Interactive multimedia-based map media development

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Abstract. This study aims to develop maps as a valid, practical, and effective interactive multimedia-based instructional media in learning social science for primary student’s grade 5th. An interactive multimedia is selected to utilize technology, innovate, and enhance students’ interest in learning social science. The materials designed on the media are about ethnic and cultural diversity in Indonesia. The development model used is 4-D (define, design, develop, disseminate). The data are obtained from validity test (media validation sheet), practicality test (students’ and teachers’ response questionnaire), and efficacy test (students’ learning activities and results). The data are analyzed descriptively. The results of the research show that the media is valid, the characteristics of the media content are in accordance to the curriculum, the design and layout are interesting, the operation is easy, the language is clear, simple, concise, and easy to understand, and the presentation is clearly tailored to the characteristics of the students. The results of observation and questionnaire indicate that the instructional media has been practical with the characteristics of having clear contents and purposes, being easy to read, having attractive appearance, and being able to increase the student’s interest to learn social science. In addition, the media developed is effective in improving the activity and learning outcomes of students with a learning mastery level of 85.7%.

1. Introduction
The way of delivering material by teachers in learning is very diverse ranging from conventional to technology based. The teachers can utilize various technological developments today. The development of influential technology in the field of education helps education experts in designing new learning methods and utilizing computer-based media as a means of supporting education [1]. The advances in science and technology have influenced people's lives such as elementary school students. The effect of technology is seen in the level of elementary students in which they really love to play the gadget. This matter may lead to a negative effect such as gadget addiction. The solutions that can be done to limit the negative effect is to combine learning with technology through the media for instructional design. The learning process will be more effective and efficient with the use of computers as a medium of learning [2]. The utilization of ICT can be used to develop instructional media tailored to the needs and learning objectives [3]. On the other hand, there is still problem on the lack of multimedia utilization that caused by several things: 1) learning is dominated by using books that are perceived to meet the needs of learning in the classroom; 2) the books used are not equipped with clear supporting information; 3) the books used as a medium are lack of the original form [4]. The instructional media can also improve the students’ understanding, present effective and reliable material, facilitate data interpretation, and
condense information. In other words, the presentation of materials using media can create interesting learning process, so it can spur the students’ interest and curiosity [5]. The lessons that use multimedia certainly make learning easier, especially for abstract areas which are better understood with images and animations. In addition, the interactive multimedia also has an advantage such as it can be controlled by the user [6-10]. In addition, the literature indicates that the abilities of decoding and drawing maps constitute long-lasting fundamental skills that are very useful in life and with great pedagogical value that strengthens learning in all aspects of the curriculum [11]. So the use of encoding in the form of symbols contained in the map will be able to facilitate the students’ understanding. Through the use of this map, it can also be used as a mediator of the students’ preferences in the following development of technology.

One of the programs that can be used in making interactive multimedia is adobe flash CS6 program. It is used to create animation by combining media elements such as audio, text, video, image, and others as needed. There are some advantages of using adobe flash CS6 compared to other software: (1) able to create an interactive button with a video or other objects; (2) able to make color transparencies in the video; (3) able to make changes to the animation of the form into another form and make motion animation by following a predetermined path; (4) able to convert and publish to the application files (exe); (5) able to provide more varied tools [12].

2. Method
This research was a Research and Development (R & D) type research that aimed to produce interactive multimedia products [13]. The development model used refers to the 4-D model proposed by S. Thiagarajan, Dorothy S. Semmel, and Melvyn I. Semmel. This model consisted of four stages: define, design, develop, and disseminate [14]. The research was conducted at Pembangunan Laboratorium UNP primary school, meanwhile the development stage was done in grade 5th Buah Hati primary school. The development of this media used 4-D steps; (1) defining stage by conducting curriculum analysis and student analysis, (2) designing stage by determining standard competencies, basic competencies, indicators, purposes, and subject matters of learning. The media designed was about the diversity of ethnicity and culture in Indonesia, (3) developing stage by conducting the media validity test to the expert (validator), media practicality test in the form of a questionnaire to the students of grade 5th at Pembangunan Laboratorium UNP primary school, the efficacy through evaluation activities given to the students to see whether the media developed can increase the learning activities and the students’ learning outcomes, (4) disseminating stage by limiting the population (due to limited time, energy, and cost). So, the dissemination was only done on the limited scale to only one other school that was in grade 5th Buah Hati primary school. The data analysis technique used was descriptive qualitative that aimed to explain the developed instructional media product and descriptive quantitative related to product feasibility which was implemented in learning.

