Development of Android-Based Interactive Multimedia on Odd Semester Chemistry Materials for Class X SMA/MA

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Abstract. This study aims to develop android-based interactive multimedia for chemistry subjects for class X odd semesters that are valid, practical and effective. This research is a development research. The data analysis technique used is quantitative descriptive analysis technique and qualitative descriptive analysis technique. The results of this study are android-based interactive multimedia that has been developed based on the design (storyboard) that was designed, according to a review by two material experts, the average value of the three aspects considered to be in the valid category (93%), according to a review by a media expert , indicates a valid category (88%), and according to a review of two chemistry teachers showed the average value of the three aspects that were assessed in the good category (86.67%). Thus this interactive multimedia is said to be valid, practical and effective and can be implemented for the learning process.

Keywords: Interactive Multimedia, Android Based, Chemistry

1 Introduction

The development of information technology today is so rapid that it affects the world of education. The rapid development of science and technology has a major influence on improving the quality of teachers in Indonesia [1]. Learning in education must also be interactive, inspiring, challenging, and improve the quality and motivation of the learning process [2]. Global demands demand that the world of education be able to adapt technological developments to improve the quality of education, so that educators as facilitators are required to be more creative in developing quality learning media and teaching materials to be used in learning. Quality learning media must be able to present teaching materials in accordance with the demands of the curriculum, follow the development of science and technology (IPTEK) [3].

Chemistry is one of the subjects considered difficult by students. It is difficult for students to understand chemistry learning because chemistry is a subject that has facts, procedures and concepts, and Chemistry is not just solving problems but also students must learn descriptions such as chemical facts, chemical rules, and the material studied in chemistry is very much. The use of multimedia in chemistry learning is expected to make the delivery of difficult

chemistry material easier and can make abstract chemistry material more concrete which can improve student learning outcomes [4].

Multimedia is an intermediary tool in various types of communication activities [5]. Multimedia is a means or device that functions as an intermediary or channel in a communication process between the communicator and the communicant [6]. One of the communication tools that are already owned by students that can be used for learning multimedia is a cellphone with the Android operating system. Android is an operating system for Linux-based mobile devices that includes an operating system, middleware and applications, Android provides an open platform for developers to create their applications for use by various mobile devices [7]. Android is commonly used in smartphones and tablet PCs.

One of the benefits of interactive multimedia based on Android is being able to make it easy for students to access learning anytime and anywhere [8]. Multimedia is also designed to help students understand a material efficiently and pleasantly [9]. In accordance with the current reality that the use of Android has become a trend among students. Most high school students have androids that have been equipped with the best features, so developing a learning media with basic android can be implemented to facilitate the learning process [10]. Developing interactive multimedia using Android, it makes sure that multimedia can support the learning process of students, especially when learning outside of school by providing easy access for students to learn to understand the material through multimedia anytime and anywhere. In addition, the existence of interactive multimedia based on Android can attract students' interest during learning because interesting learning can increase students' learning motivation from the material being taught so that it is easy for students to understand [11]. Besides being useful for students, interactive multimedia based on Android is also useful for teachers, where this multimedia can make it easier for teachers to deliver teaching materials to students. In addition, the existence of interactive multimedia based on Android is able to attract students' interest during learning because interesting learning can increase students' learning motivation from the material being taught so that it is easy for students to understand [12]. Besides being useful for students, interactive multimedia based on Android is also useful for teachers, where this multimedia can make it easier for teachers to deliver teaching materials to students. In addition, the existence of interactive multimedia based on Android is able to attract students' interest during learning because interesting learning can increase students' learning motivation from the material being taught so that it is easy for students to understand [13]. Besides being useful for students, interactive multimedia based on Android is also useful for teachers, where this multimedia can make it easier for teachers to deliver teaching materials to students.

In addition, Smart Apps Creator can also create learning media with a simple arrangement without using a programming language and can be changed in the structure we need [14]. Therefore, the researchers carried out the development of android-based interactive multimedia on chemical materials.

