not just text, but there are images, animations, videos, quizzes and discussions that are interesting and interactive.

METHOD

Research Design

This research is a research and development (R&D) using a 4D development model developed by Thiagarajan et al. (1974). The selection of this model is based on the development of interactive learning media as a learning tool which is one of the advantages of the 4D model (Arywiantari et al., 2015). In addition, this 4D model has more complete and systematic stages (Taufik et al., 2022). The 4D model used is divided into four stages, including define, design, develop, and disseminate. The research design during the product effectiveness test uses a Pre-experimental design with a One Group Pretest-Posttest Design design by observing one group that will be given a pretest at the beginning before treatment, then given the treatment of applying interactive learning media products through the genially platform, then at the end a posttest is given (Sugiyono, 2024).

Research Objectives

The subjects of this study are students from MTsN 2 Kota Malang and science teachers of MTsN 2 Kota Malang. The sample in this study was selected by non-random sampling with a purposive sampling technique, namely as many as 5 students in product trials, as many as 30 students in class 7F in product effectiveness tests, as many as 30 students in class 8I in the trial of the posttest pretest question instrument, as well as two science teachers in MTsN 2 Kota Malang. This research was conducted in February-May in the even semester of the 2023/2024 school year.

Data Type

The data obtained is in quantitative and qualitative form. Quantitative data was obtained based on the results of the student needs

questionnaire, the results of the media and material validation test and question validation, the results of the test of question instruments, the results of the readability test on teachers and students, as well as the results of the student response questionnaire and the results of the effectiveness test, namely in the form of pretest and posttest scores. The results of interviews with teacher needs, suggestions from validators of media and material experts, and suggestions from teachers and students become qualitative data that is used as a form of evaluation of the learning media developed.

Data Collection Techniques

Data collection techniques in this study include observation, interviews, tests, and questionnaires using research instruments in the form of interview guideline sheets, needs analysis questionnaires and validation questionnaires including media validation questionnaires, material and question validation, teacher and student readability test questionnaires, pretest and posttest question sheets and student response questionnaires. Validation is carried out through a validity test by lecturers who are experts in media and materials of the Science Education Study Program by conducting a quality assessment of interactive learning media. The preparation of research instruments is based on a grid of instruments that are guidelines for formulating questions. In the form of pretest and posttest questions, the validity of the construct and empirical validity are measured (Sugiyono, 2024). The validity of the construct is carried out by validators or expert lecturers from the Science Education Study Program by assessing the suitability of the assessment aspect with the grid of the questions, while the empirical validity is carried out by students by conducting test questions so that the validity of the question items and the reliability of the questions are produced. The teacher's readability test was carried out by science teachers of MTsN 2 Kota Malang while the student readability test and student response were carried out by MTsN 2 Kota Malang students. The results of media and material validation as well as pretest and posttest questions, teacher and student readability tests, and student responses using the Likert scale are presented in the form of a checklist. According to Likert (1932), the assessment of the Likert scale is found in Table 1.

Table 1. Likert scale assessment

Criteria	Score
Respondents strongly agree/very good/very interested	4
Respondents agree/like/interested	3
Respondents disagreed/lacked good/less interested	2
Respondents disagree/disagree/are not interested	1

The result of validating the correctness of the concept obtained in the validation of the material uses the Guttman scale by using two options, namely "yes" if the concept made is correct or "no" if the concept made is wrong. According to (Guttman, 1944) the assessment of the Guttman scale is shown in Table 2.

Table 2. Guttman scale assessment

Criteria	Skor
Correct concept	1
Wrong concept	0

Data Analysis Techniques

Analyze the data of the student needs questionnaire, validation test, readability test and student response questionnaire by determining what percentage of results are obtained using equation (1):

$$P = \frac{\sum \mathrm{x}}{\sum x_i} \times 100\%$$

Information:

P = Percentage of results obtained

$\sum \mathrm{x}$ = Score obtained

$\sum x_i$ = Maximum score/total score

The percentage of results obtained after using the equation was then changed in the interval of validity, feasibility and student response criteria to learning media according to Akbar (2016) shown in Table 3.

