



The Development of Learning Media for Mobile Learning on Virus Contents

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Abstract

Learning media is a vehicle for distributing messages and learning information which, if designed properly, will greatly help students achieve learning goals. The results of first observations made on students of SMA N 1 Boja, data obtained that only 50% of students remember virus content during X class, and there are more than 90% of students who have and bring Android smartphones to school which should be used for learning. While the results of interviews with biology teachers at SMA N 1 Boja class X, the difficulties in teaching virus content are the absence of teaching aids, content that tends to be abstract and students who tend to memorize rather than understand. Viruses are a content that is difficult to observe because of its form that cannot be seen with the naked eye because of its very small size. Mobile learning media is an innovation of learning media based on Android and information technology (IT) that can be used without the need for an internet connection and can be used anytime and anywhere to learn. Starting from the problem of abstract virus content and its small size so it cannot be seen with the naked eye, and the media used by the teacher is only power point, as well as the potential of students who already have and bring Android smartphones to school but have not been used optimally in learning, it is necessary to develop an android-based learning media, namely mobile learning. Sampling using random sampling technique. In this study using the Pre Experimental Design method with One-Group Pretest-Posttest Design with a sample of class X MIA students at SMA N 1 Boja. The instruments used are: interviews, questionnaires and documentation. Validation was carried out by a biology lecturer at Unnes and a biology teacher at SMA N 1 Boja with a score of >81% (very valid). A small-scale trial was conducted in class XI MIPA 1 with results >91% (effective), while the student and teacher questionnaire responses reached a score of >81%. A large-scale trial was carried out for class X MIPA 4 by conducting a pretest and posttest with classical completeness results >75% (effective). Thus the learning media for mobile learning virus content developed is feasible and effective to be used as a learning resource.

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INTRODUCTION

Information technology currently has a very important influence on the world of education, especially in the teaching and learning process. One of the uses of information technology in education is the manufacture of learning media. Learning today can not only be done face-to-face but can also use an online system or online. The more sophisticated the technology, the more creative the learning required, so that students will enjoy the learning process and get optimal learning outcomes. To achieve optimal learning outcomes, it takes interesting learning media and a pleasant learning atmosphere, so that students can be fully involved in the learning process.

One of the uses of information technology in education is the manufacture of learning media. It takes the use of media in the learning process to achieve the expected goals. In addition to achieving learning objectives, the media is also very helpful to clarify learning contents. The use of learning media has a positive impact in supporting learning. The learning process becomes more effective and students also feel happier because the learning done by the teacher is not monotonous and makes students more active in accepting learning (Triyanto, et al. 2013).

Learning media is a vehicle for distributing messages and learning information. Well- designed learning media will greatly help students achieve learning objectives. The use of non- printed learning resources in education is expected to change the idea that invisible knowledge can be concreted through visualization and provoke radical changes in the learning process from the "passive student" learning method to the "active student" model (Alimah, 2012).

Virus learning content is one of the contents taught to class X high school students. Learning this content cannot be done by seeing the original object with the naked eye or in a practical way in the laboratory. So that most students find it difficult to learn virus content. According to Harahap and Nasution (2019), one of the biggest factors in the category of the influence of student learning difficulties is influenced by the teacher factor. One of the indicators used is the teacher's method of teaching.

According to Darmawan and Nawawi (2020) virus learning media containing animation, video and audio are more suitable for abstract content because they are more contextual and students feel interested in learning rather than using textbooks. Innovation is needed in the development of learning media to support the optimization of the biology learning process and help students achieve learning objectives. In learning activities, the media has an important role, namely to convey subject matter to students. Currently, almost all students and teachers have and are allowed to bring smartphones during the teaching and learning process. The school has also provided wifi for students and teachers to use to study. With all the potential of mobile technology, especially handphone, it is very possible to optimize its use for learning because it offers many opportunities, such as saving space and time and can be used anywhere, it can open up possibilities for the development of new innovative learning media more effectively and productively, namely mobile learning (Aripin , 2018).

Based on the results of interviews with biology teachers at SMA N 1 Boja, it is known that learning biology so far has used learning media in the form of power points and videos displayed by the teacher on a projector so that learning occurs only in one direction. Even though almost 100% of teachers and students currently have and can operate smartphones and are allowed to take them to school, including during class hours. However, this is not utilized by teachers and students in the teaching and learning process.

The questionnaire for assessing the need for mobile learning learning media for virus content was given to 28 students in class XI MIA 2, it was found that only 50% of students remembered and understood virus content in class X.

In order to improve the quality and optimize the learning process, teachers need to take steps to overcome the problems they face. One of them is by developing mobile learning media on virus content. Mobile learning learning media on virus content presents content in the form of pictures and videos that can make it easier for students to understand the cycle of viruses.

Based on this description, this research will develop a valid, feasible and efficient learning media in viral content for high school. The development of learning media is expected to enable students to find their own learning concepts, connect the learning contents they receive with students' daily lives, so as to create effective, innovative, interesting and fun learning.

