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Analysis of android-based interactive multimedia needs analysis in learning biology in high school

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ABSTRACT

Education in the 21st century cannot be separated from technology-based learning. The existence of technology provides many conveniences in learning and has many choices depending on the needs of students, one of which is Android-based interactive multimedia. The purpose of this study was to analyze the needs of high school students before developing Android-based interactive multimedia in biology learning. This research is a qualitative descriptive study. The instrument used was a student response questionnaire. Questionnaires were given to 72 students at SMAN 1 Kayan Hilir. The data obtained were analyzed using a qualitative descriptive analysis technique. The results of this study indicate that 76% of students stated that mushroom material was considered the most difficult material, 93% of students want the development of new and fun learning multimedia and 87% of students want learning to use interactive multimedia based on Android. The conclusion from this study is that it is necessary to develop interactive learning multimedia based on android on mushrooms for class X SMA.

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INTRODUCTION

Learning in the 21st century is learning that is closely related to technology-based learning. The existence of technology-based learning in the world of education is used as an innovation that can overcome the limitations of space which has been a weakness in conventional learning

(Khairani et al., 2021). This technology-based learning is also an innovation in responding to the challenges of the availability of various learning resources (Su Ling et al., 2020). The advantage of this technology-based learning is that it is considered more flexible, efficient and practical in terms of sharing any learning content (Sakiah & Effendi, 2021).

Biology subject is a structured subject, meaning that in studying it we are first faced with the easiest to the most difficult material (Serang et al., 2021). The material contained in biology learning is very complex, this is because a lot of material is abstract and uses a lot of Latin terms so that it makes students lazy to learn it so they are unable to fulfill the KKM given by the teacher (Akinbadewa & Sofowora, 2020). In biology learning material, there is a lot of abstract material and the names are in Latin. Meanwhile, each biology material is mandatory material which is the basis for continuing the next material (Fitriani & Krisnawati, 2019).

One effort to achieve these competencies is through the use of interactive multimedia (Setiyadi et al., 2019). This is inseparable from technological advances, such as learning with the help of Android, computers and the internet. Interactive multimedia-based learning has become a necessity in the learning process (Sari et al., 2021). With interactive multimedia as a learning medium, it can overcome various obstacles that usually occur in the learning environment, including overcoming the limitations of class hours, delivering very complicated abstract material and overcoming boredom in learning (Wibowo & Sadikin, 2019). Android-based interactive multimedia is very easy to apply in the learning process, because in the 21st century Android smartphones have become everyone's needs, both for accessing social media and finding learning resources (Hamimi & Sari, 2020). Learning using Android-based multimedia can be implemented in the form of learning applications according to appropriate learning steps in the classroom (Humairah & Sitorus, 2020).

The design of interactive multimedia based on this learning environment is very important, this is because the core of any digital learning multimedia development is interactive (Triyanti & Suswati, 2015). The interactive element in this multimedia is the existence of reciprocal activities between students and the learning system that uses the multimedia (Maryuningsih et al., 2019). In interactive multimedia, discussion rooms such as group chats can also be provided so students can easily interact with teachers and other students. Android-based interactive multimedia learning allows users, in this case students, to interact with various kinds of media such as material texts, animations, learning videos, video tutorials, quizzes and group chats (Utami & Akhyar, 2023). This is what makes the use of Android-based interactive multimedia can improve student learning outcomes and student motivation in learning (Princess & Muhtadi, 2018).

The important fact obtained is that learning biology becomes more lively and keeps abreast of technological developments by using Android smartphone-based learning, so it is very good at supporting biology learning (Nofitasari et al., 2021). Learning by using interactive multimedia can also be used as a learning resource that can help students be independent in learning because it can be accessed anytime and anywhere, is flexible and if students don't understand learning can be repeated many times (Hamdani et al., 2022). This is in line with what Humairah et al said in 2020 which said that Android-based interactive multimedia has proven to be valid and effective and feasible to apply as a science learning solution for high school students. It is also said that the learning outcomes of students who use interactive multimedia based on Android are better than students. whose learning comes directly from the internet by finding the material yourself (Humairah & Sitorus, 2020). Previous research by (Sepdyana Kartini et al., 2022) also revealed that an android-based learning media is needed in the subject matter of hydrocarbon chemistry, but in this study the researchers analyzed the needs of multimedia consisting of more than one media packaged in an android application in biology subjects.

Based on these facts, researchers are interested in researching the needs analysis of Android-based interactive multimedia, especially in biology learning in high school. It aims to (1) analyze biology learning in class X that has been implemented; (2) Analyzing students' needs for android-based interactive multimedia; (3) Analyze the Biology material for class X which is considered difficult by students. The results of this needs analysis will become the basis and reference for researchers to design and develop Android-based interactive multimedia. This needs analysis is the initial stage of the development model (A Lee, WW & Owens, 2004)namely analysis that aims to identify existing facts and determine ideal conditions by developing products according to the problem.

