SOLAR SYSTEM LEARNING MEDIA
BASED ON ANDROID MOBILE
FOR ELEMENTARY SCHOOL STUDENTS

PUBLICATION ARTICLE

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ABSTRACT
Learning is an interactional process between students and teacher and source of study in teaching learning process. The material of solar system is actually complex, to clarify the understanding of the solar system material, needs information technology support that can be applied to this material. The researcher makes design and application as interactive learning media in studying solar system material based on android mobile for elementary school students. The researcher used research and development method. Research and development method is a kind of research method that used to produce special product, and examine the effectiveness of the product. The result in the questionnaire assessment that has been tested in SD N 1 Singopuran, Kartasura, Sukoharjo, Jawa Tengah can be concluded that more than 80% students and teachers give respond strongly agree that this application can be as interesting and interactive learning media which help the students in studying solar system material.

Key Word: solar system, learning media, android.

INTRODUCTION
Learning is an interactional process between students and teachers and study material in teaching learning process (UUSPN No.20, 2003). In other word, learning is a process to help the students to study well. The media and the method of learning process in transferring the material will be an important factor to get the best result.

The methods of delivery to students there are different kinds, one of them the
lecture method. The lecture method is explanation and narrative verbally by teacher in the class, while the role of student is listen carefully, and noted of which presented by the teacher (Surakhmad, 2003). The lecture method has disadvantage that the interaction to be centered on teachers so teachers cannot know with certainty how far students understand about the material (Muhammad, 2011). Seen here that the lecture method is learning more dominated by teacher as "the transferor" science, and students were more passive as the "recipient" of science.

The material of the solar system actually is complex, such as discusses about all of planets in the solar system and satellite. It also discusses about meteors, comets, asteroids, and space objects other (Prihantono, 2013). This material is usually presented using textbook. The material of solar system presented in form of images and text that dominated with theory explanation. To clarify the understanding of the solar system material, need information technology support that can be applied to this material. It was difficult we find in the past before the rapidly growing information technology. The sophistication technology lies in the ability of technology to combine real and virtual condition which the results are displayed in real-time.

Because of that, the writer tries to make an application as an interactive media to help elementary school students to study about solar system based on android mobile. Researcher chose android because Android is the one desired society platform besides blackberry platform and IOS that most popular of Smartphone. Almost all of ages used android platform, from young until old ages (antaranews.com, 2011). This application consists of solar system materials like: planet, space objects, earth, and moon movement that applied in interesting graphic to support learning process, so it will raise the student’s desire in understanding the material. To support this application the writer also make interactive questions, to know how far the
student’s capability in understanding the material by using this application.

**LITERATURE REVIEW**

Learning system in the school limits student’s learning process in the class and also time allocation in teaching learning process. Teaching learning process will be over if the teacher move out from the class. The purpose of this research is to create learning media based on multimedia technology to teach solar system for the tenth grade students of vocational high school in the interactive CD form. The result of the creativity is analyzed statically and tested to the students which the purpose to prove whether this learning system can be applied to solve the existence and the difference problem. (Santosa, 2010)

There are so many nature phenomenon that happened in this word, because of that it is good to study science that discuss about nature phenomenon. Include learning solar system, to support the user in understanding solar system, the writer tries to make mobile - based system application to present the material and the discussion about solar system by using Android. Can be concluded that in making android – based mobile application OS is not too complicated but is too long in editing Figure. For the next developing and the finishing maybe it can add search engine which make the user to find specific material easily, and it will be efficient in searching the necessary material. (Putra, 2011)

Learning strategy that used in SD Negeri Kenep 03 has low variation, and most of the method is communicative method, and there is no media, so the students feel bored and passive. SEQIP (Science Education Quality Improvement Project) is a learning media that can improve student’s capability in science subject. Can be concluded that SEQIP media (Science Education Quality Improvement Project) can help learning process at 6th grade students of SD Negeri Kenep 03 Sukoharjo in academic year 2010/2011. (Pusvitasari, 2011)

There are so many nature phenomenon that happened in this word, because of that it is good to study science that discuss about nature phenomenon. Include learning solar system, to support the user in understanding solar system, the writer tries to make mobile - based system application to present the material and the discussion about solar system by using Android. Can be concluded that in making android – based mobile application OS is not too complicated but is too long in editing Figure. For the next developing and the finishing maybe it can add search engine which make the user to find specific material easily, and it will be efficient in searching the necessary material. (Putra, 2011)
RESEARCH METHOD

There are some steps in designing the application. The researcher using research & development method. Research & development is the research method used to produce a particular product, and test the effectiveness of these products. The system designing and developing with the process of producing DFD, flowchart and implemented using Android Developer Tools Bundle v21.0.1-543035 programing tools. The steps can be drown in the flowchart like Figure 1

![Flowchart System](image)

This research has been held in SD Negeri Singopuran 1, Kartasura, Sukoharjo, Central Java. The assessment uses questionnaire. The data in questionnaire is quantitative form, it is numerical form.

RESULT AND DISCUSSION

a. The Result

Solar system learning media based on android mobile for elementary school students is made using Android Developer Tools Bundle v21.0.1-543035, used Java programming language, and SQLite to save the data.