Table 3. Interval of assessment criteria for learning media

Interval	Criteria
$81\% - 100\%$	Very valid/very feasible/very good
$61\% - 80\%$	Valid/feasible/good
$41\% - 60\%$	Quite valid/quite feasible/good enough
$21\% - 40\%$	Less valid/less feasible/not good
$< 20\%$	Invalid/unworthy/not good

The validity and reliability test is used in analyzing the trial data in the form of pretest questions and posttest questions by giving these questions to students who have obtained earth and satellite materials. Testing the validity and reliability of the questions using the help of the SPSS version 26 application. The purpose of the question validity test is to show the validity or

invalidity of the question. Then correlate the score of each item with the total score to obtain the r-count which is compared with the r-table at alpha=0.05 to find out whether the question item is valid or invalid using the decision: the instrument is considered valid if the r-count > the r-table, and vice versa the instrument is considered invalid if the r-count < the r-table (Riduwan et al., 2013).

The reliability test of the research instrument aims to obtain the accuracy of the measurement of the instrument so that it is consistent if the measurement is carried out more than once using the same measurement instrument and circumstances. The reliability test was carried out using the split half technique through the SPSS version 26 application so that Guttman Split-Half Coefficient was obtained. This technique was chosen because the question instrument in the form of multiple choice only has one correct answer. To find out whether the instrument can be said to be reliable or not, a comparison can be made, if Guttman Split-Half Coefficient > r-table, then the question instrument can be said to be reliable (Riduwan et al., 2013).

The data analysis technique of the effectiveness test of this study was with a normality test, a hypothesis test in the form of a t-test and an N-gain test. The normality test was assisted by the SPSS version 26 application by paying attention to the results of the Shapiro-Wilk test of normality because the data in this study was less than 50 (Sundayana, 2016). In the normality test using the decision, the data is said to be normally distributed if the significance value is > 0.05, on the other hand, the data is said to be not normally distributed if the significance value le is 0.05. In this study, one treatment was carried out on the same subject, namely one group during the effectiveness test will be given a pretest at the beginning before treatment, then given the treatment of applying interactive learning media products through the genially platform and at the end given a posttest so that the sample groups are paired. If the paired data is normally distributed, then a test is carried out on the hypothesis (mean difference test) assisted by SPSS version 26 with a parametric test (paired sample t-test) which has the condition that the data is in the form of an interval or ratio and the two groups of paired data are normally distributed. Paired sample t-test is used to determine whether there is a difference in learning outcomes before and after being treated in the form of the use of interactive learning media through the genially platform by making a hypothesis as follows:

$H_0 =$ There was no significant difference between the average pretest score and the average posttest score

$H_a =$ There is a significant difference between the average pretest score and the average posttest score

Based on the hypothesis that has been made, the decision rules are as follows:

If the significance value > 0.05 then H_0 accepted

If the significance value < 0.05 then H_0 rejected

According to Hake (1998), to determine the level of effectiveness of interactive learning media products through the genially platform, an N-gain test can be carried out using equations (2):

$$Normal\ Gain\ (g) = \frac{Posttest\ Score - Pretest\ Score}{Ideal\ Score - Pretest\ Score}$$

The results of the N-gain test are then changed in the gain index criterion interval in Table 4.

Table 4. Gain index criteria

Score	Criteria
$g \geq 0{,}70$	High
$0{,}70 > g \geq 0{,}30$	Medium
$g < 0{,}30$	Low

RESULTS AND DISCUSSION

The development of interactive learning media through the genially platform is carried out using a 4D model development procedure. The first stage is to define and describe the needs of learning. There are five steps carried out at this stage, including initial research analysis, student analysis, task analysis, concept analysis, and formulation of learning objectives. The initial analysis of the research was carried out by observation at MTsN 2 Kota Malang which aimed to see firsthand the state of the school so that the problems and needs of teachers and students could be known by conducting interviews with science teachers. The results of observation found that the use of learning media is still very limited only relying on textbooks and sometimes presentation teachers use PowerPoint media that is projected through *Liquid Crystal Display* (LCD) projectors. However, students sometimes do not respond to the learning media used because they are not interesting and interactive. In addition, teachers have also shown learning videos but often use a whiteboard to explain the material. When there is a discussion activity, only a few students tend to actively answer and this is dominated by certain children, while other students are only listeners so that the discussion goes on for a long time. The limited allocation of time for science learning also affects the learning process in the classroom, where it causes teachers to not have completed the entire learning material so that students have to learn

independently about the material. Teachers have difficulty when conveying abstract material, such as the earth and its satellites. This is because students who still have difficulty understanding material that cannot be seen directly by them due to the limitations of learning media owned by teachers. Cognitive learning outcomes in physics lessons, especially those that have concepts that are difficult for students to imagine, for example in earth and satellite materials, around 60% of students have not reached KKM.

