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Development of interactive multimedia based on adobe flash integrated with character values on the respiratory system materials

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ABSTRACT

This study aims to determine the feasibility of interactive multimedia learning integrated with character values developed using Adobe Flash CS 6 Software on the respiratory system material in humans based on the responses of material experts, media experts, field teachers, and students. This study uses a 4-D model of instructional development design, including the define, design, develop, and disseminate stages, limited to the limited deployment stage to see the students' classical learning completeness, namely 36 students. class XI MIA 1 SMA Negeri 1 Sipoholon Academic Year 2021/2022. The results showed that the interactive multimedia learning developed was suitable for use in learning the human respiratory system material because it met the eligibility criteria with an average score of 4.4 from material experts included in the very good criteria, an average score of 4.3 from media experts who included in the very good criteria, the average score of 4.7 from the subject teachers included in the very good criteria, and the average score for each test 4.5 from the students included in the very good criteria.

Keywords : Adobe Flash, interactive multimedia, character values, development, respiratory system

INTRODUCTION

Education cannot be separated from the learning process. Education is not only held by using only books and educators. In this case, education can be implemented by utilizing learning media following the knowledge being taught. One of them is using interactive learning multimedia(Fahmi, 2014).

In fact, in the world of education today there are still various problems related to the limitations of learning media that make it difficult for teachers to convey material to students. There are biological materials that are difficult to visualize or objects that are difficult to present visually such as the respiratory system. In other words, the use of learning media as a priority learning resource in the abstract biology learning process has not been carried out optimally.

Interactive multimedia is multimedia that is equipped with settings that can be run by the user so that they can choose what they want for the next process(Gunawan,2015). One of the software that can be used to create interesting multimedia is Adobe Flash because it is simultaneous or can be used simultaneously.

In the learning process, 3 assessment domains are interrelated with each other, namely the cognitive (understanding), affective (attitude), and psychomotor (ability) domains (Ermayasari, 2013). In this regard, many learning media have been developed using interactive multimedia which tend to only aim to increase students' cognitive values but have not brought up the character values that exist in the interactive multimedia. Besides that, character education is the main concern of the Indonesian nation today. This is due to the waning of character values that should be the identity and characteristics of the Indonesian nation. Therefore, it is necessary to load character values in the developed interactive multimedia. Integrated character values are the incorporation of character values that are defined and presented into interactive multimedia.

Based on the results of the interviews, it is known that the learning media used is still limited to PPT and uses biology books with the help of discussions and questions and answers between teachers and students. In the process of implementing learning, it is also found that character values are

decreasing in some students, namely the attitude of responsibility, honesty, discipline, independence, and religion when participating in learning. In this case, the emphasis on character values that must be possessed by students needs to be considered, especially in the learning process. Therefore, it is necessary to research to develop interactive multimedia that support the learning process on the respiratory system material and conveys character values that can be accepted by students in the learning process..

RESEARCH METHOD

This development research refers to the 4D development research model which includes the definition stage, the design stage, the developing stage, and the dissemination stage but disseminates only limited field tests. Based on the purposive sampling technique in this study, the research sample was determined, namely the students of class XI MIA 1, amounting to 36 people. Data collection techniques used in this study were interviews, observations, and questionnaires. The instruments used in this study were questionnaires and learning outcomes tests.

Classical student learning mastery is seen from the evaluation scores obtained by students in using interactive multimedia which was developed with a large value equal to the minimum completeness criteria (KKM) that have been set. Hasibuan, et al (2019) explained that the percentage of classical completeness (PKK) of cognitive test results can be determined using the following formula:

$$\text{PKK} = \frac{\sum Xi}{n_i} \times 100 \%$$

Information :
PKK = Percentage of classical completeness
$\sum Xi$ = Number of students who finished studying
n_i = Total number of students

The research procedure carried out to produce interactive multimedia based on Adobe Flash CS 6 integrated character values in the respiratory system material for class XI MIA SMAN 1 Sipoholon consists of several stages, namely the definition stage (Define), the design stage (Design), the development stage (Develop) and dissemination stage. In the define stage, end analysis, student analysis, curriculum analysis, and formulation of learning objectives are carried out. At the define stage, media selection, media formatting, and initial design are carried out to produce draft 1. At the development stage, expert validation and development trials will be carried out. In the dissemination stage, limited dissemination is carried out using valid media.