2 Method

The type of research used in this research is Research and Development (R&D). The subjects of this study were Medan State University lecturers and teachers. R&D research is a research method used to produce a particular product and test is effectiveness of that product [15]. The product to be developed is a chemistry e-module using the Smart Apps Creator 3.0 software. The development model used is the ADDIE (Analyst, Design, Development, Implementation,

Evaluation) model. Of the five stages of the ADDIE model, only 3 steps were adapted in this study, namely Analyst, Design, and Development. A more complete procedure in this study is presented in Figure 1.
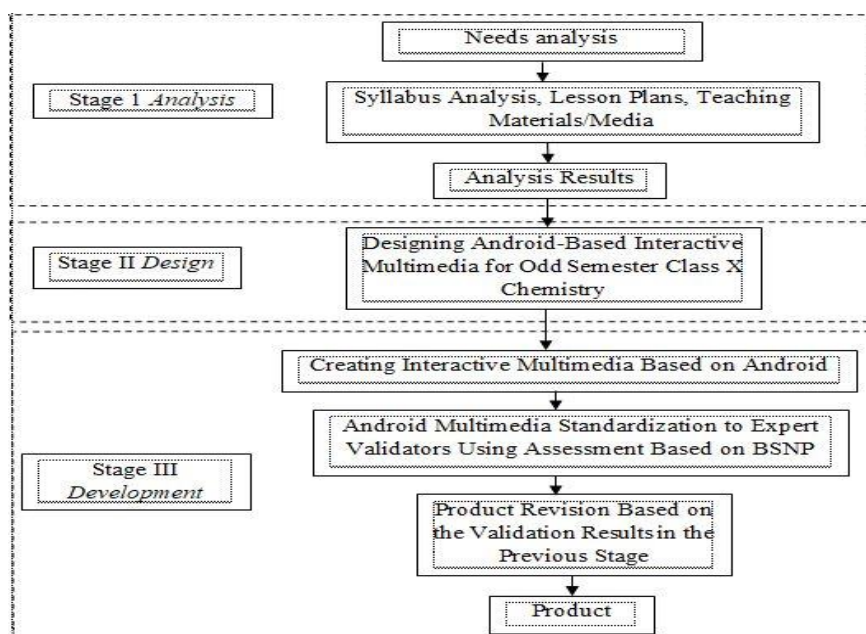

Figure 1. Research Chart

The data collection instrument used in this study was a validation questionnaire sheet based on eligibility standards according to the National Education Standards Agency (BSNP). Questionnaires were given to expert lecturers in the field of materials and media as well as chemistry teachers. The scale used in the android-based interactive multimedia feasibility questionnaire is a Likert scale with a range of 1-4 where the answers given strongly disagree to strongly agree. The data analysis technique used is quantitative descriptive analysis technique and qualitative descriptive analysis technique. Interpret the feasibility category of Android-based interactive multimedia, can be seen in Table 1.

Table 1. Criteria for Validity of Average Value Analysis

Average	Interpretation
3.26 - 4.00	Valid and does not need to be revised (decent)
2.51 – 3.25	Sufficiently Valid and does not need to be revised (pretty decent)
1.76 – 2.50	Less Valid, some multimedia content needs to be revised (not feasible)
1.00 – 1.75	Invalid and need to be revised (not feasible)

3 Results and Discussion

This research is a Research and Development (R&D). This development research process uses the ADDIE model which consists of Analyze, Design, Development.

Analyst

At this stage of analyst, an initial analysis is carried out to collect the information needed for consideration in multimedia development. The initial analysis carried out is a needs analysis by analyzing the curriculum, materials and media used by teachers. Researchers conducted interviews with teachers and analyzed the learning media that are often used in the learning process. The information obtained through interviews is that the implementation of the learning process is currently still face-to-face so updated media is needed, namely Android-based interactive multimedia which includes questions, animation media, and learning videos that can make it easier for students to understand the material presented. Based on the results of interviews in the process of developing learning media, especially android-based, the data obtained that teachers are still experiencing difficulties or obstacles in developing learning media, especially in making android-based learning media. The results of the teacher interview analysis on the development of android-based multimedia are shown in Figure 2.
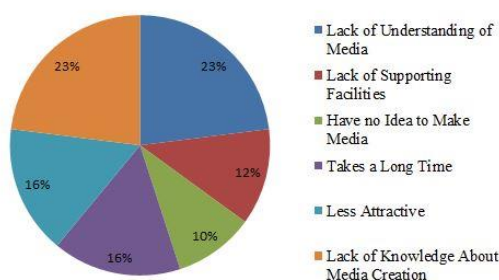

Figure 2. Barriers to Media Development

The solution to these problems is that the teacher wants a tutorial in creating, developing and using chemistry learning media so that they are able to make their media. This is related to the number of teachers who have not been able to integrate technology with the learning process to be used as media. In addition, several factors hinder the use of technology in learning such as teachers feeling burdened because they are required to be more creative, require careful preparation and also require the ability to operate the technology. Therefore, the results of interviews and analysis of learning media are the basis for developing android-based interactive multimedia.

