Development of Smart Card Media for Elementary Students

Cita Audia*, Ika Yatri, Aslam, Sri Mawani, Zulherman
Universitas Muhammadiyah Prof. Dr. Hamka, Jakarta, Indonesia

*audia.cita@gmail.com

Abstract. Learning medium is a means of communication to ease the transfer of messages during the learning process. Continuous innovation in the learning process shall be conducted to increase the quality of education. This research and development form of research aims to develop the Smart Card media on conservation of living beings subject and know the smart card media qualification on conservation of living beings subject for 4th-grade elementary students. The development of the smart card uses the ADDIE development model, which involves five stages that includes Analysis, Design, Development, Implementation, and Evaluation. The data is collected by distributing questionnaires of the Likert scale with the range from 1 to 5. The analysis technique of this research uses quantitative data analysis and qualitative data analysis. The result of validating the smart card qualifications by material experts, media experts, teachers, and participants shows that the smart card's use in the conservation of living beings subject is qualified to be used for 4th-grade students of elementary school as an alternative learning media.

1. Introduction

The 2013 curriculum currently being applied in Indonesia [1] shifts the focus of learning, which previously centers on the teacher to focus on the students in an active learning process. An active learning process can be achieved by giving in specific stimuli such as a new learning media and choosing a suitable learning model in line with the lesson plan [2]. This situation will demand teachers to be able to develop appealing media. [3].

Learning media refers to a set of learning tools that will be used during the learning process that could assist the delivery of the learning materials to reach its designated goal [4]. By that, using a proper learning media will ease the deliverance of the materials to be accepted well by the recipients [5].

Basing on the result of observation and interview conducted in SDN Petukangan Utara 07 Pagi with one of the 4th-grade teachers, it shows that to only use the PowerPoint slide as a learning media during the teaching process could make the learning process to be less active. Coming from that, the researcher intends to develop the smart card so it would be applied for the 4th grader, specifically on the conservation of living beings subject. The smart card media is an innovative and creative game tool that can be used for playing that will activate the students during the learning process (Winant, 2018). It is
hoped that using smart card media on the conservation of living beings subject would make an active and meaningful learning process for 4th-grade elementary students.

2. Methodology

This research uses the Research and Development (R & D) model that refers to the ADDIE development model [7]. The ADDIE model consists of 5 stages, which are (1) analysis (2) Design (3) Development (4) Implementation (5) Evaluation. The development research conducted is purposed to develop and validate an education product that results in the form of process, product, and draft [8]. The said education product that will be developed is the smart card, which later will be tested for its qualification by the material experts and media experts. The total sample used to understand this smart card's responses consists of 2 teachers and 34 students, which consists of 12 students during the small group test and 22 students during the big group test that comes from different schools. The validation instrument that is given is a google form in which its valuation uses the Likert scale ranging from 1 to 5. The analysis technique in this research uses both quantitative and qualitative data analysis [9], where the gathered data will be analyzed descriptively along with calculating the average [10].

3. Result and Discussion

3.1. Development of the Smart Card Media

The smart card media development uses the ADDIE development model, which consists of 5 stages that involve Analysis, Design, Development, Implementation, and Evaluation. (1) The analysis stage in this study will involve the needs analysis, curriculum analysis, and analysis of students' characteristics [11]. (2) The design stage involves the creation of the smart card media draft. At this stage of the process, the researcher will plan the theme, title, material, and questions. The theme chosen is about a zoo with the title of "let us get the living beings." The smart card media design uses the adobe photoshop and adobe illustrator application. (3) The development stage involves the qualification test by handing out the smart card towards the validator. After being assessed, it will be revised according to the suggestion and inputs that have been given [12]. (4) The implementation stage involves small and big group testing. The small group testing is conducted by 12 4th grade elementary students, and the 22 4th grade elementary students conduct large group testing. (5) The evaluation stage is done at all stages of the smart card evaluation. The evaluation is intended to perfect the product during the development process [13].

3.2. Qualifications of the Smart Card Media in development.

3.2.1 Qualification Assessment of the Media from Experts.

The smart card assessment is done by four experts involving two media experts and two material experts. The data of the result of the media expert assessment using the questionnaire below shows the average Percentage of each aspect scoring at 91% under the category of Very Good. The result of the Percentage can be seen in table 1.