The data analysis conducted in this research is descriptive, where the data analysis technique is divided into two, namely data analysis for the results of the validation questionnaire and the results of the student-teacher questionnaire. Analysis the data from the questionnaires of material experts, media experts, teachers, and students was analyzed in the following steps:

The data obtained is in the form of a checklist which is summarized in the form of a Likert scale that has been scored. Obtaining the average score range provided that on the Likert scale the ideal maximum score is 5 and the ideal minimum score is 1. Based on these data, it can be said that a product can be said to be suitable for use if the results of field trials are at least included in good criteria.

Data analysis of the character value questionnaire results in interactive multimedia developed using descriptive statistical analysis with the following steps:

a. The first step is to change the "yes" and "no" statements to a score of 0 and 1. For negative questions, the answer "yes" = 0 and the answer "no" = 1. While for positive questions, the answer "yes" = 1 and the answer "no" "= 0

b. Next is to find the average score of the assessment. The formula used is:

$$\bar{x} = \frac{\sum x}{n}$$

Information :
$\bar{x}$: average score
$\sum x$: is the number of item scores,
n: number of items

c. The average value of the total score of each component obtained is converted into qualitative data in the form of a questionnaire to strengthening the student's character value.

Table 1 Conversion of Actual Scores into Qualitative Categories for intervals 0 and 1.

No	Score Interval	Score	Category
1.	$\bar{x} > 0.8$	A	Very worth it
2.	$0.6 < \bar{x} \leq 0.8$	B	Worthy
3.	$0.4 < \bar{x} \leq 0.6$	C	Decent enough
4.	$0.2 < \bar{x} \leq 0.4$	D	Not worth it
5.	$\bar{x} \leq 0,2$	E	Very Not worth it

RESULT AND DISCUSSION

This study begins with the initial stage of research which shows that the learning carried out is not optimal by only using the media available at school in the form of books and Power points. This refers to the results of interviews and direct observations to schools which state that students are less motivated by only using learning media in the form of books and Powerpoint. Students of this school prefer learning by using technology that can explain with video, audio, moving animation, and speaking and viewing pictures interactively. As stated by Armansyah (2019), interactive multimedia is a solution to make it easier for students to learn material compared to monotonous textbooks/e-books.

In the process of implementing learning, it is also found that character values are decreasing in some students, namely the attitude of responsibility, honesty, discipline, independence, and religion when participating in learning. In this case, because it is not only the respiratory system material that is contained in interactive multimedia, but also integrates the character values that have been set into the interactive multimedia, this is following the opinion of Ratnawati (2015) which states that character education can be included in the learning process, and added with Ambarita (2020) which states that interactive multimedia can be delivered in a good category in the developed interactive multimedia. Therefore, this interactive multimedia product based on Adobe Flash integrated character values is designed according to the cognitive needs and good character that students need to have.

The initial design for interactive multimedia begins with preparing materials in the form of a selected background as needed, images in png format, music, and audio made in wav and video formats with an embedding process to input them into Adobe Flash CS 6 and other components. needed in multimedia learning to produce draft 1 interactive multimedia based on Adobe Flash CS 6. The resulting draft 1 can be seen in Figure 1.

Figure 1 Draft 1 of multimedia preview

Draft 1 the interactive multimedia produced in the respiratory system material in humans is presented with appropriate delivery of text, still images, animations, and videos. Interactive multimedia also contains instructions for using the application as well as evaluation questions. The integration of character values is also contained in the form of a message that will appear. For the product feasibility test, media validation was carried out on material experts and media experts at the development stage. The eligibility criteria for a product according to Hasibuan et al, (2019) is declared feasible if the average value of the total score is in good criteria. The results of the material and media expert assessment are as follows:

Material Expert Validation

The material expert validation questionnaire contains 40 statement items with an average total score on the quality aspect of the material obtained at 4.42. Based on these results the value of X> 4.2

is included in the "very good" criteria. Based on this, it can be explained that the product developed is suitable for use by students in terms of material in the media, it is feasible with the "very good" criteria.