Student analysis was carried out by distributing a questionnaire on the needs of students in class VII MTsN 2 Kota Malang as many as 30 children. Based on the results of the questionnaire, as many as 73% of students had difficulty understanding material related to science lessons. This also affects the cognitive learning outcomes of students so that around 67% of students have not reached the KKM. The limited learning media in schools makes teachers only use whiteboards and power point media in explaining learning materials, this results in students not understanding science lessons well. When learning uses more interactive media with pictures, videos, and interactive quizzes presented in it, 90% of students show interest in participating in science learning. The genially platform that can be accessed through laptops/smartphones by students can be an alternative in the use of learning media.

The next step is task analysis, concept analysis, and formulation of learning objectives in accordance with the implementation of the curriculum in schools, namely the independent curriculum. The main source used in the analysis of this assignment and concept is the handbook for teachers and students on science learning for junior high school grade VII issued by the Ministry of Education and Culture. Task analysis is carried out by recording the tasks in general that will be done by students and considering their suitability with learning outcomes. Concept analysis is carried out by identifying concepts in accordance with the learning materials that will later be used in the learning media. The results of this analysis are that students will learn the concept of earth movement in the solar system, the moon as an earth satellite, and earth satellites other than the moon. After analyzing the tasks and concepts, then formulate the learning objectives that students will achieve: (a) describe the consequences of the movement of the earth on natural phenomena on earth, (b) describe the effects of the movement of the moon, on natural phenomena on the earth, (c) describe the differences in artificial natural satellites.

The second stage is design which aims to plan the creation of learning media. There are four steps, namely the preparation of test standards, media selection, format selection, and initial design. The results of the previous analysis are the basis for the preparation of test standards that are adjusted to the cognitive abilities of students to see their initial abilities and become an evaluation tool after learning. The step that must be taken before compiling the test is to design a grid in the learning outcome test that contains question indicators, question items, answer keys, and the cognitive level of the question. The form of the test is in the form of multiple-choice questions that are done by students before being given the treatment of applying interactive learning media products through the genially platform and after using learning media products.

The next step is the selection of media and the selection of learning media formats. The development of this interactive learning media is through a genially platform that utilizes the features in it including text to write the content of the material presented in the learning media; insert to add audio, photos, and videos; resources to display a wide selection of icons, illustrations, graphs and tables; Interactive Elements to make the buttons in the learning media more interactive in the form of Go To Page will direct to the intended page, Tooltip will display brief information related to the displayed content without having to click on the element, Window will display more coherent information related to the displayed content by clicking on the element; Interactive Questions to create interactive quizzes in the form of single or multiple choice, true or false, and image selection questions. Furthermore, learning media is packaged in the form of links that can be shared via social media links or WhatsApp so that students do not need to download applications.

The initial design in the design stage is carried out by making a flowchart and storyboard to explain the description of the learning media to be developed before entering the development stage. Flowcharts function to describe the content of the material that will be presented and the menus available in the learning media, while storyboards are used to provide a rough design overview (layout) of the development of learning media. Each feature in the learning media is designed according to its function and the presentation of the material will be presented in the order in the learning media. The initial design of the learning media is then consulted with the supervisor to obtain suggestions that will later be used in improving the design of the learning media before development.

The third stage, namely development, has the goal of realizing the initial design that has been made at the design stage so as to produce the final product. In this study, interactive learning media

products were developed through a genially platform with earth and satellite materials that have learning support features such as text, images, audio, video, interactive elements, and quizzes which are then made into a unit in the form of a collection of slides such as PowerPoint. Interactive learning media through the genially platform can be accessed by users using smartphones, laptops or computers accompanied by stable internet network support so that students can use this learning media anytime and anywhere. This learning media has two main displays, namely the initial display and the menu display (Figure 1).

Figure 1. Initial view of learning media

The initial display of the learning media in Figure 1 contains a brief description of the learning media, namely the title and learning material as well as the start button to start entering the main menu display containing media features, learning objectives, learning materials, interactive quizzes, bibliography, and profiles as shown in Figure 2.