| Aspect | Indicator | Question Number | Average Percentage (%) | Criteria |
|--------|-----------|-----------------|------------------------|----------|
| General Assessment | The media design is suitable with the conservation of living beings subject | 1 | 92% | Very Good |
| | The media design is suitable with the concept of zoo. | 2 | |
| | The creation of the media is suitable in integrating the conservation of living beings subject with the concept of zoo. | 3 | |
The design of the media is visually pleasing  4
The design of the media presents various examples of living beings  5
The design of the media presents the efforts of conserving living beings, kinds of living beings and the life cycle of living beings.  6

| Special View                  | The selection of colors in the media | 7 | 90% | Very Good |
|------------------------------|-------------------------------------|----|-----|-----------|
|                              | Selecting a unique media            | 8 |     |           |
|                              | Includes the integration of the concept of zoo in the conservation of living beings subject. | 9 |     |           |
|                              | The presentation of the media is pleasing and easy to carry/move | 10 |     |           |

| Media Presentation           | The title/explanation of the media is provided | 11 | 90% | Very Good |
|------------------------------|-----------------------------------------------|----|-----|-----------|
|                              | Includes the steps of using/terms of use      | 12 |     |           |
|                              | The presentation of the media able to increase the interest of the students to engage in learning | 13 |     |           |

Average  91%  Very Good

Figure 1. Diagram Result of The Product Feasibility Assessment by Media Expert

According to the result shown in the Picture above, there are 3 aspects used for the media assessment. Validation result of the smart card media affirm its suitability for usage. The average score of assessment from the media experts is 91% placing it in the very good criteria. The highest score is at the general assessment with the Percentage of 92%, while on special view and media presentation both receive a percentage of 90%. The suggestion and feedback that were given by the media experts would be later be used to revise and repair the deficiency of the smart card media.

Furthermore, the result of validation by the material experts receive a very good assessment with the average Percentage of 90% under the criteria of Very Good. Assessment data percentage is presented in Table 2.
### Table 2. Result of Qualification Assessment from Material Experts

| Aspect                  | Indicator                                                                 | Question Number | Average Percentage (%) | Criteria       |
|-------------------------|---------------------------------------------------------------------------|----------------|------------------------|----------------|
| Relevancy               | The material is relevant with the competencies that has to be mastered by the students | 1              | 90%                    | Very Good      |
|                         | The smart card media is relevant with the competencies that has to be mastered | 2              |                        |                |
|                         | The comprehensiveness of the material is suitable to the development stage of the student | 3              |                        |                |
|                         | The material is sufficient to fulfil the needs of the curriculum            | 4              |                        |                |
|                         | The media illustration is suitable with the development stage of the students | 5              |                        |                |
|                         | The functional media illustration is sufficient                           | 6              |                        |                |
| Accuracy                | The material presented is in accordance with scientific truth              | 7              | 95%                    | Very Good      |
|                         | The material presented is in accordance with the latest development        | 8              |                        |                |
|                         | The material presented is in accordance with daily life                    | 9              |                        |                |
|                         | The creation of the material in the media is in accordance with the relevant scientific approach | 10             |                        |                |
| Comprehensiveness of Content | Presents the competencies that the students need to master                 | 11             | 80%                    | Good           |
| Basic Material Concept  | Relevancy of the material concept of the conservation of living beings subject | 12             | 85%                    | Very Good      |
|                         | Relevancy of the explanation with the questions                             | 13             |                        |                |
|                         | **Average**                                                               |                | **90%**                | **Very Good**  |

**Figure 2. Diagram Result of Product Feasibility Assessment by Lesson Material Expert**
According to the picture above there are 4 aspects that were assessed by the material experts. The average result of the assessment is 90% placing it in the very good criteria. The highest assessment is given to the accuracy with the Percentage of 95%, followed by the relevancy aspect with the Percentage of 90%, continued by the basic material concept with the Percentage of 85%, and the lowest goes to the comprehensiveness of content scoring at 80%. The suggestion and feedback that were given by the material experts will be followed up for revision to enhance the deficiency of the smart card media.

3.2.2 Teacher Response Assessment Result towards the Smart Card Media.
According to the result of teacher response in table 3, the average that is earned in each aspect scores at 92% under the criteria of Very Good.

| Aspects         | Indicator                                                                 | Question Number | Average Percentage (%) | Criteria     |
|-----------------|---------------------------------------------------------------------------|-----------------|------------------------|--------------|
| Material        | The presentation of material in the smart card media already include all basic competencies | 1               | 93%                    | Very Good    |
|                 | The material conveyed is suitable with the planned outcome of the lesson  | 2               |                        |              |
|                 | The explanation material and the questions that are presented in the smart card media is suitable with the conservation of living beings subject/ | 10              |                        |              |
|                 | The clarity of the material presented in the smart card media are clear enough and can be easily understood by the students | 3               |                        |              |
| Content         | The presentation of the image, writings and illustration in the smart card media can increase student’s interest in learning | 4               | 92%                    | Very Good    |
|                 | The smart card media is practical in presentation                         | 5               |                        |              |
|                 | The smart card media is easy to use                                       | 6               |                        |              |
|                 | The terms of use is easy to understand                                    | 7               |                        |              |
|                 | The smart card media can be used as a independent learning media by the students | 8               |                        |              |
|                 | The smart card media could motivate the students in learning              | 9               |                        |              |
| Average         |                                                                           |                 | 92%                    | Very Good    |
Figure 3. Diagram Result of Product Feasibility Assessment by Teacher

According to the teacher response shown in Picture 3, the average score of Percentage is 92% with the criteria of Very Good. The highest score assessed is on the material aspect which is 93% and the lowest aspect is on the content aspect scoring at 92%. The scoring shows that the teachers accept the use of the smart card as an alternative learning media for the conservation of living things subject. The qualification assessment shows that the smart card media development can be continued and implemented for small group test.

