

JETSU (EXPLORE THE SOLAR SYSTEM): STUDENT EDUCATION APPLICATION FOR SCIENCE SCIENCE MATERIAL FOR JUNIOR HIGH SCHOOL GRADE 7

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Abstracts

Interactive learning media that integrate aspects can make visual learning clearer. The result of this study is a set of learning programs that can be used as teaching tools. This research uses a type of R&D (Research and Development) research using the ADDIE model. In the development stage, researchers prepare sheets for validation to experts and tested to grade VII students. This research produced the following findings: (1) Development of android-based physics learning media on solar system materials; (2) With an average percentage of 88.33%, material experts, media experts, and material experts can evaluate the feasibility of learning media based on the results of argumentation and testing questionnaires and can conclude that the media is in accordance with the criteria for use of "Eligible". And tests were conducted on seventh-graders who were in areas near the researcher's home, and were assessed by an average percentage.

Keyword:

Solar System, Educational Applications, Science

Introduction

Technology has become a necessity of life for everyone in today's 5.0 society. The virtual and physical worlds merged in the 5.0 era, which we are seeing. One of them is the world of education, where changes occur rapidly as technology advances in this field. This kind of thing is possible because of the technologically possible learning processes and procedures. In the realm of education, especially in the learning process, especially in early infancy, the use of technology is very beneficial (Rahayu, 2021). Given the current pace of technological advancement, it is only natural that some organizations have started developing technologies designed to make things easier.

The successful learning process is fun, inspiring, involves creative elements, presents barriers, and gives students the opportunity to express their creativity and freedom (Hakim, 2018). Children are required to understand various information during the learning process, and their brains are formed to be able to memorize, store, and recall knowledge (Anisa et al.,

2017). It's important for students to build their memory skills early on by remembering the basics.

One of the topics discussed in class regarding science material for grade VII junior high school students is the solar system. The arrangement of celestial bodies surrounding the sun as its core is called the solar system. Because each planet has so many unique properties, understanding and memorizing information about the solar system can be challenging for certain children. This happens as a result of the limited learning resources offered by teachers during practicum. The methods used now to teach students about the solar system are still manual. Because information about the solar system is presented through visuals such as whiteboards and photos in textbooks, it may be difficult for students to understand that the planets of the solar system being studied actually exist (Firmansyah et al., 2021). In addition, students may struggle to distinguish one planet from another that is compatible with planetary properties.

When presenting information or subjects in class, teachers can benefit from the use of learning media. Media can host learning resources, provide information about them, and serve as a source of practice questions. Along with the advancement of information technology, learning media can be planned and produced. Technology and information (ICT)-based learning materials can make learning more interesting and improve academic achievement in terms of student learning outcomes and learning motivation (Astuti et al., 2019). Student learning outcomes can be improved with the use of ICT-based learning materials. One application of learning styles in today's world is the use of Android-based educational content. The use of this kind of educational media has the potential to improve students' academic performance in the areas of cognition and learning motivation.

Information technology support that can be integrated into the learning process is needed to ensure that the material is understood. Researchers in this field make it easier for users to get the latest information by providing a smartphone application that can be used to study the science of the solar system. The JETSU (Explore the Solar System) app is designed to provide comprehensive and accurate information about this material in a way that is easy for students to understand. This will prepare them for junior high school by getting them used to processing or processing their knowledge. Introduce the solar system to students as an example that can be used according to their stage of development.

At times, various aspects of life, as well as almost all institutions in the social, economic, cultural, security, and educational fields, have been affected by the rapid progress of science and technology. The use of technology in the field of education today has facilitated the current structure of employment. The field of education also makes extensive use of computers in a variety of ways, including to aid instructional activities, access the Internet, and find necessary information.

Students will not get bored easily and will understand the content more easily if it is presented in a fun way. Much of the digital media world has been absorbed by education. Even though learning activities have shifted to the use of interactive media and ways of delivering material digitally (Safaat H, 2014). As a result, various educational applications began to be used for learning media to facilitate content distribution using various techniques. Since many students today prefer to play games on their phones rather than read textbooks, educational apps can be used instead of traditional learning materials.

