The Development Of Students Spatial Intellegent Through Space Dancing (Smart Practice Drone For Learn Remote Sensing) On Geography Subject Of High School

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Abstract: Using media is important in learning geography, especially in Geographics Information System (GIS) and remote sensing. Infact to fullfill it was difficult. The difficult’s part of geography subject specially located in Remote Sensing and Geographics Information System (GIS). It’s because of the expensive of tool which is used as a learning media.. In addition, other free aerial image provider just can make a bad image. Therefore the problem need to be solved by using Space Dancing. Space Dancing is a solution to become new learning media. The aim is making students has spacial thinking. Development method of Space Dancing refer to Borg and Gall mode. The mode has good steps which basically focus on material development. Research subjects are students of 10th grade social 1 on SMA Taman Madya Malang and SMAN 7 Malang, and students of X IS 1 grade in MAN 3 Malang. Collecting data using quisioner method. Data analyze using by counting student’s satisfied on media. The aim of research can be an optional learning media in geography. Result of Product is tool mode and aerial image. For the next, image could use in geography learning process especially in remote sensing and GIS topic. The media also can be added in other material. Space Dancing could be recommended media to Geography Teacher’s Association (MGMP). According to research’s result of Space Dancing media has a lot of benefit. The research’s result show that Space Dancing media has interesting aspect 77.33% percentation. Media’s ability to increasing motivation is 80.15%. Space Dancing media also can increasing student’s understanding which 79.78% percentation. Media also has a good structur which is 78.57% percentation.

Keywords: Learning media, remote sensing and GIS, Space Dancing

I. Introduction

Background

Media has an important role as learning component (Arsyad, 2011) because it has a unique presentation function so that it can help teachers in teaching. According to Latuheru (1988) learning media are materials, tools, methods or techniques used in learning activity to make the process of educative interaction between teachers and students go on effectively and efficiently. Sadiman (2005) concludes “media is able to handle objects which are too big, replaced by reality, images, frame films, films or models, and past events which can be displayed through film recording, video, frame film, photo or displayed verbally”.

The existence of media especially the visual one is very important in learning activities. The advantage of visualization in learning activities will indirectly affect the final result of students’ comprehension. Dale (in Latuheru, 1988) which is also known as cone of experiment stated that “someone experience learning 75% through visual sense (eyes), 13% through audio sense (ears), and the rest through the other senses”.

Particularly in geography subject, visualization of the earth surface is one of the ways to introduce to students about the condition of space around them. Earth surface visualization in geography subject is important to make students have the comprehension of geographical thinking. Geographical thinking according to Alagona (2008) is the development of spatial perspective, knowledge about scale, and comprehension in analyzing several forms and types of geography data (in Ruhiyat, 2013). The comprehension of spatial thinking can be improved through a good geography education. A good geography education should have functions of developing knowledge about spatial patterns and related process, developing skills to process data and information and to practice the geography knowledge, and bringing about attitude of caring about environment and resource (Maryani, 2006).

In order to bring about spatial thinking comprehension among students, geography has some tools such as remote sensing and Geographic Information System (GIS). Both of them are present in geography subject in high school. However, some obstacles occur when geography learning in classes comes to the matter about remote sensing and Geographic Information System (GIS).
Based on Adrasmoro’s (2010) study, teachers face some problems because of (1) teachers are not capable enough to operate GIS software and difficult to get the software, (2) learning tools and media for GIS and remote sensing are not sufficient enough, (3) teachers are not capable enough to master the learning tools and media for remote sensing and photometry, (4) students are lack of understanding about aerial image, (5) students have less understandable references, (6) Remote Sensing and GIS are given to students in XII grade while they have to concentrate on National Examination, (7) facilities in every school are different and less, and (8) there is no laboratory for social science in every school.