Design

At this design stage the researcher collects sources or references related to odd semester class X chemistry and designs the beginning of android-based interactive multimedia, the material that will be included in android-based interactive multimedia in accordance with the learning objectives and achievement indicators that have been determined, the researcher also collects pictures , animations, websites, and videos that will be used in developing interactive multimedia based on Android. After collecting materials and references, at this stage the researcher also designs Android-based interactive multimedia which will be developed and designed as attractive as possible so that students can more easily understand the material

presented in Android-based interactive multimedia. Researchers designed android-based interactive multimedia based on existing media,

Development

At this development stage, the product that will be developed is made, namely interactive multimedia based on Android. The activities carried out are making designs, questions and games, compiling material so that it is systematic and in accordance with predetermined indicators, making animated videos and inserting learning videos that have been designed previously. After everything is done, combine all the materials that have been prepared using the Smart Apps Creator 3.0 software so that it becomes an innovative Android-based interactive multimedia. The android-based interactive multimedia design can be seen in Figure 3.

Figure 3. Android-Based Interactive Multimedia Design

After the android-based interactive multimedia has been created, the next step is to conduct a feasibility test of android-based interactive multimedia for material and media experts and teachers to determine whether the developed android-based interactive multimedia is feasible or not to be used in odd semester class X chemistry learning and aims to determine one aspect of product quality development is the aspect of validity [16]. At this stage the researcher only carried out the validation test phase by experts, for small group trials, namely the teacher.

Android-based interactive multimedia that has been developed is then validated by material and media experts as well as teachers using a validation questionnaire based on eligibility standards according to the National Education Standards Agency (BSNP). The results of android-based interactive multimedia validation can be seen in Figures 4, and 5.
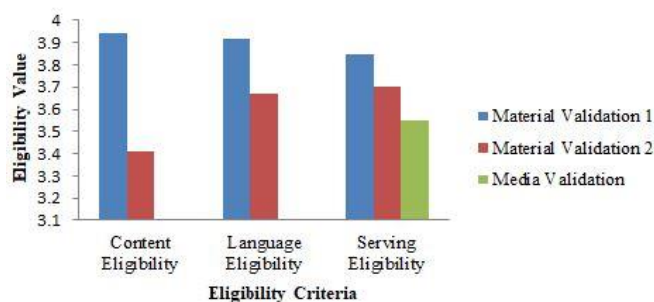
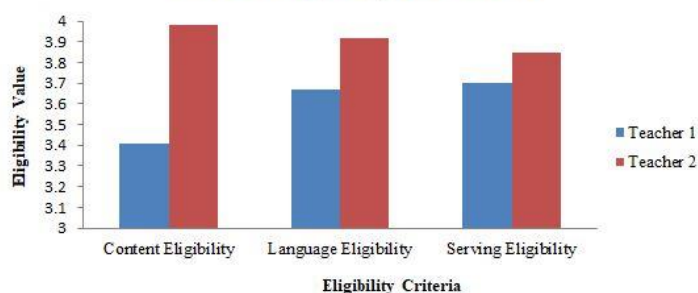**Figure 4**. Average Feasibility Results of Material and Media Experts

Figure 5. Average Eligibility Results (Teachers)

Based on Figures 4 and 5 of the validation assessment data analysis criteria, it was found that the review scores by two material experts got the average value of the three aspects that were considered to be in the valid category (93%), according to a media expert's review, indicating a valid category (88%), and according to a review of two chemistry teachers showed the average value of the three aspects that were assessed in the good category (86.67%). Based on the data that has been obtained, the Android-based interactive multimedia developed is valid and suitable for use in chemistry learning. There are several suggestions for improvement from the validator to the Android-based interactive multimedia that was developed including 1) adding the learning objectives to be achieved, 2) wrong writing techniques, and 3) the suitability of the writing color with the background,

Android-based interactive multimedia assisted by Smart Apps Creator 3.0 software can be used as a medium in chemistry learning. Completely designed media, with attractive and adequate illustrations will affect the learning atmosphere so that the learning process that occurs in students becomes more optimal and will stimulate students to utilize learning materials as learning materials [17].

4 Conclusion

Based on the results and discussion, it can be concluded that Android-based interactive multimedia which was developed based on the design (storyboard) that was designed, according to the results of a review by two material experts, got the average value of the three aspects that were considered to be in the valid category (93%), according to the review. a media expert, showed a valid category (88%), and a review of two chemistry teachers showed the average value of the three aspects that were assessed in the good category (86.67%). Thus this interactive multimedia is said to be valid, practical and effective and can be implemented for the learning process.

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