This educational application is an option and solution for learning both online and offline because the application can be installed and used anytime and anywhere only with cellphones and internet data. This solar system application is an application that contains material about the solar system at the Junior High School Class VII level. As a result, it is anticipated that this application will attract users and improve students' knowledge and learning outcomes related to the content of the solar system.

And the development of science and technology in this 4.0 era, we as students must have a creative and innovative spirit. With the innovative and moderate narrative moving together to realize these SDGs, we as researchers make it happen by making software that can support and facilitate students in understanding the material. Based on this description, researchers can formulate problems including how to design and create an android-based JETSU (Solar System) educational application and how to operate a JETSU (Solar System) educational application on an Android smartphone.

Based on these discussions and problems, researchers will discuss the creation of software that supports access to information and material about the solar system, namely by using the help of application making websites using Android-based devices or smartphones in the form of applications. Based on the research conducted, the author hopes to be able to provide benefits including adding knowledge and insight in making educational applications that are used as learning media that utilize science and technology in the world of education, help teaching and learning activities, and utilize internet connections to find material about the solar system, make it easier to understand the material, are expected to foster interest in learning and improve student learning outcomes.

Methods

The type of research used is the R&D (Research and Development) method. This research design is based on research (Erwan & Mukhidin, 2013) on this R&D method using three main stages, including: 1) Preliminary study; 2) Model Development; and 3) Test model validity. At this main stage, researchers use ADDIE research design (Analysis, Design, Development, Implementation, Evaluation). The next stage is to process the data for analysis so that we can find out the opinions and arguments of experts against the submitted application after we have collected the necessary data. The evaluation data used is collected through surveys or evaluation questionnaires distributed to media and subject matter experts. The data consists of qualitative data and is processed as follows:

1. Convert qualitative data into quantitative data with the following scores:

Table 1. Quantitative data score

Category	Score
Excellent	5
Good	4
Good enough	3
Bad	2
Very Unkind	1

2. Calculate the average score on each aspect with the following calculation:

$$\text{Presentase} = \frac{\text{Scores obtained}}{\text{Maximum score}} \times 100\%$$

3. Determine the qualitative average number with score conversion criteria according to (Rayanto & Sugianti, 2020).

Table 2. Qualitative Average Sum Score

Presentase	Information
80% - 100%	Valid
60% - 79,99%	Valid enough
50% - 59,99%	Invalid

Results and Discussion

Findings

The result of this study are draft specifications of interactive learning media, which are then transformed into educational applications. Researchers will create educational application items using methodologies that have been approved by experts. At this main stage, researchers use ADDIE research design (Analysis, Design, Development, Implementation, Evaluation). In this research method will produce a product and test the effectiveness of the product. And in research, the ADDIE model is a research model that has the aim of producing products and conducting effectiveness tests in the products produced.

The first stage is the analysis stage. Researchers go into detail about how to get the data and information necessary to complete each stage of product development. The goal of the project is to design, develop, and understand how to use Android-based solar system applications on smartphones. In addition, it can spur students' interest in learning and understanding the material provided and help them understand the concept of the Solar System in Natural Science lessons.

The second stage is the design stage. The process of making learning media in the form of educational applications using the andromo website. This andromo website is a mobile application maker website that uses the flutter framework that allows users to create cross-platform applications and applications that can be used for iOS and Android. Once you reach the main menu, a number of sub-menus with learning objectives, Qur'anic postulates, learning videos, and mini games will appear. In the sub-menu, there are several information that students want to learn independently or learning in class. The quiz menu will display several menu options in the form of mini games that can be accessed by students. There are several menus including Quizizz, puzzel, crossword, finding words and matching pictures