The lack of media used for learning Remote Sensing and Geographic Information System (GIS) nowadays is caused by the expensive price. The expensive price of images can be proven in websites providing images such as www.citraspasial.com which provides images with price about $25.00 or Rp 8,500,000.00 ($1.00=Rp 13,600.00) for once order (www.citraspasial.com). It will militate school in providing images massively to be used as media for learning.

Actually, the fast development of technology nowadays also offers some media as solutions which can be used in geography learning practice especially about Remote Sensing and Geographic Information System (GIS). One of those tools is drone. Drone or UAV (Unnamed Aerial Vehicle) has some advantages such as the price which is cheaper than the price of original images. However in practice, it only use in entertainment industries even intelligent rather than in education.

The existence of drone should be introduced to broader society, and the easiest way is by including it in one of learning activities in schools. In this term teachers and other related parties can facilitate students by making a drone special for learning. It can be implemented, drone will make teacher easier to give the matter, especially geography teachers who has a duty as what has been defined in Permendiknas no. 22 year 2006 i.e. to develop students’ understanding about spatial patterns, environment and area, and to be capable in analyzing related process.

Drone or UAV (Unnamed Aerial Vehicle) were used in many researchs nowadays. For example the research for detection mozaic virus disease in cassava by Sadasiva Nair Raji et al (2015). Before that were a using of drone for analyzing characterization of Mediteranian riperian forest by R Dunford et al (2009). In this day and before, drone has never been used in learning proces, especially on geography material.

Thus, it is important to make a development effort of media for learning to optimalize drone technology to produce good images of earth surface. Entering an up-to-date technology element is important so that the subject also develops continuously and it can give benefits for teachers and students. Space Dancing (Smart Practice Drone for Learn Remote Sensing) is one media which will be developed.

The aim of the development of Space Dancing is to make a media for learning Remote Sensing and Geographic Information System (GIS) especially for students in high schools and their teachers. The output expected from this is the creation of a product as media hardware for learning which can help the understanding of Remote Sensing and Geographic Information System (GIS) either to public or to high school students of social science. Space Dancing media will also benefit as a facility for the application of theoretical knowledge, one of which is geography in field of empirical world, and for the development of conception and experience in education researches.

II. Methods

Research plot

This study is based on a model of the development of media for learning by Addie. However, this model will get some modifications on its sintax adapted to the materials and students’ need in class. For the future research, the team had planned some stages bellow:
This is the explanation of the stages:

a. Topic Study
   This activity aimed to determine what topics appropriate to discuss and present. It is done together with some parties. The first is the research advisor, and the second is the professionals of drone.

b. Preparing Tools and Materials
   This stage is done by preparing several things as what has been discussed in the previous stage, including preparing drone as the main tools and other tools. Some tools for data collection in field test such as questionnaires, student understanding test, and learning activity sheets are also prepared. We also ask permission from several related instantiations.

c. Making Prototype
   The prototype making is done with the assistance from some professionals such as students from electrical engineering, drone experts, research advisor and media experts.

d. Professionals Validation
   This stage is done to know whether Space Dancing media is suitable for field test or not. The validators are the advisor, lecturers, and drone experts. If a good result is obtained, media will be tested directly in field. But if the result is not satisfying, the team will do a reparation.

e. Application (Field Trial Run)
   This stage will be done in some schools in Malang city such as SMAN 7 Malang, SMA Taman Madya, and MAN 3 Malang. The trial run will be done through two types. First, to test the effectiveness of the media on students. Second, to know the teachers’ opinion toward the media.

f. Evaluation
   It will be done after testing the effectiveness of Space Dancing in some schools. It aims to make improvement of the media either on the hard or soft component.

Data collection
In this research, we use questionair to collect the data. The questionair used is a close questionair. We also collect data images through remote sensing technique. The sensing of earth surface is simply done using UAV or drone. The data obtained is a simple aerial image.

