

## DEVELOPING ANDROID-BASED SIMPLE LEARNING MEDIA SOLAR SYSTEM MATERIALS AS A RESOURCE OF SELF-LEARNING STUDENTS OF JUNIOR HIGH SCHOOL

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### ABSTRACT

In line with the rapid development of information and communication technology and globalization in the 21st century, reforms are needed in the world of education as a source of needs. The success of a nation is often based on progress and development in the world of education. One of the contributions of technology in the world of education is to make it easier for teachers to establish good communication with students or with students' parents. The existence of learning media is able to concretize concepts and ideas and is able to foster learning motivation in students. The learning resources that will be tested are in the form of materials and programs, namely by developing a simple android application *Solar System*. Validation was obtained with the "Very Eligible" category for each aspect in the form of a questionnaire filling instrument by lecturers of the Faculty of Tarbiyah at the IAIN Kediri.

**Keyword:**

Education, Globalization, Learning Media, 21st Century

### Introduction

In line with the rapid development of information and communication technology and globalization in the 21st century, reforms are needed in the world of education as a source of needs. Phenomena that will definitely occur due to the existence of information and communication technology and globalization, which include transformation tools, electronic communications that are increasingly rapid, developments in various fields such as social, political, economic, cultural, and education. As a result of the above, highly qualified Human Resources are needed in various fields. There needs to be major changes in the world of education so as to produce human resources who have a professional, thorough, honest and tenacious attitude. So that when a highly qualified human resource has been formed, it will become the initial capital to encourage good development and growth in various fields,

especially in the economic field. In response to this, the world of education must be shifted to an educational approach based on the future or 21st century learning.

The change in the new learning paradigm that we know as the 21st century learning paradigm is a change in the way of learning that has become a demand in learning. Because students are required to have critical thinking skills, problem solving, metacognition, communication skills, collaboration, innovation and creation. This emphasizes that the teacher is no longer the only source of learning. Thus students are required to be more active in learning. So as to produce a responsive learning scope, between teachers and students.

The success of a nation is often based on progress and development in the world of education. It has become a major factor that the world of education brings a country to be more advanced. In Indonesia, the government implements the foundation of the national education system as a benchmark in achieving its goals as a developed country. Article 41 of the SISDIKNAS Law explains that the mission of the National Education System is to strive for expansion and equal distribution of opportunities to obtain quality education for all Indonesian people. Article 3 of Law Number 20 of 2003 explains about the National Education System, that national education has a role and function in developing capabilities and forming a more dignified personality of national civilization in educating the nation's life.

The government's efforts to improve the quality of education in Indonesia have continued until now. This can be seen with the existence of a new curriculum, namely the Independent Learning Curriculum. Where educators are given the flexibility to convey learning material and create quality learning in accordance with the student learning environment. The independent learning curriculum also offers a variety of extracurricular activities so students can choose according to their talents and interests for extracurricular learning. This extracurricular activity will produce a product that will be launched once a year.

There is a link with the independent curriculum, the readiness of teachers must be broad, thorough and mature in accordance with the competencies they have. In achieving a standard, size, and criteria, teacher competence provides important benefits in learning. The competencies used as a reference or basis for evaluating the performance of teachers are Pedagogic Competence, Professional Competence, Personal Competence, and Social Competence (Ratna Wahyu Wulandari et al, 2019).

Pedagogic competence is based on good, broad and up-to-date knowledge and knowledge about student learning and in the teaching and learning process in the classroom. Teachers need to have the ability to plan, initiate, lead, and develop education, especially in the teaching process in the classroom. In addition, the breadth and depth of the material according to the competence of each teacher is also important. This is because the material delivered by the teacher can be well received by students, instead of providing motivation to learn. The teacher's ability to process issues both inside and outside the school that are related to education and teaching and learning in higher schools is also included in the concept of pedagogic competence. This pedagogic competence supports the creation of sustainable education (Rosni Rosni, 2021).

The four competencies above that most influence teacher performance are social competence. This becomes the dominant factor because the teacher must pay close attention to the social environment that occurs both with fellow teachers or educators and also students. The quality of student learning and teaching is very influential on the social competence possessed by a teacher, because the key in the learning process is good communication between teachers and students.

The development of digital technology makes its use more convenient by enabling automatic, fast, high-quality, efficient and easy transfer of data, and easy retrieval of information quickly from other electronic media. The internet is one of the products of this

digital technology development that can be used (Zidah Chotamy Nuriyah et al, 2023). One of the contributions of technology in the world of education is to make it easier for teachers to establish good communication with students or with students' parents. The inclusion of technology systems in the world of education also helps students in welcoming the development of information and communication technology in life. Interesting learning programs will facilitate the learning process of students in capturing and receiving the material presented by the teacher (Puspoko Ponco Ratno, 2022). The atmosphere in the class becomes fun so that the learning objectives can be achieved properly.