Figure 2. Display of the learning media menu

The material menu contains three main subjects discussed in the learning media, namely the movement of the earth in the solar system, the moon as an earth satellite, and earth satellites other than the moon. Each material icon can be clicked and a display of the content of the material will appear according to the one selected. After completing the series of materials presented, students can return to the main menu display and then take an interactive quiz as shown in Figure 3. The discussion of the interactive quiz will appear after the students finish working on the quiz questions in each number.

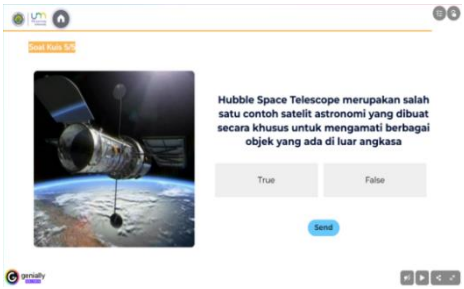

Figure 3. Display of quizzes on learning media

The development stage has two steps, including expert assessment accompanied by revision and development trials. The purpose of the expert assessment is to conduct a validity test on the learning media development product. The step taken during the expert assessment is to send learning media products to validators or lecturers who are experts in media and materials for the Science Education Study Program (Table 5).

Table 5. Media expert validation results

No	Aspects	Number of Questions	$\sum x$	$\sum x_i$
1	App view	10	37	40
2	Application operation	6	20	24
3	Benefits of the app	4	14	16
	Total	20	71	80
	Average			**88.75**

Info: $\sum x$ = Score obtained; $\sum x_i$ = Maximum Score

Based on Table 5, the average score from media experts was 88.75% so that interactive learning media got a very valid category. Media experts also gave suggestions and comments, namely correcting the google form links given in the learning media because some were still not in accordance with the previous google form. Input from these media experts is the basis for making revisions to the learning media (Table 6).

Table 6. Material expert validation results

No	Aspects	Number of Questions	$\sum x$	$\sum x_i$
1	Grammar	4	13	16
2	Materials presented	3	11	12
3	Truth of the concept	11	11	11
	Total	18	35	39
	Average			**89.75**

Info: $\sum x$ = Score obtained; $\sum x_i$ = Maximum Score

Based on Table 6, the average score from material experts was 89.75% so that the interactive learning media obtained a very valid category. General assessments from media experts and materials on the development of interactive learning media through the genially platform can be used with revision. After the interactive learning media went through the media validation and material validation stages, then a logical validity test was carried out by the validator on the pretest and posttest question instruments (see Table 7) to see the validity of the questions based on the reasoning results from the validator (Akbar, 2016).

Table 7. Results of validation of pretest and posttest question instruments

No	Aspects	Number of Questions	$\sum$ x	$\sum x_i$
1	Question indicators in accordance with learning objectives	20	72	80
2	Questions made according to cognitive level	20	64	80
3	Correct answer key	20	78	80
4	The picture presented in the question is clearly visible	2	8	8
	Total	62	222	248
	Average			**89.5**

Info: $\sum$ x = Score obtained; $\sum x_i$ = Maximum Score

Based on Table 7, the average result of question validation was 89.5% so that the pretest and posttest questions that had been made received a very valid category. Suggestions and comments from validators are that there are still some questions that are made not in accordance with their cognitive level, so the researcher revised the questions by changing the question indicators according to the cognitive level of the questions. Furthermore, the pretest and posttest question instruments are tested for empirical validity by students by conducting a test of questions in grade 8I MTsN 2 Kota Malang as many as 30 students who have studied the earth and its satellites so that the validity and reliability of the questions are produced. Testing the validity of question items using the help of the SPSS version 26 application. The r-table value at the significance of 5% (alpha=0.05) with the number of data (N) = 30, obtained an r-table of 0.361.

Based on the results of the validity test of 20 pretest and posttest questions, 14 questions were said to be valid, including question items number 1, 2, 3, 5, 7, 9, 10, 11, 12, 13, 16, 17, 19, 20 and 6 question items were said to be invalid, including question items number 4, 6, 8, 14, 15, 18. Valid question items are followed by conducting a question reliability test. The reliability test of the question uses the SPSS version 26 application using the split half technique with the results showing a Guttman Split-Half Coefficient of 0.701 > r-table (0.361) so that it is concluded that the question instrument can be said to be reliable.