Media Expert Validation

The media validation questionnaire contains 35 statement items with an average total score on the program design aspect of 4.3. Based on these results the value of X> 4.2 is included in the "very good" criteria. Based on this, it can be explained that the product developed is suitable for use by students in terms of media, it is feasible with the criteria of "very good".

After being validated by material experts and media experts, the product in the form of learning media has been revised, then it is then given to the field of study teacher to obtain data on the response of the subject teacher to the developed interactive multimedia. The teacher's response questionnaire in the field of study contains 29 statement items with an average total score on the aspect of media presentation, the result is 4.67. Based on these results, the value of X > 4.2 explains that the product is suitable for use with the criteria of "very good". The diagram of the results of the assessment of material experts, media experts, and field teachers can be seen in Figure 2.
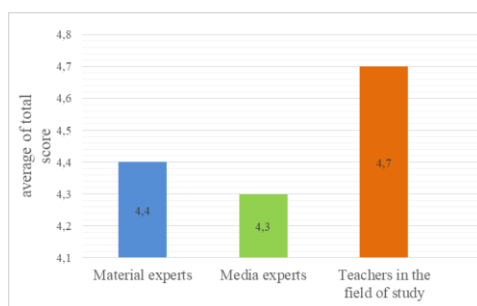

Figure 2 Diagram of the Test Results of Material Experts, Media Experts, and Teachers in the Field of Study

Based on this, the criteria for selecting learning media are said that the criteria in media selection include practical feasibility, namely the type of media and media availability, technical feasibility consisting of message quality (curriculum) learning objectives, visual quality, and cost feasibility (Rahma, 2019).

Thus the product that has been developed has been declared suitable for use by students in field trials. The field trial consists of several stages of testing, namely individual testing, small group testing, and large group testing.

Based on the results of field trials, students' responses to the media in each overall test on the product developed can be seen in Figure 3.
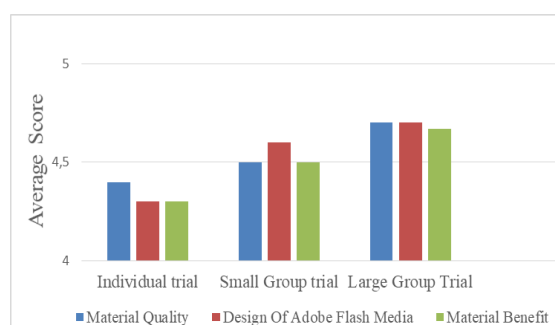
Figure .3 Diagram of Student Responses in Field Trials

Individual Trial

Individual trials were carried out on 3 students of class XI MIA 1 with high, medium, and low ability levels, the average total score on individual trials was 4.4, which was located at X> 4.2 which was included in the "very good" criteria.

Small group trial
Small group trials were carried out on 6 students of class XI MIA 1 with high, medium, and low ability levels, the average total score on the small group test was 4.5, which was located on the value X> 4.2 which was included in the "very good" criteria.

Large Group Trial
Large group trials were carried out on 36 students of class XI MIA 1 with high, medium, and low ability levels, the results obtained that the average total score of students' responses in the large group test to the media was 4.7 located on the value X> 4.2 which included in the "very good" criteria.

Based on Figure .3 it can be seen that the interactive multimedia product developed is in the "very good" criteria and has increased in each test group. In this case, it means that the product is feasible to be used as a medium for learning materials on the respiratory system in the learning process. The presence of this product can also convey the character values needed by students in participating in learning. The integration of character values in interactive multimedia based on student assessments in each test can be seen in Figure .4.
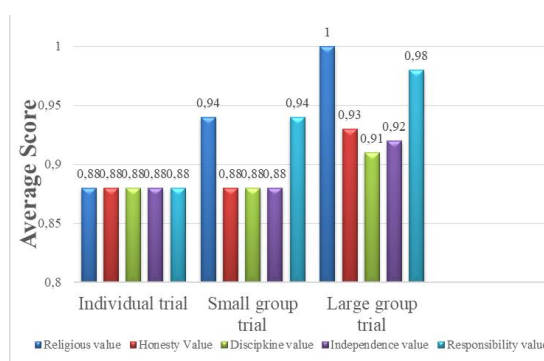