Nowadays Information and Communication Technology is not only a means of support but needs to be the main weapon in supporting the success of the world of education so that it is able to compete globally. Globalization has become a major figure in the world of education where the education system that used to run conventionally or face-to-face is now an open education system. This is one of the important roles for the inclusion of information and communication technology in the world of education. This is because students and teachers are able to establish good interactions both inside and outside of school. Giving assignments can be done with online learning media that students can access anytime and anywhere.

The development of relevant learning media can optimize the teaching and learning process. Learning media is able to concretize concepts and ideas and is able to foster motivation to learn in students (Ani Cahyadi, 2019). The New Oxford American Dictionary says that the word media comes from the Latin "medius" which means "amongst". While the Association of Education and Communication Technology (AECT), says that the media is all forms of things that include the forms and channels used as the delivery of messages and various kinds of information (Ani Cahyadi, 2019). A media can be said to be a learning media if it includes messages and learning objectives.

Learning media is a tool, intermediary, means and liaison used to carry and disseminate and convey a message so that it can stimulate students' thoughts, feelings, actions, interests and attention. In this learning media there are two important elements contained, namely the first is the teaching material or the message to be conveyed, the second is the display tool to convey the message. As well as the advantages gained when using learning media according to G. G. Salandanan (Ani Cahyadi, 2019), are as follows:

- a. At the school stage it provides students with concrete learning experiences.
- b. Students understand more about the meaning of objects and phenomena that they see, hear, use and witness for themselves.

With the existence of learning media, of course, it will facilitate the teacher's work in conveying material and realizing learning objectives. The teaching and learning process will run effectively and efficiently. The reason is with learning media the teacher can demonstrate objects that are relatively difficult to obtain. Even on objects that have a rare category. For students, learning media can also be a source of student learning. Because through learning media students can learn things that they did not understand before, to understand in a real or concrete way.

Today's latest technology-based learning media, for example, is by using a smartphone. The use of smartphones is known to be very popular among today's students. Usually used as playing games, social media and the like. We need to balance the high use of smartphones with Android-based education. Where students can learn without time and space limits. The application of smartphones as learning media will certainly produce representative and interactive media. In addition to this, the use of Android-based learning media can provide a stimulus to the community, especially for students to use it in more productive ways, for example as a learning medium. The learning media developed by these educators can become a work besides being a learning media, namely by uploading Android learning applications to the Playstore. In this case, of course, learning media can be introduced to students widely, not

only students within the scope of the school concerned with educators. The steps for uploading to the Playstore are also very easy. To upload it can be accessed for free, but you must have a google play developer account. Google play developer can be accessed for a fee. Even though it is paid, the use of the application will have a broad reach, especially in terms of learning media as well as being a source of independent learning for students.

Learning resources are all sources, both in the form of data of people or certain forms which can be used by students either individually or in combination in the learning process so that the expected goals and competencies of students can be achieved. Conventional learning resources include material notes, textbooks or LKS, articles and journals. In a book entitled *Instruction Technologis : The Definition and Domains of the Field*, AECT records six types of learning resources (Ani Cahyadi, 2019), namely:

a. Message (*message*)

Messages conveyed either formally or informally can be used as a type of student learning resource. A formal message is a communication message according to an organizational structure such as downward and upward communication and horizontal communication. Meanwhile, informal messages are social relations that have the power to determine authority and are transitioned into formal messages.

b. People (*people*)

As we are able to get new information from someone, then that person can be said to be a source of learning. People are divided into two groups, namely:

1. A group of people who have the ability to get education and are expected to become teachers. Its main task is in the form of providing guidance, conducting teaching and learning processes, and providing training to teachers.

2. A group of people who have other professions but they are in an educational environment. An example is a trader. Police and health workers

c. Materials and programs

The materials and programs in question are software. This application program is a supporting component in teaching and learning activities. Through this application program, messages that will be conveyed by the teacher will be more readily accepted by students. For example through slide programs, teaching aids, video programs, audio, films and learning modules.

d. Tool (*Device*)

The tool he means is in the form of hardware. Where this hardware functions as a distribution of application programs so that they can be received directly by students. Some of them also function as learning resources. Examples are LCD projectors, tape recorders, and multimedia.

e. Method (*Method*)

The method is a way or steps for delivering learning material from the teacher to students who are expected to achieve the goals of a lesson. Some of the learning methods applied by the teacher are the demonstration method, the discussion method, the expository method, the question and answer method, and so on.

f. Background (*Setting*)

Background or environment is a situation and condition of the learning environment both inside and outside the school environment. This environment includes both what has been planned and what has not been planned by the teacher as a place in the learning process. Examples of settings are libraries, laboratories, lighting rooms, school grounds, classrooms, and so on.