The next step is to carry out a development trial aimed at finding out the feasibility of the learning media that has been developed. The trial process was carried out by providing learning media links to teachers and students. In addition, the teacher readability test questionnaire was given to two science teachers and the student readability test questionnaire was given to five students at MTsN 2 Kota Malang (Table 8).

Table 8. Results of teacher readability test questionnaire

No	Aspect	Number of Questions	$\sum$ x	$\sum x_i$
1	Materials presented	3	22	24
2	App view	7	54	56
3	Application operation	5	37	40
4	Benefits of the app	5	39	40
	Total	20	152	160
	Average			**95**

Info: $\sum$ x = Score obtained; $\sum x_i$ = Maximum Score

Based on Table 8, the average score from the teacher readability test questionnaire was obtained of 95% so that the interactive learning media received a very feasible category. The teacher also gave comments related to the development of learning media that are very interesting and easy to understand and interactive (Table 9).

Table 9. Results of student readability test questionnaire

No	Aspects	Number of Questions	$\sum$ x	$\sum x_i$
1	Materials presented	4	68	80
2	App view	4	70	80
3	Application operation	4	72	80

No	Aspects	Number of Questions	$\sum x$	$\sum x_i$
4	Benefits of the app	3	55	60
	Total	15	265	300
	Average			**88.33**

Info: $\sum x$ = Score obtained; $\sum x_i$ = Maximum Score

Based on Table 9, the average score from the student readability test questionnaire was 88.33%, so the interactive learning media got a very feasible category. The fourth stage is disseminate which is the final stage in the development of learning media with the aim of finding out the effectiveness of learning media in improving learning outcomes. The effectiveness test of this product was carried out on 30 students in class 7F MTsN 2 Kota Malang during two meetings. Before conducting this test, the researcher prepares a teaching module that will be used in learning. At the beginning of the first meeting learning, students work on pretest questions and then do practice questions in learning media that can train students' cognitive abilities. In the second meeting, students used learning media and took interactive quizzes on the genially platform, then students did the posttest and filled out a student response questionnaire at the end of learning.

The results of the effectiveness test of learning media in this study were analyzed with a normality test, a hypothesis test (t-test) and an N-gain test using the SPSS version 26 application. The normality test is a prerequisite test before carrying out the t-test and the N-gain test. The normality test used Shapiro-Wilk with the results of the significance value of both > 0.05 in the pretest question of 0.366 and the posttest of 0.076. Based on the results obtained, it can be stated that the distribution of data is normally distributed. Furthermore, for hypothesis testing whether there is a significant difference between the average pretest score and the average posttest score, a parametric test with a paired sample t-test is carried out (Table 10).

Table 10. t-test results

	t	Sig. (2-tailed)
Pretest-posttest	-12.071	.000

Info: t = count of **t**

Table 10 shows the acquisition of a Sig. (2-tailed) value of 0.000. The result of the significance value < 0.05 so that H_0 rejected and H_a accepted. Based on the results obtained, it can be stated that there is a significant difference between the average score in the pretest and the average score in the posttest. Furthermore, to determine the level of effectiveness of learning media products in improving student learning outcomes, an N-gain test was carried out as shown in Table 11.

Table 11. Results of N-gain analysis

Average Pretest	Average Posttest	N-gain score	Criteria
45.24	75.95	0.56	moderate

Based on the results of the N-gain analysis shown in Table 11, the N-gain score was obtained which was 0.56 and obtained a moderate criterion. This proves that learning media is effective in improving the cognitive learning outcomes of students in the medium category. According to Jufrida et al. (2019), students' cognitive learning outcomes are influenced by (1) internal factors from themselves such as interest, motivation, and concentration in learning (2) external factors come from the surrounding environment such as facilities and infrastructure in school. The results of observations from observers in this product effectiveness test show that internal factors such as students' interest as seen from their activeness in exploring learning media cause interest and enthusiasm. The activeness of students in discussions and involvement in the work of interactive quizzes shows that there is student motivation in participating in learning using learning media. However, during the presentation activity, there were students who were less active because their confidence was still lacking. These internal factors affect student learning outcomes. Most students are skilled in operating learning media, but there are students who are constrained by the network so that it is difficult to access learning media. This is one of the external factors that is important to consider, namely facilities and infrastructure such as adequate internet access. Furthermore, to find out the response of students to the learning media, an analysis was carried out, the results of which are shown in Table 12.