The achievement of this research is the application of solar system learning media based on android mobile for elementary school students, it is about solar system material in science subject at 6th grade. The results of the study are as the following:

1. Splash Screen Page

Splash page is the first page when the program running and it will close automatically then goes to the first menu page.
2. First Menu Page

First menu page will appear after splash page closed. In this page there are a music back sound and some button menus. The first menu button used to access to the definition of solar system, the second button is used to access to the sub menu of solar system material, the third button is used to access to evaluation menu, the forth button is used to access to searching menu, the fifth button is used to access to about display, the sixth is used to log out from the application.

3. Page of *Menu Materi Tata Surya*

This page contains some button of solar system sub material based on proper curriculum.

![Figure 3 Main Menu Page](image)

**Figure 4 Page of Menu Materi**

There are some buttons in solar system material menu:

a) The Page of *Matahari Sebagai Pusat Tata Surya*

The content of this page is about the review of solar system material, it is about the definition of galaxy and solar system.

![Figure 5 The Page of Matahari Sebagai Pusat Tata Surya](image)
b) The Page of *Planet-Planet Dalam Tata Surya*

This page contains about the gallery which scrollable to the right and left. The information or the name of planets is available on the text view under the planet Figure. The name of the planet will follow or will appear based on the planet which is located on the center.

![Figure 6 Page of Planets](image)

The contents of planet page are video and text view to describe planet’s characteristic. Actually the display and script this page is also same with planets page but it different are Figure, video, and material.

d) The Page of *Gerakan Bumi dan Bulan*

The page menu of *Gerakan Bumi dan Bulan* is two images in linearlayout as button to show the earth and moon movement material. The content of the rotation and revolution page is video that play automatically, and the explanation will show when user click the button of *penjelasan*.

![Figure 8 Page of Revolusi Bumi](image)
e) The Page of *Gerhana Matahari dan Bulan*

This page is about the solar and lunar eclipse material. It adds the activity to show the Figure because it needs big Figure. The activity will appear when the Figure is clicked, and the Figure will appear based on the eclipse type.

![Figure 8 Page of Gerhana Matahari](image)

f) The Page of *Sistem Penanggalan*

This page is about calendar system material based on the curriculum. The layout is really simple, linear layout and text view is component to make this page. The material layout is text view that can be scrolled up and down using scrollview.

4. Page of *Latihan Soal*

The question types of the evaluation are divided into two, first the question consists of multiple choice that sow randomly, and the answer will be corrected directly, whether the answer is true or false.

If the answer is true, user will be given choices to go to the next question randomly, if the answer is false user will be given the chance to see the material relates to the question, and the user can answer till it correct.

![Figure 9 Page of Question Latihan Soal](image)

The second type of *Latihan Soal* (quiz) consist of 10 random question and the last result is score in which it will be appear if the student has finished to answer the ten questions. This type uses data base to save the data of the total questions, question number, and result. To make data base the researcher used query order that inserted in Java file.
Question display consist of ten multiple choices question that shows randomly and the same question is impossible to appear again, till the user get the result of that ten questions.

Figure 10 The result of Quiz

5. Page of Pencarian

This page consists of edittext column is used to insert the keyword, a listview to show the data result of searching and search button to process the searching.

The keyword data is saved in search table. The production processes same with the process in making question table. Production script and database insert is done in dbsearch.java file

b. Testing

Testing of this research was done in SD 1 Singopuran, Kartasura, Sukoharjo, Central Java at March 19 2013 with demonstrated the application of solar system learning media in front of the of 6th grade elementary school students. And it was guided by the teacher of that school.

The process of the application demonstration, the students was divided into some groups that consist of some students, and every group has one hand phone as a media. The demonstration is done in front of the class and every student tries to operate that.

Evaluation of the system is aimed to know how proper the creating system, whether the system is suitable with the main purpose of the creating. The way to
prove it is through questioner with Likert Scale, the formula is:

The highest score (SMax) = 5 x n = 5n (SS) ...... (1)

The lowest score (SMin) = 1 x n = n (STS), n = total of respondent ...... (2)

Score (S) = \[ \sum (\text{The Answer Voter Respondent Total} \times \text{Answer Score}) \] … (3)

Interpretation Percentage (P) = \[ \frac{\text{Score(S)}}{\text{SMax}} \times 100\% \] ...... (4)

Where each answer has weighed:

SS : Strongly Agree (5)
S : Agree (4)
N : Neutral (3)
TS : Disagree (2)
STS : Strongly Disagree (1)

Next, the measurement of interpretation percentage (P) is using international scale (Riduwan, 2010) as follow:

81 – 100 (very strong)
61 - 80 (strong)
41 - 60 (enough)
21 - 40 (weak)
0 - 20 (very weak)

Based on that result testing, could be collected the data as follow:
The score that collected from every respondent would be guidance to evaluate this system; whether the system worked well or not. Besides, it was also determined whether the creating system was suitable to the main purpose of the system creating.

**CONCLUSION**

Based on the design, development and testing this application can be concluded as follows:

1. Based on the testing that have been conducted to the respondent, 86.7% teachers and 97.3% students stated that this solar system application is interesting.

2. From the testing that have to the respondent, 86.7% teachers stated that this solar system application is interactive.

3. From the testing that have to the respondent, 100% teachers and 96.75% students stated that this solar system application can help students to studying solar system.

Based on the description above can be concluded that the purpose of research is making application based on android mobile as interesting and interactive learning media that can help students in studying solar system material has been reached successfully.
BIBLIOGRAPHY


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