The learning resources that will be tested are in the form of materials and programs. Given that technology is a need and no longer a desire in the education process, a simple

application can help students get to know the function of technology in the world of education. A good learning is based on the principle of processing skills, where students are able to develop their own concepts and facts of a material. Based on the background that has been described above, it is necessary to develop technological media to keep pace with technological developments in the world of education. Through the Solar System material, a simple android-based application will be developed which includes material about planets and there are quizzes to hone students' cognitive knowledge.

The focus of the problem in this research is "Is the android application simple *Solar System* suitable for use in science learning?" and "How are the characteristics of simple applications *Solar System* on the matter of the Solar System?". The purpose of this study is to determine the feasibility and characteristics of a simple android application *Solar System*.

## Method

This research was conducted for 1.5 months, from February 13 to March 22. The source of the data obtained is from the results of observations and the results of validator responses in the form of questionnaires. The research method used is *Reserch and Development*, which includes the following steps:

a. Analysis of needs according to the media developed

At this stage, research was carried out regarding the introduction by conducting a literature review. The purpose of this study is to obtain the data needed in product design, namely a simple android application *Solar System*.

1. Problem identification

The more rapid technology and communication, in the world of education the existence of qualified technology in the learning process is a necessity. This is because in Indonesia the use of learning media is still very limited by using a blackboard. Meanwhile, the majority of students are either elementary school, junior high and high school already using *Smartphone* as a daily necessity. Of course, the presence of learning media that is interesting and can be accessed anytime and anywhere will foster a spirit of student learning motivation.

2. Evaluation

Merdeka Learning curriculum is used in product development. The curriculum contains learning objectives for Earth and the Solar System material, namely as follows:

- Comparing the planets in the solar system based on the characteristics of the planets, satellites and the peculiarities of each planet.
- Describe the relative positions of the earth, moon and sun.
- Explain the description of the existence of the sun in life.
- Describe the structure of the earth's layers.

3. Modelling

The application model used is *Thumb Focused Interaction* or interactions focused on thumb use. The purpose of using this model is for students to easily operate the application even if they use one hand. Each button in the application is positioned in the middle with a large size. The goal is to make it easier for students to access and press buttons even with one hand. The advantage of using this model is the ease of access to navigation where each user does not need to use two hands to use the available control buttons. Movement *SWIPE* the screen is not only touchable but also moveable. This movement has the same function as touching a button, which is to open a new layout page. *Swipe View* This also has several advantages including speed, efficiency and comfort when used.

4. Specification

This application contains images, text, animated videos and practice questions. Images and text are used to explain solar system learning materials. Animated video is used to find out the state of the planets around the sun. While the questions are used for students' cognitive exercises regarding the material that has been given.

5. Reviews

Simple Android-based learning media application *Solar System* is an application designed to be accessed using the Android system and smartphones. The main menu on the application's start page consists of Material, Quiz, and Developer Profile.

b. Preparation of learning media

1. Architectural design

In architectural design, several widths are needed, such as:

- a) Text view
- b) Button view
- c) Radio group / Radio Button
- d) Image view
- e) Message box
- f) Swipe view

2. Interface design

c. Expert validation according to the experts developed

To find out the feasibility of a simple Solar System android application, feasibility validation was carried out by final semester students of the Faculty of Tarbiyah IAIN Kediri.

d. Conduct trials of the developed media

This simple Android-based application will be tested on students of Natural Sciences Semester 4th semester of class B IAIN Kediri.

**Result and Discussion**

Data validation test results by final students of the Faculty of Tarbiyah IAIN Kediri in the form of scores converted in the form of standard values with a range of 0-100. This assessment consists of 5 assessment indicator items. The 5 items consist of 1 aspect of material suitability, 1 aspect regarding practice questions or quizzes, 1 aspect concerning the aesthetics of a simple android application *Solar System*, 1 aspect regarding the ease of operation of a simple android application *Solar System*, and finally, 1 aspect regarding the ease of language so that it can be understood clearly by students.

Table 1. Interval Shoes

Interval Shoes	Category
$75\% < x \leq 100\%$	Very Worth it
$50\% < x \leq 74,99\%$	Worth it
$25\% < x \leq 49,99\%$	Not feasible
$0\% < x \leq 24,99\%$	Very Unworthy

Simple android application validation *Solar System* carried out by Lecturers of Tadris IPA Faculty of Tarbiyah IAIN Kediri. Simple android application validation results *Solar System* which can be seen in Tables 2 and 3.

