The development of interactive multimedia-based instructional media for elementary school in learning social sciences

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Abstract. This research is motivated by inappropriate instructional media used in learning social science for elementary school students. For instance, the images used as instructional media are not clearly visible and do not match in the size. This study aims to develop valid, practical, and effective interactive multimedia-based instructional media in social studies learning. This type of research is Research and Development (R & D) research using the four-D (4D) development model which consists of four stages; define, design, development, and disseminate. The media developed is in the form of interactive multimedia-based instructional media for social studies learning in elementary school. The results showed that: (1) the validity test by three validators in the three aspects which are media, material, and language are in the very good category, (2) the practicality test of the instructional media by the teacher and students are in very good category, and (3) the effectiveness test in the form of learning outcomes for the cognitive domain is in an average score which can be stated as the very good category, while the affective and psychomotor aspects are in the good category with a percentage 85% of 20 students. Thus, it can be concluded that the interactive multimedia-based instructional media is very valid, practical, and effective to be used in learning social studies for elementary school students.

1. Introduction

Social science learning (IPS) learns more about social interactions that integrated other social sciences learning such as geography, sociology and others [1]. There are many things that teachers can do in teaching IPS to students [2]. They can teach the students to recognize the environment or interact socially with the environment [3] because IPS learning in elementary school aims to enable the students to study, assess, and understand social problems that occur in the surrounding community, especially fellow friends [4]. In addition, the students can learn IPS well and can understand the learning process, while the teachers are required to be able to provide innovation in learning to make the students enjoy [5]. On the other hand, the teachers tend to use lecturing method in giving the lesson to the students due to the limited time for learning. In the result, this method makes the students are bored and the learning becomes monotonous [6].

There are many solutions can be used by the teachers in studying social studies to make learning more interesting [7], such as using various models. Moreover, they also have to use instructional media that can develop the students’ willingness and curiosity in learning [8]. By the development of technology, it is a must for the teachers to develop technology-based instructional media [9]. This media is used as a tool to transfer information [10]. It can also be used as a source of learning aside
from the of learning material because it is a kind of information that can be used by the students to solve the problem [11]. The instructional media adapts the learning media to achieve learning goals.

There are many types of instructional media [12]; audio, visual, and audio-visual [13]. The instructional media that combined these three types of instructional media is called interactive multimedia [14]. The interactive multimedia that can combine images and videos in a screen has some advantages to make the students pay their attention, such as animated video [15]. Another side, some problems in learning social science were found based on observations and interviews that the researchers conducted in elementary schools in the city of Padang. The problems were related to learning media used in describing natural appearance material in the surrounding environment. These problems can be categories as followed: (1) the teachers used instructional media that were not suitable in the form of map images as shown in Figure 1, globes (Figure 2) and atlases (Figure 3) to help the students understand natural appearance material, (2) the teachers did not follow the development of science and technology in the development of instructional media, (3) the teachers were less able to develop interactive multimedia-based instructional media, (4) the map media used by the teacher had not displayed the form of natural appearance in the environment around the students, (5) the lack of interactive multimedia facilities in learning in the form of a map that could display the form of natural appearance in the environment around students.

![Figure 1](image1.png) **Figure 1.** A map media in the school

![Figure 2](image2.png) **Figure 2.** A globe media used by the students

![Figure 3](image3.png) **Figure 3.** An atlas used by the students

Based on the problems and types of map media used above, the researchers conclude that the media used by the teachers and students in social studies learning about natural appearance material in the surrounding environment were less valid, practical and effective. The media used by the teachers and students such as map images, atlas and globe cannot provide an overview of the shape of nature. The above facts have an impact on students: (1) the students had difficulty in understanding the material, (2) the students tended to be less active in learning, (3) the students were less able to express their ideas or ideas and unite ideas in learning activities, and (4) the learning process was less meaningful for the students. These problems affected learning outcomes. The pre-test result score did not achieve the criteria standard minimum (KKM).

2. Methods

The research method used in this study was the R&D development model in order to produce certain products [16]. It consisted four stages which called define, design, develop, and disseminate stage. The purpose of define stage was to the learning conditions at the beginning with the objective analysis of the constraints of the material being developed, the design stage was to prepare the form of learning media, the development stage was to test the learning media, and the disseminate stage was to obtain instructional media that had been developed to be useful for the social studies learning process in elementary school grade IV.
3. Results and discussion

3.1. Define stage
The researcher conducted several analyses like the needs of the instructional media, curriculum, material, media and student analysis.

3.2. Design stage
After analyzing the needs, curriculum, material, media and students, the next stage was designing the instructional media. The researchers developed designing interactive multimedia-based map media and tested for IV grade elementary students, including:
  a) Preparing learning material arrangements, such as the appearance of land, water, natural environment, and artificial natural environment.
  b) Preparing evaluation test questions
  c) Selecting of media, that was interactive multimedia-based map media using Adobe Flash CS6 applications.
  d) Selecting the formats by making a design along with the learning media components that would be created.
  e) Creating media designs
  f) Creating a flowchart.
  g) Creating a storyboard.
  h) Creating an interactive multimedia-based map media using Adobe Flash CS6 application.

3.3. Development stage
3.3.1. Validity Test
The validity test aimed to determine the level of developed instructional media validity. The aspects of validity that assessed were aspects of media, material, and language. Each aspect was assessed by validators who were experts in media, material, and language.