Figure .4 Diagram of Student Responses to the Integration of Character Values in Interactive Multimedia

Individual Trial
Individual tests were carried out on 3 students of class XI MIA 1 at SMA N 1 Sipoholon. The test questionnaire contains 15 statement items with the average total score on the character value indicator, which is 0.88, which lies in the value of $X > 0.8$ which is included in the "very feasible" criteria.

Small group trial
The small group test was conducted on 6 students of class XI MIA 1 at SMA N 1 Sipoholon. The test questionnaire contains 15 statement items with the average total score on the character value indicator, which is 0.9, which lies in the value of $X > 0.8$ which is included in the "very feasible" criteria.

Large group trial
The large group test was conducted on 36 students of class XI MIA 1 at SMA N 1 Sipoholon. The test questionnaire contains 15 statement items with the results of the average total score of the total average score on the character value indicator, which is 0.94, which lies in the value of $X > 0.8$ which is included in the "very feasible" criteria.

The product developed received an average total score of 0.9 from student assessments as shown in Fig. 4 Adjusting the conversion of the actual score into a qualitative category for the intervals 0 and 1 stated that the average total score which lies in the value X> 0, 8 is included in the "very feasible" criteria. Based on this, it can be explained that the product developed by the researcher is suitable for use by students in integrating the predetermined character values, namely religious values, honesty, discipline, independence, and responsibility in interactive multimedia based on Adobe Flash CS 6 which was developed.

The success of student learning and the achievement of learning objectives after using learning multimedia based on Adobe Flash CS 6 can be seen in Figure .5.
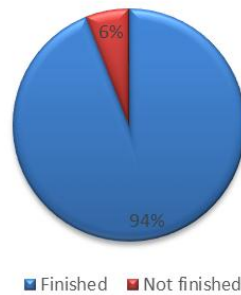
Figure .5 Diagram of the Completeness Percentage of Student Learning Outcomes

Based on Fig. 5, the percentage of students who achieved the minimum completeness score was 94%. A total of 34 students achieved a minimum completeness score with an average score of 92.2. Based on the value obtained, the product developed by the researcher was declared successful in helping students learn about the respiratory system material which is abstract and difficult to understand and helps students to achieve minimum completeness scores, following the percentage of classical completeness proposed by Hasibuan et al. 2019) it is said that each student can be said to have completed his studies (individual completeness) if in that class there are 85% of students who have completed their studies and according to Daryanto (2014) the 85% previously submitted were fulfilled. This product can be declared suitable for students to use as an interactive multimedia learning material for the respiratory system with very good criteria. This is supported by Anggraini's research (2019) which shows that interactive multimedia learning media is very effective for learning biology with classical learning completeness showing a percentage of 100%.

CONCLUSION

Based on the results of the research and discussion that have been described, it is concluded that the material expert's assessment of the material coverage of interactive multimedia based on Adobe Flash CS 6 on the respiratory system material has met the eligibility criteria with an average score of 4.4 which is included in the "Very Good" criteria. " The results of the media expert's assessment of interactive multimedia based on Adobe Flash CS 6 have met the eligibility criteria with an average score of 4.3 which is included in the "Very Good" criteria. Interactive multimedia developed using Adobe Flash CS 6 integrated character values included in the "very good" criteria with an average score of 4.7 based on the teacher's response to the field of study. Based on students' responses to interactive multimedia media, it is included in the "very good" criteria with an average score of 4.5. Mastery of classical learning of class XI MIA 1 SMA Negeri 1 Sipoholon after using interactive multimedia based on Adobe Flash CS 6 on the human respiratory system material got a percentage of 94%. Interactive multimedia that is integrated with character values using Adobe Flash CS 6 software gets an average total score of 0.9 located at the value of X> 0.8 which is included in the "very feasible" criteria

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