Data Analysis
To draw a conclusion, the result will be acumulated using this formula:

\[ P = \left( \frac{\sum x}{\sum xi} \right) \times 100\% \]

Note:
- \( P \) = Percentage
- \( \sum x \) = Total score of one type of respondent
- \( \sum xi \) = Total score of all respondents
- 100 = constant

From the result of the acumulation will be conform with the table of satisfaction level as follows:

<table>
<thead>
<tr>
<th>No</th>
<th>Percentage</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>90%-100%</td>
<td>Very Good</td>
</tr>
<tr>
<td>2</td>
<td>75%-89%</td>
<td>Good</td>
</tr>
<tr>
<td>3</td>
<td>65%-74%</td>
<td>Average</td>
</tr>
<tr>
<td>4</td>
<td>55%-64%</td>
<td>Less</td>
</tr>
<tr>
<td>5</td>
<td>0%-54%</td>
<td>Very Less (revision)</td>
</tr>
</tbody>
</table>

III. Result And Discussion
The stage of topic study had been done on 6 March – 8 April 2016. This stage found out that Space Dancing not only suitable for Remote Sensing, but also for some other topics. The design of teaching with Space Dancing was also determined. The results are teaching materials for Remote Sensing and geography concept. Preparation stage which had been done on 7-23 April 2016. The preparation is aimed to fulfill the completeness needed in making prototype and in getting permission for the implementation and tools operation. There were problems in the preparation i.e. the slow process of getting permission and the difficulty in getting the tools. The result obtained regarding the permission to do the research is the license for flying drone from Abd. Saleh airbase, permission to do the research in SMAN 7 Malang, permission to do the research in SMA Taman Madya Malang, and job card to SkyVision Malang (Drone Community). The results are several drone components such as case, motor, camera, etc. The prototype is made from 10 April until 24 April 2016. In this stage, the tools were made until ready for trial run. There were some problems occurred in this stage such as the schedule for assistance by drone experts was not organized well, and some components were not matched so
that they should be replaced. Validation of instruments and media for the research had been done on 3-20 May 2016. Instruments validation was done with the assistance from the lecturer experting Remote Sensing, while media validation was done with the assistance from drone experts. The result of this stage is a drone which is ready to use in teaching. The trial run was done on 26 May 2016 in class X IIS 4 of SMAN 7 Malang, 28 June 2016 in class X IIS 1 of SMA Taman Madya Malang, and 29 June 2016 in class X IIS 1 of MAN 3 Malang. In this research, Remote Sensing was combined with general concept of geography. The result of this research is the score of level of anxiety, motivation, understanding, effectiveness and efficiency of explanation using the media. The result gotten from calculation of every aspect of trial run in the three schools is presented bellow:

Total students = 68 students
Percentage of response score of anxiety = 77.33%
Percentage of response score of motivation = 80.15%
Percentage of response score of understanding = 79.78%
Percentage of response score of effectiveness and efficiency = 78.57%

Result of Quantitative Analysis

<table>
<thead>
<tr>
<th>Anxiety</th>
<th>Motivation</th>
<th>Understanding</th>
<th>Effectiveness &amp; Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>81. 0%</td>
<td>80. 0%</td>
<td>79. 0%</td>
<td>78. 0%</td>
</tr>
<tr>
<td>77. 0%</td>
<td>77. 0%</td>
<td>76. 0%</td>
<td>75. 0%</td>
</tr>
</tbody>
</table>

Diagram 1: percentage of score in every aspect

IV. Conclusion

The development of Space Dancing media could be well done suitable with the model of media development. Some stages had been implemented from topic study, preparing tools and materials, making prototype, professionals validation trial run until evaluation. The results of the development are recycle drone and supporting materials for teaching such as compact disk (CD) and manual book.

The result of this research shows that the development of Space Dancing media is very good for geography subject especially on Remote Sensing and Geographyc Information System (GIS). This can be proven by the result of trial run in some schools i.e. SMAN 7 Malang, SMA Taman Madya, and MAN 3 Malang. The result of trial run shows the average score as follows:

References