The Development of Geo Smart Based Android for Geography Learning Media on Hydrosphere Material and Its Impact towards Life on Earth

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Abstract. Students, as smartphone android users, give potency to be used as flexible and representative learning media. This potency is appropriate for geography learning on hydrosphere material and its impact towards life on earth which has complex material characteristics and many concepts. The objectives of this research are: 1) to find out the need of learning media for geography android-based on hydrosphere topic and its impact towards life on earth. 2) to find out the steps of Geo-Smart development using android-based. 3) to find out the feasibility of Geo-Smart on hydrosphere material and its impact towards life on earth. This research used Research and Development (R&D) with ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). The result showed that: 1) Students needed learning media of geography with android-based, 2) learning media of android-based Geo-Smart was compiled with ADDIE development model adapted to core competencies, basic competencies, indicators, and learning objectives on curriculum 2013 and equipped with feature of map concept, hydrosphere material, picture, schema, map, video, exercise, quiz, assessment, and profile. Android-based Geo-Smart was developed by using Adobe Flash CS6, and 3) the feasibility of Android-based Geo-Smart according to the experts consisted of media expert and material expert was 85% and students' response was 84%, therefore it could be concluded that Geo-Smart learning media was proper to be applied.

1. Introduction

Smartphone or smart cellular device is a mobile device called hand phone that can be used for doing basic communication (sending short messages and phone calls). Inside of the smartphone is available PDA (Personal Digital Assistant) functions and it works like a mini computer. This smartphone generation is the impact of technological developments that move rapidly. In March period 2014-2015 smartphone ownership in Indonesia rose doubly, from 12% to 24% of the total population in Indonesia [1]. It was argued that the use of smartphones or smart cellular device in Indonesia in 2015 almost achieved 15 million units, and the majority of users came from among teenagers with the age range of 15-18 years.

The other Research Institute, digital marketing eMarketer, estimates in 2018 that the number of active users of smartphones in Indonesia is more than 100 million people. Smartphones can grow rapidly along with prices that can be reached by various circles of society with varieties of smartphone's specification and type.

The rapid development of smartphones can be challenges and opportunities, especially in the field of education. The challenge is seen from many cases about smartphones abuse among students such as playing games, too active in social media and storing inappropriate videos to be watched. While the opportunity is the utilization of smartphone in the field of education that is started from the development of innovative, creative, and interactive learning media.

Applications in smartphone are a software which is used for particular purposes, such as processing documents, managing windows and games, and so on. Android is an operating system for Linux-based mobile devices that includes operating systems for middleware and applications [2].

Geography is one of subjects in Senior High School. Geography is important to learn because humans need to understand a home where they live [3], several materials in geography are directly sourced from nature that can be reachable or unreachable, so the role of media is needed to make the students easier to learn the materials. In this case, Hydrosphere is one of the important subject matter that should be learned by students. In spite of the need for an understanding of the material and the necessary of academic in school, the knowledge of the hydrosphere material is also required in maintaining the environment related to the hydrological conditions of the area around the students. This material requires a strong understanding so that it takes a representative learning media and can be repeated at the time the students need it.

Based on the explanation above, it is required a learning media which is effective, interesting, and innovative. It is needed to facilitate students in understanding the subject matter of hydrosphere and the impact of it toward the existence on earth. The geo-smart learning media based android is expected to make students not dependent on the teacher as the only source of information. Students can be more independent in the learning process, and at the end of the goal creates a student-centered learning.

2. Methods

This research was conducted at SMA N 8 Surakarta at Jalan Sumbing Raya No.49, Mojosongo, Jebres, Surakarta City, Central Java. It was implemented in June to July 2017. The methodology in this paper used Research and Development or called RnD. This research includes educational development research intended to produce learning products that are feasible to use and as needed. According Sugiyono (2011: 297) [4], Research and Development (RnD) method is used to produce a particular product, and to examine the effectiveness of the product.

Development research refers to the ADDIE model [5], this model consists of 5 stages which stand for A: Analysis, D: design, D: Development C: Implementation, E: evaluation. Furthermore, explains that the ADDIE model is a repetitive instructional design process, whereas the outcome of formative evaluation of each stage can cause a return to each of the previous stages [6]. However, this research was only done until the stage of Development. The results of geo-smart media development based on the android program was validated by media experts and material experts, and it was tested on a limited group of 7 students from class X IPS at SMA Negeri 8 Surakarta. Data collection techniques in this research used questionnaires and documentations. The research instrument used in this research was questionnaires about the analysis of the needs, media validation and material, and responses toward learning media.

3. Results

3.1. The analysis of the needs of geo-smart based android learning media

Based on interview with Geography teacher of SMAN 8 Surakarta on Monday, June 12th, 2016, there were six obstacles in Geography learning which were disclosed 1) Students tended to be lazy if the task was related to memorization, based on teacher report, memorizing material and many concepts in the field of study that should be understood by students often made students have difficulty; 2) Low reading interest, when confronted with Geography material that was conceptual understanding, students felt very difficult when they were asked to read; 3) Still rare students who bring a laptop, so based on teacher report, although the school had a Wi-Fi network which was needed to facilitate

students and teachers, it had not yet functioned optimally. 4) When direct observation was done to see the teaching process in the classroom, the learning strategy used by teachers was still centred on teachers, and students were passive in the learning. 5) To overcome the students' learning needs, teachers have had the package of literacy book in accordance with the material and curriculum applied that was the curriculum 2013. 6) The media used by teachers as guidance in teaching process was the video and power point because both the Medias could be an attraction in the process of delivering the material, but it was still sourced from the book package and materials.