RESEARCH METHODS

Research Design

This study uses a qualitative descriptive research method which is described in the form of a profile description of the need's analysis of learning media in high school. This research was conducted in July 2022 at SMAN 1 Kayan Hilir.

Population and Samples

The population in this study were all students of class XI SMA Negeri 1 Kayan Hilir. The sample selected in this study were 72 students of class XI who had studied Biology in class X. The sample was taken in this study using a simple random sampling technique. The researcher used this sampling technique for the reason that it was not biased so that every student (respondent) had the same opportunity. Every student is considered to have the same opportunity because all students in class X have studied mushrooms.

Instruments

The instrument used was a student response questionnaire consisting of 4 indicators, namely identification of problems in learning biology, availability of media and learning resources, personal ownership of learning support and support for the school environment in teaching and learning activities. This response questionnaire consists of 9 statement items.

Procedures

This research was divided into three stages, namely the research preparation stage, the research implementation stage and the research completion stage. The procedure of this research can be seen in Figure 1.

Figure 1. Research Stages

An explanation of the stages of the research is shown in Figure 1, namely at the research preparation stage, the researcher collected information from school principals and biology teachers as well as made observations, reviewed theories, formulated research problems and determined research samples using random sampling techniques. At the research implementation stage the researcher prepared research instruments and distributed them to students. At the completion stage,

the data that has been collected through a student response questionnaire is then analyzed and then described to get the final conclusion.

Data Analysis

Analysis of students' needs for Android-based interactive multimedia was carried out using a student response questionnaire which had previously been validated and declared feasible for use. The student response questionnaire used consisted of 4 aspects, namely identification of problems in biology learning activities in class X, availability of media and learning resources, ownership of private learning support facilities and support for the school environment in teaching and learning activities.The research data were analyzed qualitatively and then based on calculations they were analyzed descriptively. To calculate the percentage of each item analyzed, use the formula for calculating participants as follows:

$$P = \frac{Number\ of\ Indicator\ per\ Category}{Number\ of\ Indicator\ per\ Category}\ x\ 100\%$$

RESULTS

The results of the analysis of students' needs for Android-based interactive multimedia in more detail can be seen in Table 1.

Table 1. Results of Student Needs Analysis of Android-Based Interactive Multimedia

No	Indicator	Question	Results
I	Identification of problems in learning biology in class X	Material that is difficult to understand and learn (maybe more than one answer)	1. Biological scope (13%) 2. Gene diversity, genius and ecosystem (10%) 3. Viruses (65%) 4. Eubacteria (67%) 5. Protists (70%) 6. Mushroom (76%) 7. Plants (57%) 8. Animalia (71%) 9. Environment (23%) 10. Environmental and climate change (19%)
		Causes of material being difficult to learn (Answers may be more than one)	1. Many terms in biology learning are difficult to understand (99%) 2. Lots of material and difficult to memorize (100%) 3. Submission of material that is less interesting (89%) 4. The use of learning media that is less than optimal (74%)
		The learning method/method most often used by the teacher	1. College (60%) 2. Group discussion (86%) 3. Group percentage (77%)

		(more than one answer may be allowed)	4. Practicum (56%) 5. Media Use (56%)
		Impressions felt during biology learning	1. Fun (24%) 2. Average (32%) 3. boring (44%)
2	Availability of media and learning resources	Learning resources and learning media that are most often used in class (more than one answer is allowed)	1. Book Package (91%) 2. LKS Book (98%) 3. PowerPoints (67%)
		Is it necessary to develop new learning resources and learning media?	1. Need (93%) 2. Not Required (7%)
		Learning resources and new learning media that students want (more than one answer is allowed)	1. Learn by watching videos (13%) 2. Learn by using the android application (there are videos, materials and quizzes) (87%)
3	Private ownership supports learning	Private facilities owned by students	1. Computer (2%) 2. Laptop (4%) 3. Android smartphones (94%)
4	School environment support in teaching and learning activities	Is the school environment suitable for learning using an Android smartphone in class? Does it have adequate signal?	1. Yes (100%) 2. no (0%)

DISCUSSION

Learning media, in this case, namely Android-based interactive multimedia, has a very important role in biology learning because it can be used as the main source in optimizing the learning process (Taufiq et al., 2016). The quality of learning is said to be achieved if the learning outcomes are in accordance with the planned objectives. Based on the results of the research, it is known that the material based on survey results that is the most difficult for students to answer is mushroom material, this is because the material is many and complex so according to students it is difficult to memorize. The Biology teacher in class X SMA Negeri 1 Kayan Hilir has also tried to apply various learning methods, but according to students the teacher still predominantly uses the lecture method and the discussion method so that students become passive in class learning. Monotonous learning makes students less enthusiastic in learning.