3.3.2. Practicality Test
Practical test data for multimedia-based map instructional media in the form of primary data was data that directly obtained from the teacher and students using questionnaire assessment instruments. The guardian and students of IV grade of SDN 22 were chosen as a trial subject. The variables test of the media practicality were ease of use, benefits, appearance, and time.

3.3.3. Efficacy Test
The data from the test results of the efficacy of interactive multimedia-based map media in trials were obtained from the student learning outcomes. These learning outcomes were assessed in the three learning domains: cognitive (knowledge), affective (attitude) and psychomotor (skill).

3.3.4. Disseminate Test
The disseminate test was done in class IV. At this stage, the teacher carried out the social studies learning about the natural appearance of the environment using interactive multimedia-based map media. The data obtained was the test data on the effectiveness of the student learning outcomes. The following was an explanation of the student learning outcomes at the disseminate stage:

The cognitive domain assessment at the stage of dissemination was done by giving an evaluation test questions to the students. It was obtained with the average score of 80.53 (Very Good) and the percentage of completeness was 90.24% from 41 students. The efficacy domain assessment at the dissemination stage used an observation sheet. This assessment was carried out by two guardian teachers of IV grade as observers. This assessment was carried out during learning activities using interactive multimedia-based map media about the natural appearance material. There were three aspects that assessed in the affective domain: (1) active learning, (2) care for the environment and (3)
respect to others. Overall, the affective domain learning outcomes in the disseminate stage obtained a total score of 462 with an average value of 75.07. The psychomotor domain assessment at the disseminate stage used an observation sheet. This assessment was carried out by two guardian teachers of IV grade as observers during learning activities using interactive multimedia-based map media about the natural appearance material. There were two aspects that assessed in the psychomotor domain: (1) the skill of using the media and (2) the skill of discussion. Overall, the psychomotor domain learning outcomes at the disseminate stage obtained a total score of 333 with an average value of 79.29 (Good).

Based on the results of the research described above, it was seen that the process of developing interactive multimedia-based map media was in accordance with the 4-D (four-D) model applied in this study. This study consisted of 4 stages: the define stage which consists of needs analysis, curriculum analysis, material analysis, media analysis and student analysis, (2) the design stage which consists of media design and creation, (3) the development stage which consists of the testing in the form of validity test, practicality test, and the effectiveness of learning media, and (4) the disseminate stage.

The assessment results of the interactive multimedia-based map media products using the Adobe Flash CS6 application in the IV grade elementary school in learning social studies subjects were in very good category. The judging from the results of the media validity test that consisted of testing the validity of media, material and language aspects was reviled to be good. The final validity test of the media aspect obtained a score of 92% in the very good category (Very Good). The final validity test of the material aspect obtained a score of 98% (Very Good). While the final validity test of the language aspect obtained a score of 89% (Very Good). Therefore, the results of the media practicality test, namely the assessment of teachers and students as a whole can be treated to be very good. The assessment of media practicality tests by the teacher obtained a score of 90.80% (Very Good) and assessment by 20 students obtained a score of 83.23% (Very Good).

The results of the media efficacy test were seen from the student learning outcomes in the aspect of the cognitive, affective and psychomotor. The trial test stage of the product for these three aspects was in the good and very good category. The cognitive aspects obtained in the average score of 81.25 (Very Good) with a percentage of completeness 85% from 20 students. The affective aspects obtained in the average score of 75.20 (Good) and psychomotor aspects obtained in the average score of 78.50 (Good). Therefore, the results of this study indicated that the use of the interactive multimedia-based map media has a positive impact on social studies learning in elementary school. It can provide many benefits in the process of teaching and learning using interactive multimedia-based learning applications, for instance, efficient in delivering material and increasing the students' learning interest in natural appearance material.

The appropriate interactive multimedia-based instructional media must meet the characteristics for a media and multimedia. Based on the assessment, the interactive multimedia-based map for instructional media was in accordance with the characteristics of the learning media as followed:

1. Fixative features that describe the ability of the media to record, store, preserve, and reconstruct an event or object.
2. Characteristics of manipulatives known as the ability of the media to transform an object, event or process in overcoming the problem of space and time. For example, the process of larvae becoming cocoon and then a butterfly that can be presented at a shorter time (or accelerated by time-lapse recording techniques). Or vice versa, when the event can be slowed down in order to obtain a clear sequence of events.
3. Distributive features that describe the ability of the media to transport objects or events through space and the events are presented to a large number of the students simultaneously, in various places, with a relatively similar stimulus experience of the event.

This interactive multimedia-based map media is also in accordance with multimedia characteristics, as followed:
1. Having more than one convergent medium, for example combining audio and visual elements.
2. It is interactive in the sense of the ability to accommodate users’ responses.
3. It is independent in the sense of providing ease and completeness of the contents in such a way that the users can use without the guidance of others.

4. Conclusion
There are 4 points that can be concluded based on the data obtained and the discussion of research data that has been done: first, the developed interactive multimedia-based map media starting with conducting needs analysis, curriculum analysis, material analysis, media analysis, and student analysis. After all, analyses have been carried out, the next steps are compiling teaching materials, evaluation tests, media selection, format selection, and initial media design (making flowcharts, storyboards, and media making processes). Second, the results of the validity test of the instructional media by the media, material, and language experts reach the very good category (SB). Third, the results of the practicality test of the instructional media by the teacher and the IV grade students reach the very good category (SB). The last, the efficacy test of the instructional media shows that the learning outcomes of IV grade elementary school students have increased compared to the student learning outcomes before using the interactive multimedia-based map media with a passing grade 85%.

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