Based on the percentage of questionnaire results from the analysis of the needs given to 27 students, 40.74% answered always having the difficulty of the hydrosphere material, 33.33% answered often, 14.81% answered sometimes, 11.11% answered rarely and 0% answered never. The other result of questionnaire from the analysis of the needs toward learning media: 44.44% answered always happy if learning process used learning media that was supported by animation picture / video / map, 14.81% answered often, 22.22% answered sometimes, 18.52% answered rarely, and 0% answered never. The last questionnaire calculations show that 62.96% answered always happy if the teaching material was visualized / presented through electronic media such as mobile phone, 11.11% answered as frequently, 18.52% answered sometimes, 3.70% answered rarely and 3.70% answered never.

Based on the calculation results from the analysis of the needs questionnaire, it shows that students prefer to the learning media which uses several images / maps / video, and teaching materials are visualized / presented through electronic media such as mobile phone, students also have difficulty if they must receive too much explanation of the material. Geo-smart learning media is expected to be used as a representative and flexible teaching materials.

3.2. Development of geo-smart based android

The first stage in the development of geo-smart media is the analysis of student's needs that include the necessaries and characteristics of students who become the target users of learning media. While the competence and instructional analysis includes the analysis of Competency Standards (CS) and Basic Competence (BC) which are served in this media. The published Competency Standards are to understand the Hydrological Cycle with Basic Competence Due to Hydrosphere Dynamics. Instructional analysis is an elaboration of Basic Competence (BC) that has been selected at the competency analysis stage into an indicator of learning that allows to be presented as geo-smart learning media.

The second stage in the development of geo-smart media is the design stage or product design that includes the creation of media design (storyboard), the preparation of the material, the compilation of questions and answers, the collection of backgrounds, fonts, images, videos and buttons. After determining the design, the next thing to do is to determine the core competencies, basic competencies, indicators, and learning objectives. Geo-smart is developed along with the Curriculum 2013 which is more emphasized for the learning process and meaningful for students. The display image of geo-smart media based-android can see in figure 1, figure 2 and figure 4:
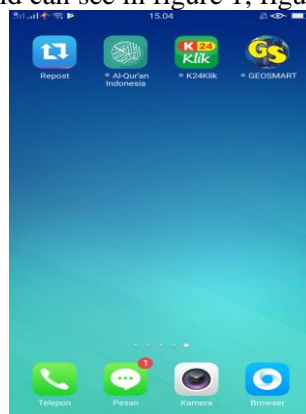

Figure 1. The Media Icon of Geo-smart based-android

Figure 2. The Display of Geo-smart based android

Figure 3. The Menu of Geo-smart based-android

Figure 4. Sub-Section of Materials

In Figure 4 shows that the sub-section of materials consists of four chapters which are the concept maps, the terrestrial waters, the potential of surface water and groundwater, and marine waters. Each material in the chapter is equipped with Exercise, quizzes and group discussions.

After making a design, then the third stage is the validation stage. At this stage, the validation product is done by expert team, and it is also the stage for testing the product. Validator consists of media experts, material experts, and practitioners of geography lecturers. The results of validation can be seen in Table I:

Table 1. The results of geo-smart media validation

Validator	(%)	Criteria
Media Expert	82	Good
Material Expert	81	Good
Geography Teacher	93	Very Good
Mean	85	Good

Source: The Analisis of Research data in 2017

From Table 1, it can be seen that the validation Geo-smart media based-android is 85%. As the result, it is good to use in learning.

The fourth stage after doing validation, the geo-smart media was tested to 7 students from class X IPS 1. For the next stage, to know the student responses was used close-ended questionnaire with 10 statement items. After the student responses questionnaire were analyzed, it could be seen that the mean of student responses from item 1 to 10 was 84%.

From the result of validation analysis of media expert team, material expert, geography teaching practice and also student's response, then geo-smart based android learning media can be qualified.

4. Discussion

Geo-smart based android learning media is a representative media, because it can be accessed directly from students' smartphones, helping students continuously to learn independent [7]. Geo-smart-based android have contained apperceptions, conceptual understandings, concept applications, quiz games, assignment activities, environmental problem solving, experimental activities, and formative tests.

Geo-smart based-android is developed with the R&D research stage referring to the ADDIE model. The first stage is the analysis stage. It is conducted literature analysis, field analysis, and student needs. From the analysis it is known that the students need an electronic teaching material [8].

The second stage is the design stage. Geo-smart media based on android is designed using Adobe Flash CS6 application, because this application is easy to be operated. The geo-smart based-android media are equipped with main competencies, basic competencies, indicators, learning objectives, concept maps, hydrosphere materials and the impact of hydrosphere on the earth's life, pictures, schemes, maps, videos, exercises, quizzes, answer keys, and author's identity. The geo-smart based android media that is developed has been integrated with the 2013 curriculum.

After the designing stage, the third stage is development. At this stage, the researcher do validation by team experts and testing the product. Geo-smart based Android media is validated by media experts, materials experts and geography learner practitioners. Then testing the product to small group that consisted of 7 students. From the validation and trials results, the geo-smart learning media based android is qualified to use in the learning process.

5. Conclusions

Based on the results of research and development about geo-smart learning media based android on hydrosphere material and the impact of it toward life on the earth for class X SMA, it can be concluded as the followings: (1) From the result of the analysis of the need media, the students prefer the varied learning resources to make the lesson more interesting and Not monotonous. (2) The development of geo-smart media based on android was done with ADDIE model which was developed with adobe flash CS6 software. (3) The worthiness of product development, the average of the validation stage assesed by the expert team was obtained at 85%, and it is included in the eligible criteria as good criteria. Then the limited trial stage obtained 84% and also included in the eligible criteria as good criteria.

Suggestions that can be given for further research is the geo-smart learning media based android can be still developed with the addition of various animated moves, and animated cartoons, giving wider material and provision of seminars about learning media.

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