RESEARCH METHOD

This research is a Research and Development (RnD). The research was carried out at SMA N 1 Boja in the odd semester of 2017/2018. The subject of this research is in class X MIA 4 with a total of 36 students.

The data from this study include observations from biology teacher interviews which were described qualitatively and questionnaires to students which were described quantitatively, learning media in the form of mobile learning which was validated by media experts and content experts from Unnes biology lecturers using validation sheets then described in quantitative percentages, data from this mobile learning learning media, it was also tested on a small scale to biology teachers and 13 students of class XI MIA 2 as many as 13 people using a questionnaire and then analyzed descriptively quantitatively, effectiveness data obtained from students' cognitive learning outcomes in the form of pretest and posttest in class X MIA 4. The cognitive learning outcomes of N-gain in the form of pretest and posttest were analyzed quantitatively.

RESULTS AND DISCUSSION

Validation of the learning video by experts

The development of this mobile learning learning media has been validated by two experts; media expert and content expert. This learning media is said to be valid if it gets results > 62%.

The validation by the media expert gave a score of 94.2% which means the category is valid. Media validation was carried out by a biology lecturer at the State University of Semarang. Media assessment is assessed from two aspects, namely aspects of software engineering and aspects of audio-visual communication. In the aspect of software engineering, four points get a score of 4, and one point gets a score of 3. This learning media can be used easily by students and teachers, and can be reused for further research. In the aspect of audio-visual communication, six points get a score of 4, and two other points get a score of 3. Media experts say that the media display is good, but still needs to be improved in terms of the font that must be enlarged, as well as the naming of the application.

Another step is content validation conducted by a biology lecturer at the State University of Semarang. There is only one aspect of the content assessment which consists of 10 points. The results obtained from content validation are 90% which are included in the valid category. In the aspect of learning design, six points get a score of 4, and four points get a score of 3. The content presented is still lacking in depth and the completeness and quality of learning aid contents is still lacking.

Feasibility of Learning Media-Mobile Learning

The feasibility of learning media was carried out for biology teachers at SMA N 1 Boja and students of class XI MIA 2. The results given by biology teachers for learning media were 82.5% which were included in the feasible category. Meanwhile, from the questionnaire, the results of student responses obtained 90.7% which were included in the very feasible category. Student responses to this learning media-mobile learning indicate that students are more interested in learning with this learning media because they are not fixated on books and blackboards. Students also understand better the explanation of virus replication using videos on mobile learning media than just pictures and explanations.

The Effectiveness of Learning Media-Mobile Learning

Based on the results of the effectiveness, the implementation of the development of mobile learning learning media at SMA N 1 Boja has positive results on students' cognitive learning outcomes. Students' cognitive learning outcomes can be seen in table 1.

Table 1 Results of cognitive learning of students

Data	Pretest	Posttest
High Score	65	95
Low Score	15	75
Average	38.05	82.77

Based on the data in Table 1 shows the results that the posttest results are higher than the pretest results. Furthermore, the normality gain (N-gain) of the pretest and posttest was calculated to determine the increase in students' cognitive learning outcomes after using mobile learning learning media. The n-gain analysis can be seen in Table 2.

Table 2 Result of N-gain.

N-Gain	Criteria	Total Student	%
$0,70 \leq g \leq 1,00$	High	25	69.44
$0,30 \leq g < 0,70$	Medium	11	30.56
$0,02 \leq g < 0,30$	Low	0	0.00
N-gain	0.69		
Criteria	Medium		

Based on the results in the table above, the n-gain result is 0.69 which is included in the medium category. There is an increase in students' cognitive learning outcomes based on the results of the pretest and posttest using learning media- mobile learning.

One of the factors that influence students' cognitive learning outcomes is the video element in mobile learning media which makes it quite interesting. The learning media developed are designed to be studied by students anywhere and anytime, so that students can learn independently. In this mobile learning there are also questions as an exercise for students to find out how well they understand the virus content.

CONCLUSION

Based on this research, it can be concluded that, (1) The mobile learning media for virus content is included in the very valid category based on validation from media experts and content experts. The validation results from media experts are 94.2% and get a score of 90% from content experts. (2) The learning media for mobile learning virus content is feasible to be used as a learning medium for class X high school students. The feasibility of this learning media is based on the results of responses from biology teachers and students from SMA N 1 Boja, with the results of 82.5% of teachers and 90.7% of students being in the good category.

The implementation of the learning media for mobile learning virus content has been effective to be used for learning media because there is an increase in student cognitive learning outcomes with an N-gain score of 0.69 which is included in the medium category.

Based on this research, we suggest as follows: (1) This application can only be used on the Android operating system, it cannot be used on other operating system users such as iOS and Windows. In the future, it is hoped that mobile learning media can be developed that can be used in all operating systems so that all students can use it, (2) It is necessary to deepen the material in the application. So that the learning media that is made is more valid to use.

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