Table 12. Results of student response questionnaire

No	Aspects	Number of Questions	$\sum x$	$\sum x_i$
1	Understanding of the material	3	330	360
2	Application display	2	223	240
3	Application operation	2	208	240
4	Application benefits	3	336	360
	Total	10	1097	1200
	Average			**91.42**

Info: $\sum x$ = Score obtained; $\sum x_i$ = Maximum Score

Based on Table 12, the average student response questionnaire was 91.42% so that the interactive learning media received a very good response according to the assessment criteria according to Akbar (2016). Students also commented, namely that the display of the learning media was not too crowded so that it was interesting and made learning more exciting, there were still not many practice questions in the interactive quiz. The suggestion from the students is to add practice questions in interactive quizzes and in the future can compete together to answer the interactive quizzes.

The use of interactive learning media equipped with images, animations, audio, and video media displays can create more fun learning activities. This is in accordance with the research of Muyaroah and Fajartia (2017), namely the use of media in learning motivates students to learn material and makes them happier in learning. Interactive learning media through the genially platform is also equipped with interactive quizzes that are equipped with discussions so as to support interaction between students and learning media. This makes students not passive and not bored in learning. In line with the research of Hidayat et al. (2023), it is stated that learning media can be presented in the form of online games in the form of quizzes, which can increase the motivation and sustainable interest of student learning activities so as to create an atmosphere that is not boring and liked by students, and makes students feel more active with all activities carried out. The earth and its satellites that students consider to be difficult to understand because they contain abstract material that can be displayed directly or visualized in learning media so that students' understanding of the material is easier and able to improve their learning outcomes. This is according to research from Rahmadhanningsih (2021) that there are difficulties in understanding abstract concepts that are needed for interactive media by visualizing the concept and can be used independently. In addition, research from Arlen et al. (2020) stated that interactive media in physics learning can increase students' attention and mind, which has an effect on improving learning outcomes from students.

CONCLUSIONS AND SUGGESTIONS

Conclusions

Through the development of interactive learning media on earth and its satellites through the genially platform, it is able to improve cognitive learning outcomes in students. The results of the media, material, and question validation tests were obtained on average 88.75%, 89.75%, 89.5% so that they received very valid criteria. The results of the validity test of the pretest and posttest questions were obtained 14 valid questions and the reliability test showed that the Guttman Split-Half Coefficient was 0.701 > r-table was 0.361 so that the question instrument was reliable. The results of the readability test for teachers and students were obtained on average 95% and 88.33% so that they received very feasible criteria.

The results of the effectiveness test with the t-test obtained a significance value of 0.000 so that H_0 rejected and H_a accepted, there was a significant difference between the average pretest and the average posttest and the results of the N-gain analysis obtained a score of 0.56 so that the media was effective in improving the cognitive learning outcomes of students with the medium category. The results of the student response were obtained on average 91.42% so that it received a very good response. Based on these results, interactive learning media on earth and satellite materials is very valid and very feasible and effective in improving students' cognitive learning outcomes.

Suggestions

This research on the development of learning media was carried out on grade VII MTsN 2 Kota Malang students, so it is recommended for teachers to use media with certain learning methods and learning media is only limited to earth and satellite materials, so the researcher provides suggestions to the researcher to further develop on different materials.

REFERENCES

Akbar, S. (2016). *Instrumen perangkat pembelajaran*. Remaja Rosdakarya.

Amrilizia, N., Dewi, N. K., & Ratnawati, S. (2023). Peningkatan hasil belajar siswa kelas VII menggunakan model project based learning (PjBL) dengan strategi diferensiasi melalui metode lesson study pada topik Bumi dan tata surya. *Seminar Nasional Sosial Sains, Pendidikan, Humaniora (SENASSDRA)*, *2*(2), 107–120.

Anderson, L. W., Krathwohl, D. R., Airasian, P. W., Cruikshank, K. A., Mayer, R. E., Pintrinch, P. R., Raths, J., & Wittrock, M. C. (2001). *A taxonomy for learning, teaching, and assissing: a revision of Bloom's taxonomy of educational objectives*. Longman.