3.2.3 Student Response Assessment Towards the Smart Card Media

After the smart card media is considered as qualified, the next step is to implement the smart card media by testing it on a small group. The questionnaire data earned at the small group test earns the average score of 93% with the criteria of very good as shown in table 4.

Table 4 Result of Student Assessment on Small Group Test

| Aspects           | Indicator                                                                 | Question Item | Average Percentage (%) | Criteria       |
|-------------------|---------------------------------------------------------------------------|---------------|------------------------|----------------|
| Media aspect      | The smart card media presents images and illustration that is appealing and is easy for me to understand | 2             | 94%                    | Very Good      |
|                   | The combination of writing, image, and colors presented is already sufficient | 4             |                        |                |
|                   | The image illustration and the material presented is related to be found in daily life | 5             |                        |                |
|                   | The smart card media help to avoid the learning situation to boring       | 6             |                        |                |
|                   | The smart card media is easy for me to use                               | 7             |                        |                |
| Material          | Illustration in the materials presented enables me to understand the conservation of living beings subject easily | 3             | 93%                    | Very Good      |
|                   | The questions material and the explanation material in the smart card media enables me to better understand the conservation of living beings subject | 8             |                        |                |
| Social Communication | The smart card media made me interested to follow the subject             | 1             | 92%                    | Very Good      |
|                   | The smart card media creates enthusiasm and challenges to discuss         | 9             |                        |                |
with my friends about the conservation of living beings subject

In general, I am interested in the smart card media use in the conservation of living beings subject

|          | 10 |
|----------|----|
| Average  | 93%|

| Average Criteria 93% |

**Figure 4. Result of Student Assessment on Small Group Test**

According to the image above, it can be concluded that the highest assessment of the media aspect scores at 94%, continued by the material aspect scoring at 93%, and the lowest assessment is earned by the social communication aspect scoring at 92%. Hence, it can be concluded that the smart card media is very good to be used for elementary school and can be continued to the next step which is the big group test. The smart card media can be furtherly implemented on big group test. The result of the big group is at 90% with the criteria of very good as can be seen on table 5.

**Table 5 Result of Student Response Assessment on Big Group test**

| Aspects        | Indicator                                                                                                          | Question Item | Average Percentage (%) | Criteria     |
|----------------|-------------------------------------------------------------------------------------------------------------------|---------------|------------------------|--------------|
| Media aspect   | The smart card media presents images and illustration that is appealing and is easy for me to understand            | 2             | 90%                    | Very Good    |
|                | The combination of writing, image, and colors presented is already sufficient                                        | 4             |                        |              |
|                | The image illustration and the material presented is related to be found in daily life                              | 5             |                        |              |
|                | The smart card media help to avoid the learning situation to boring                                                | 6             |                        |              |
|                | The smart card media is easy for me to use                                                                         | 7             |                        |              |
| Material       | Illustration in the materials presented enables me to understand the conservation of living beings subject easily    | 3             | 90%                    | Very Good    |
|                | The questions material and the explanation material in the smart card media enables me to better understand the conservation of living beings subject | 8             |                        |              |
The smart card media made me interested to follow the subject

The smart card media creates enthusiasm and challenges to discuss with my friends about the conservation of living beings subject

In general, I am interested in the smart card media use in the conservation of living beings subject

| Social Communication | The smart card media made me interested to follow the subject | 1 | 89% | Very Good |
|----------------------|---------------------------------------------------------------|---|-----|-----------|
|                      | The smart card media creates enthusiasm and challenges to discuss |   |     |           |
|                      | with my friends about the conservation of living beings subject |   |     |           |
|                      | In general, I am interested in the smart card media use in the |   |     |           |
|                      | conservation of living beings subject                          |   |     |           |

Average: 90% Very Good

From the data, it shows that the smart card media had received a very good response. It can be concluded that the use of smart card media on the conservation of living things subject can be used to support the learning process that eventually will make the students to be more actively involved during the learning process in class.

4. Conclusion
According to the findings of the research and development and the development that has been conducted, the smart card media has a very good quality both in material aspect and media aspect. As seen from the assessment by media experts and material experts, the smart card media earned the criteria of very good. It can be concluded that the smart card media use on the conservation of living things subject is suitable to be used for 4th grade elementary students.

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