3. Result and discussion
3.1. Defining stage
The defining stage related to standard competencies, basic competencies, and indicators to be achieved by the students in learning process. The steps that the researchers did; (1) the curriculum analysis which were related to the analysis of standard competencies, basic competencies, indicators, objectives, and learning materials. Thus, the developed learning material that made by the researchers was social science subject, (2) the student analysis in which most of the students tend to be inactive, less motivated, often bored, and saturated of the learning process undertaken by the teachers. The use of interactive multimedia could encourage the students to learn independently and facilitate the learning activities that in accordance to the level of the students’ understanding. The specific treatment could be given to the students who were relatively slow in understanding learning materials. The teachers could repeat the learning process as the students’ needs and desired both inside school and outside school.
3.2. Designing stage
The designing stage consisted of: (1) lesson plan, in which the learning was designed by using interactive multimedia-based map media using *Adobe Flash CS6* program. The researcher designed three lesson plans for basic competency number 1.4 that mentioned ‘appreciate the diversity of ethnic groups and cultures in Indonesia’ which were conducted in three meetings. The time allocation for each meeting was 3x35 minutes; (2) learning media, in which conducted in some steps; Flowchart, (physical description of the steps and the sequence of procedures of a program); Story Board (arrangement of sketch drawing sequentially according to script in order to convey the ideas to others easily).

- Import all materials that had been prepared, add a new layer to make it easier in media arrangement. Then, it was arranged as the teacher’s wish.

![Figure 1](image1.png)

*Figure 1. The media page start displays on the second timeline.*

![Figure 2](image2.png)

*Figure 2. The display starts a second timeline media page.*
3.3. Developing stage
The developing stage of the instructional media included lesson plan and instructional design validation. Furthermore, these two elements were tested to see their practicality and efficacy. The validity test was done by validating the instructional media by experts and practitioners. Then, the revision was made based on their suggestions. The instrument assessment included lesson plan validation instrument, media, lesson plan implementation, practicality of the teacher’s and the students’ response to the instructional media. The assessment result of the validator toward the instruments of data collection is described in the table below:
**Table 1.** The recapitulation of instrument validation assessment result.

| No | Instrument                                                     | Scoring Assessment | Average (%) | Category     |
|----|---------------------------------------------------------------|--------------------|-------------|--------------|
|    |                                                               | V1     | V2     | V3 |             |             |
| 1  | Lesson plan validation                                       | 85.7%  | 85.7%  | 82.1% | 84.5% | Valid       |
| 2  | Instructional design validation                              | 82.1%  | 89.3%  | 85.7% | 85.7% | Highly Valid|
| 3  | Lesson plan implementation sheet                             | 82.1%  | 89.3%  | 89.3% | 86.9% | Highly Valid|
| 4  | The teacher’s respond sheet toward instructional design practicality | 82.1%  | 82.1%  | 89.3% | 84.5% | Valid       |
| 5  | The students’ response sheet toward media practicality        | 85.7%  | 89.3%  | 85.7% | 86.9% | Highly Valid|
|    |                                                               |        |        |        | 85.7% | Highly Valid|

The table above shows that the data instrument collections have been declared very valid with an average of 85.7%. It can be concluded that the instrument of research data collections can be used to validate lesson plan and instructional media. Moreover, it can also be used to collect lesson plan implementation data, practicality of the teacher, and students’ response to instructional media.

### 4. Conclusion

The development of interactive multimedia-based learning in learning social science in the primary school grade 5th based on the basic competencies about ethnic and cultural diversity in Indonesia is valid. This is in accordance with the results of the expert assessment of interactive multimedia products that have been developed from the aspect of media, content, and language that are considered highly valid with minor revisions. The average number of media validators is 91.2, the content validator is 94.7, and the language validator is 89.6 with an average of 91.8. In summary, it can be categorized as highly valid product.

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