Arlen, S. R., Astuti, I. A. D., Fatahillah, F., & Purwanti, P. (2020). Pengaruh media pembelajaran fisika menggunakan aplikasi appypie terhadap hasil belajar fisika siswa di SMK. *Schrodinger Jurnal Ilmiah Mahasiswa Pendidikan Fisika*, *1*(1), 44–49. https://doi.org/10.30998/sch.v1i1.3073

Arywiantari, D., A A Gede Agung, & I Dewa Kade Tastra. (2015). Pengembangan Multimedia interaktif model 4D pada pembelajaran IPA di SMP Negeri 3 Singaraja. *Journal Edutech Universitas Pendidikan Ganesha Jurusan Teknologi Pendidikan*, *3*(1), 1–12.

Budiman, H. (2017). Peran teknologi informasi dan komunikasi dalam pendidikan. *Al-Tadzkiyyah: Jurnal Pendidikan Islam*, *8*(1), 31–43.

Febrina, F., Muliyati, D., & Sunaryo, S. (2023). *Pengembangan game edukasi menggunakan Genially pada materi hukum Newton*. *XI*, 275–284. https://doi.org/10.21009/03.1102.pf38

Guttman, L. (1944). A basis for scaling qualitative data. *American Sociological Review*, *9*(2), 139–150. https://doi.org/10.2307/2086306

Hake, R. R. (1998). Interactive-engagement versus traditional methods: a six-thousand-student survey of mechanics test data for introductory physics courses. *American Journal of Physics*, *66*(1), 64–74. https://doi.org/10.1119/1.18809

Halidi, H. M., Husain, S. N., & Saehana, S. (2015). Pengaruh media pembelajaran berbasis TIK terhadap motivasi dan hasil belajar IPA siswa kelas V SDN Model Terpadu Madani Palu. *Jurnal Mitra Sains*, *3*(1), 53–60. http://jurnal.pasca.untad.ac.id/index.php/MitraSains/article/view/58/23

Harsiwi, U. B., & Arini, L. D. D. (2020). Pengaruh pembelajaran menggunakan media pembelajaran interaktif terhadap hasil belajar siswa di sekolah dasar. *Jurnal Basicedu*, *4*(4), 1104–1113. https://doi.org/10.31004/basicedu.v4i4.505

Hartanto, S., Pemana, S. A., & Perdana, O. W. (2023). *Media pembelajaran interaktif*. UPY Pres.

Hidayat, I., Supriani, A., Setiawan, A., & Lubis, A. (2023). Implemantasi aplikasi Kahoot sebagai media pembelajaran interaktif dengan siswa SMP Negeri 1 Kunto Darussalam. *Journal on Education*, *6*(1), 6933–6942.

Historyani, T. N. (2020). Pemanfaatan metode guided discovery learning berbantuan algasi untuk meningkatkan aktivitas dan hasil belajar IPA Materi gerakan Bumi dan Bulan. *Jurnal Ilmiah Pendidikan TRISALA*, *1*(16), 116–130.

Hotimah, & Muhtadi, A. (2018). Pengembangan multimedia pembelajaran interaktif IPA untuk meningkatkan pemahaman siswa pada materi Mikroorganisme SMP. *Jurnal Inovasi Teknologi Pendidikan*, *4*(2), 201–213. https://doi.org/10.21831/jitp.v4i2.15047

Jufrida, J., Basuki, F. R., Pangestu, M. D., & Djati Prasetya, N. A. (2019). Analisis faktor yang mempengaruhi hasil belajar IPA dan literasi sains di SMP Negeri 1 Muaro Jambi. *EduFisika*, *4*(02), 31–38. https://doi.org/10.22437/edufisika.v4i02.6188

Khasanah, I., Astuti, R. K., & Fatkhurrohman, M. A. (2018). Penggunaan alat peraga gerhana Bulan untuk meningkatkan kualitas belajar siswa kelas VIII SMP Negeri 3 Kersana. *Jurnal Pendidikan MIPA Pancasakti*, *2*(1), 38–42. http://e-journal.upstegal.ac.id/index.php/jpmp/article/view/876/0

Likert, R. (1932). A technique for the measurement of attitudes. In *Archives of pshychology*. https://doi.org/10.4135/9781412961288.n454

Mølstad, C., & Karseth, B. (2016). National curricula in Norway and Finland: the role of learning outcomes. *European Educational Research Journal*, *15*(3), 329–344. https://doi.org/10.1177/1474904116639311

Moto, M. M. (2019). Pengaruh penggunaan media pembelajaran dalam dunia pendidikan. *Indonesian Journal of Primary Education*, *3*(1), 20–28.