### A. Media Expert Validation

The data from the media expert validation test results are in the form of an average score of the entire value. There are 25 items of assessment indicators by media experts. The 25 assessment indicators include 10 learning media principles, 4 management aspects and 11 media aspects. The following are the results of the assessment categories by media experts.

Table 2. Media Expert Validation Test Result

NO	VALIDATOR	PRINCIPLES OF LEARNING MEDIA	GOVERNANCE	MEDIA
1	Members of the Media 1	47	19	53
2	Members of the Media 2	31	11	38
	Total Shoes	78	30	91
	Rata-rata Skor	39	15	45,5
	Presentase	78%	75%	75,84%
	Category	Very Worth it	Very Worth it	Very Worth it

From table 2 above it can be explained or explained that the results of the assessment by the lecturer on aspects of learning media rules obtained a percentage of 78%. Based on these results, it can be interpreted that simple Android-based learning media applications are feasible to use. In the management aspect, a percentage of 75% is obtained which means that simple Android-based learning media applications are feasible to use. In the media aspect, a percentage of 75.84% was obtained, which means that simple Android-based learning media applications are feasible to use. Overall, it can be interpreted that this simple Android-based learning media application is very feasible to use from various aspects.

### B. Material Expert Validation

The data from the material expert validation test results are in the form of an average score of the entire value. There are 25 items of assessment indicators by material experts. The 25 assessment indicators include 10 learning media principles, 4 management aspects and 11 material aspects. The following are the results of the assessment categories by material experts.

Table 3. Material Expert Validation Test Result

NO	VALIDATOR	PRINCIPLES OF LEARNING MEDIA	GOVERNANCE	MATERIAL
1	Members of the Media 1	44	17	45
2	Members of the Media 2	41	17	42
	Total Shoes	85	34	87
	Rata-rata Skor	42,5	17	43,5
	Presentase	85%	85%	72,5%
	Category	Very Worth it	Very Worth it	Worth it

From table 2 above it can be explained or explained that the results of the assessment by the lecturer on aspects of learning media rules obtained a percentage of 85%. Based on these results, it can be interpreted that the material in a simple Android-based learning media application is feasible to use. In the management aspect, a percentage of 85% is obtained which means that the material in simple Android-based learning media applications is feasible to use. In the material aspect, a percentage of 72.5% was obtained which means that the material in simple Android-based learning media applications is feasible to use. Overall, it can be interpreted that the material in this simple Android-based learning media application is very feasible to use from various aspects.

## ANALYSIS

Simple android application *Solar System* is an Android-based learning media that is used to explain Solar System material. Solar System material on the application *Solar System* includes the definition of the solar system, introduction to planets, planetary structures, animated videos of planetary orbits, quizzes as practice questions and there are profiles of media developers in them.

Characteristics of a simple android application *Solar System* namely as follows:

- a. Practical and flexible means easily accessible anytime and anywhere.
- b. No need to log in to enter the application.
- c. Have an interesting visualization so that students are not easily bored.
- d. Equipped with a quiz as practice questions.
- e. There is a moving animated video about the planets around the sun.

From the results of the above calculations it is also necessary to know that this simple android-based application means that it is very suitable or very feasible if used as a source of student independent learning. Where through a simple android-based application *Solar System* this is able to assist teachers in presenting messages and information so as to expedite and support the process and student learning outcomes.

Studying independently will certainly train students in finding problems found in the material, so that their desire to find solutions to these problems will be higher. This is what can increase student motivation. Learning in the classroom is also not more interesting without learning media. Through learning media, namely simple Android-based applications, namely *Solar System* This can attract students' attention and increase students' curiosity. By applying learning media related to technology, it is able to arouse students' desires and interests, generate motivation and bring about psychological influences on students.

Of course, changes to be more advanced come from a teacher or as a prospective teacher. This is in accordance with the results of the author's research that by developing simple Android-based applications *Solar System* achieved a category worthy of being used as a source of student independent learning. Thus, this behavior is able to bring the world of education in Indonesia to be more advanced and not left behind by the rapid development of technology and communication in the 21st century.

## Conclusion

The conclusion that can be drawn from the research results and discussion of simple android-based application development as a source of student independent learning is that the validators obtained very feasible results. Thus this simple Android-based application is able to participate in fostering student motivation in learning. With this independent learning resource students are able to construct their own knowledge of the material that has been or will be delivered by the teacher. Of course, the enthusiasm for student learning will increase



compared to just learning at school where the teacher only focuses on himself and also the blackboard. This simple Android-based application is a learning media that can be developed continuously. Future application development is expected to continue to be developed by experts and experts, including:

- a. The addition of animation and simulation features makes the application more interactive and easily accessible to students
- b. Applications can be developed to be installed on various types of smartphones.

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