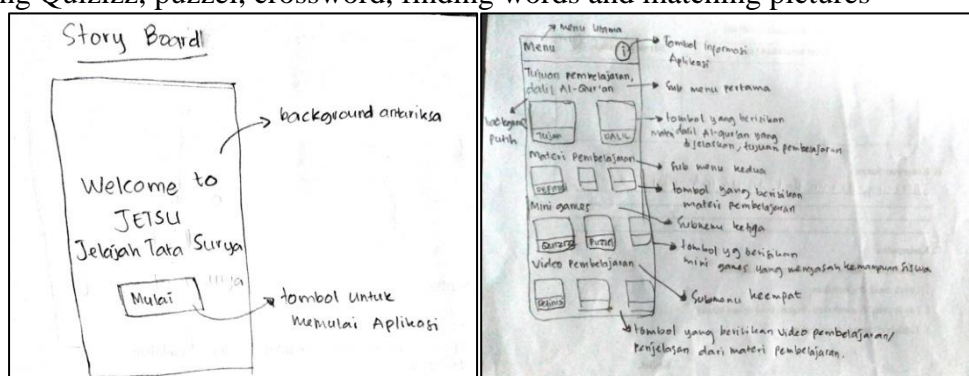


Figure 1. Storyboard main page view ad main menu.

The third stage is development stage. At this point, researchers make teaching materials based on designs that have been made (Prihandini & Siswati, 2022). The results of design development are depicted in figure 2.



Figure 2. Screenshot display and main menu

After that, product validation or assessment sheets are created for media experts and material specialists. These specialists include media experts, subject matter experts, and lecturers who have undergone testing in the field of science education. In the following table, the findings of due diligence conducted on learning media or manufactured products, the results that have been obtained from validators can be discussed.

Table 3. Learning media feasibility test results

Trial Subjects	Validity Result	Rate
Test the Learning Media Member	89,29%	Valid
Material Expert Test	87,37%	Valid
Student Class VII	85%	Valid

The data above is used to validate the findings of a study on learning media which includes text, audio, and visual components as well as media components and benefits. Based on the findings, 89.29% of media experts' findings were considered very valid for use by grade VII junior high school students. By using the instrument as a measuring tool for the development of solar system educational application media for grade VII students, the validity results of material experts covering assessment aspects including learning aspects, material aspects, and benefit aspects obtained a validation percentage of 87.37%, which can be said by saying that this media is considered very valid based on the assessment of material experts. While the results of validation by grade VII students use questionnaires based on test results conducted by teachers about learning media that will help the learning process of grade VII students, the content of the material offered. Leverage the educational use of solar system-related resources and their advantages for lifelong learning at home and in the classroom.

Judging from the table of questionnaire results filled in grade VII students produced a percentage of 85% with very valid categories. In the final stage, the validity carried out by grade VII students around the researcher's residence regarding the learning media. It can be concluded that when introduced to learning media in the form of educational applications with solar system content, grade VII students are able to utilize applications in accordance with the rules, have motivation, and have a fairly high interest.

The fourth stage is the implementation stage. This stage of implementation is where the product is ready to be introduced to the manufacturer and tested to produce product feasibility. Since this stage is not done, our hope is that in class students can be guided by the teacher to operate this JETSU (Explore the Solar System) application. It is expected that at this stage of implementation, researchers will practice the designs that have been made using methods applied in the field such as research conducted by (Anggraini & Sasmita, 2022). The next step is to introduce items that have been created to be validated and tested to grade VII students when the learning media has been generated and completed. This educational application media can be used to supplement classroom instruction or serve as a diversion during homework assignments. Each student's home internet network can be used to access instructional applications. Students can use the internet in accordance with the requirements of the material offered. Thus, it sharpens students' attention on their studies without letting them explore other topics. The learning process will be hampered by advertising if we often browse blogs. Students will not see ads in this application, which encourages learning attitudes in users.