Muyaroah, S., & Fajartia, M. (2017). Development of Android-based learning media using Adobe Flash Cs 6 Applications in biology subjects. *Ijcet*, *2*(1), 79–83. https://journal.unnes.ac.id/sju/index.php/ujet/article/view/19336/9214

Nadzif, M., Irhasyuarna, Y., & Sauqina, S. (2022). Pengembangan media pembelajaran interaktif IPA berbasis articulate storyline pada materi sistem tata surya SMP. *JUPEIS : Jurnal Pendidikan dan Ilmu Sosial*, *1*(3), 17–27. https://doi.org/10.55784/jupeis.vol1.iss3.69

Nurrita, T. (2018). Pengembangan media pembelajaran untuk meningkatkan hasil belajar siswa. *MISYKAT: Jurnal Ilmu-Ilmu Al-Quran, Hadist, Syari'ah dan Tarbiyah*, *3*(1), 171. https://doi.org/10.33511/misykat.v3n1.171

Putri, A. A., & Ardi. (2021). Meningkatkan hasil belajar siswa melalui multimedia pembelajaran interaktif berbasis pendekatan saintifik. *Jurnal Edutech Undiksha*, *8*(1), 1–7. https://ejournal.undiksha.ac.id/index.php/JEU

Rahmadhanningsih, S. (2021). Pengembangan media pembelajaran berbasis audio-visual pada materi koordinat bola dan silinder.

Jurnal Pendidikan Matematika Indonesia, *6*(September), 105–110.

Ratniati, & Harahap, R. H. (2022). Pengembangan media pembelajaran fisika dengan permainan ular tangga menggunakan platform Genially pada pokok bahasan momentum impuls di SMAN 1 Badar T.P 2021/2022. *Jurnal Penelitian Pendidikan MIPA (JP2MIPA)*, *07*, 18–27.

Riduwan, R. Rusyana, A., & Enas. (2013). *Cara mudah belajar SPSS Versi 17.0 dan aplikasi statistik penelitian*. Alfabeta.

Riyani, R., Maizora, S., & Hanifah, H. (2017). Uji validitas pengembangan tes untuk mengukur kemampuan pemahaman relasional pada materi persamaan kuadrat siswa kelas VIII SMP. *Jurnal Penelitian Pembelajaran Matematika Sekolah (JP2MS)*, *1*(1), 60–65. https://doi.org/10.33369/jp2ms.1.1.60-65

Safira, C. A., Setyawan, A., & Citrawati, T. (2020). Identifikasi permasalahan pembelajaran IPA pada siswa kelas III SDN Buluh 3 Socah. *Jurnal Pendidikan Mipa*, *10*(1), 23–29. https://doi.org/10.37630/jpm.v10i1.277

Septianingsih, M., Kurnia, D., & Hikmah, N. (2023). Pengembangan multimedia interaktif berbasis platform Genially pada subtema penghematan. Pedagogia: Jurnal Ilmiah Pendidikan, *15*(1), 34–38. http://journal.unpak.ac.id/index.php/pedagogia

Sugiyono. (2024). *Metode penelitian pendidikan (kuantitatif, kualitatif, kombinasi, R&D, dan penelitian pendidikan)*. Alfabeta.

Sundayana, R. (2016). *Statistika penelitian pendidikan*. Alfabeta.

Tambunan, H., Subakti, H., Mas'ud, S. H., & Dwinanto, A. (2023). *Media pembelajaran interaktif*. Yayasan Kita Menulis.

Taufik, M., Dwijayanti, I., & Dasar, P. (2022). Pengembangan media pembelajaran aplikasi Android berbasis problem posing untuk meningkatkan hasil belajar pada materi bangun ruang bagi siswa kelas VI. *Pendas : Jurnal Ilmiah Pendidikan Dasar*, *7*(2), 909–917.

Thiagarajan, S., Semmel, D. S., & Semmel, M. I. (1974). *Instructional develoment for traning teacher of exeptional children: a sourcebook*.

Ulayya, S. (2023). *Pengembangan aplikasi pembelajaran the planets berbasis Powerpoint I-Spring Suite 10 pada materi sistem tata surya kelas VI Sekolah Dasar*. Universitas Muhammadiyah Bangka Belitung.