The fifth stage is the evaluation stage. At this stage, conduct product feasibility tests from several experts. Evaluation of expert validation results should be done at this point, according to research by (Zsalsabilla et al., 2022). The evaluation stage is the final step in the process of creating a product. At this stage, conduct product feasibility tests from several experts. This stage is where the feasibility of the product is checked, and the benefits and disadvantages of manufactured goods are revealed. Based on the recommendations of experts, the results of the product are used to assess the substrate and make improvements. Advice from media experts takes the form of sub menu buttons on the main menu display that are too large but can be changed to the typical size of sub menu buttons. While information from subject matter experts look the menu section for words that describe celestial bodies to provide play instruction so that students more easily understand the rules of play.

After receiving feedback from experts, there are shortcomings in the form of only being accessible online, the resulting product deficiencies will be corrected or corrected until they meet the requirements for a decent learning media product. The usefulness of solar system educational applications for seventh graders can be considered sufficient to be used as teaching tools based on research findings on student educational applications.

Solar system education applications can be considered feasible for teaching materials for solar system introduction to grade VII students based on the findings of validity analysis and trial production of learning media. According to research by (Firmansyah et al., 2021) who created a product in the form of an educational game application that introduces the solar system using Virtual Reality technology in order to make it a supporting learning medium that suits the character of students, the final result can be a solution to meet students' needs in knowing the solar system from other sources. In this application also has several characteristics including linking Qur'anic verses in the solar system as evidence of the greatness of Allah SWT. The use of linked Qur'anic verses in the material of the solar system is characteristic of a Madrasah Tsanawiyah (MTs) who participates in admiring the greatness of Allah.

Analysis

Based on the results obtained, the average percentage of trial data based on experts is 87.22%. Based on this information, it obtained a valid predicate which means that this educational application is worthy as an interactive learning media. Based on these data, it supports the statement that JETSU (exploring the solar system) is an educational application for students of the science solar system material for junior high school / MTs grade 7 based on several student responses, with good feedback and interesting for them. After receiving feedback from experts, there are shortcomings in the form of only being accessible online, the

resulting product deficiencies will be corrected or corrected until they meet the requirements for a decent learning media product. The usefulness of solar system educational applications for seventh graders can be considered sufficient to be used as teaching tools based on research findings on student educational applications.

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The goal of the project is to design, develop, and understand how to use Android-based solar system applications on smartphones. In addition, it can spur students' interest in learning and understanding the material provided and help them understand the concept of the Solar System in Natural Science lessons.

a) Needs analysis

On the basis of on-site observation, a needs analysis is carried out. Based on the findings of location observations, it can be said that Android-based learning media can help science classes that include solar system material. Media supported by android is predicted to be able to support learning, inspire learning, and help maximize student learning outcomes, especially in the cognitive field. To encourage more student interest in learning, learning media include content explanations, instructional films, and fun quizzes.

b) Target user analysis

This educational application-based learning media is intended for junior high school / MTs students in the subject of Natural Sciences material Solar System.

c) Content or resource analysis

In this stage, researchers analyze the material to be delivered in educational application-based learning media, such as information about the planets, characteristics, the impact of the movement of the moon and others.

d) Analysis of bottlenecks or constraints

At this stage, researchers analyze possible obstacles in making educational application-based learning media, such as limited time, technical resources, and so on. Researchers are also looking for solutions to overcome obstacles that occur by finding alternative resources to be used and maximizing time as best as possible.

Conclusion

The development of educational applications can be considered very valid or mentioned enough to be used as a medium, based on the results of expert validation, which received an average rating of 88.33% and tested on grade VII students near the researcher's home, who obtained an average percentage of 85%. Therefore, this solar system educational application media can be said to be suitable for use based on these data.

The media has been recognized as valid and adequate for use, in accordance with research findings made in the form of solar system educational application media for grade VII students. By using solar system educational applications developed for use by both teachers and students, the usefulness of this educational application media can have a good impact, bringing benefits in the learning process. To develop children's learning media by utilizing technology, it is recommended that teachers be able to present the latest innovations and other ideas.

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