The learning resource most often used by students is LKS books, but the use of books alone is still less effective in learning. Likewise with textbooks, facts in the learning field are often centered on textbooks. In addition to using LKS books and textbooks, students also use powerpoint. However, the use of PowerPoint which is only in the form of text is less able to give an interactive impression and increase student motivation in learning.

Therefore it is very necessary to develop learning resources so that students can be enthusiastic about learning so that students are able to get scores above the KKM. Students also say

that students prefer learning media that contains more than one media such as writing, sound, images, animation, video or others in one view.

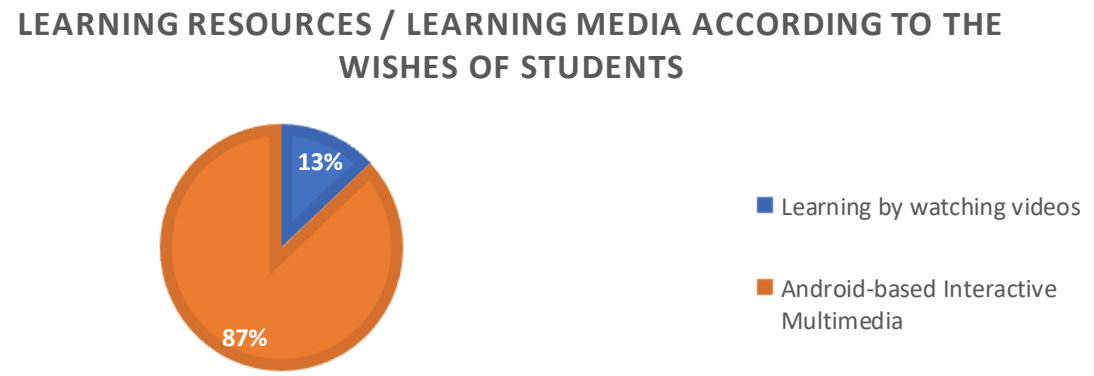

Diagram 1. Choice of Learning Resources/Learning Media by Students

Based on Diagram 1, the learning resources that students want are in the form of interactive multimedia and if linked to the second diagram, this interactive multimedia can be combined with an Android smartphone. The survey results for private facilities owned by students are shown in Diagram 1.

Diagram 2. Private facilities owned by students

As seen in Diagram 2, personal facilities in learning, the most owned by students are Android smartphones when compared to computer and laptop. After having determined this Android-based interactive multimedia that will be used to assist the student learning process in learning, the next step is to see whether the conditions of the student learning environment are in accordance with the wishes of students. Analysis of the student learning environment according to student perceptions is shown in Diagram 3.

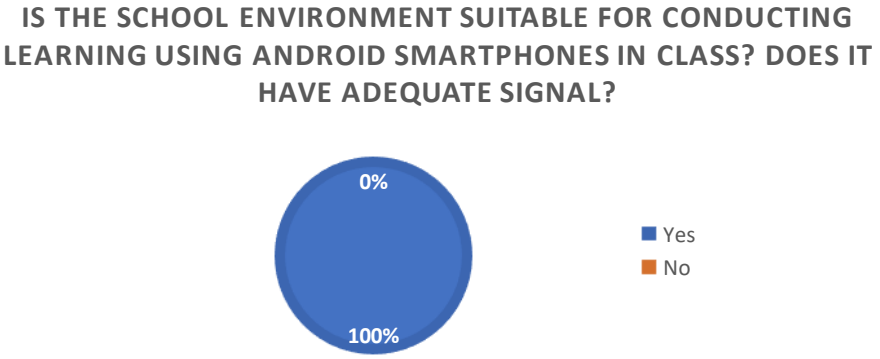

Diagram 3. Diagram of the analysis of the biology learning environment

As seen in Diagram 3, the survey results obtained from students answers, the researcher obtained information that there was already an internet network in the classroom and a network amplifier in the computer lab room. Based on the explanation above, it can be seen that all students who were respondents in this study agreed to use Android-based interactive multimedia in biology subjects. Learning in the 21st century is very appropriate when implementing learning using Android-based interactive multimedia because students need something new in learning (Haviz et al., 2018). This is in line with research conducted by (Dewantara et al., 2020)who say that interactive learning multimedia can visualize material that is abstract in nature and develop students' 21st century skills. The teacher must also actively innovate to provide a new atmosphere in the learning process so that students do not feel bored in participating in learning.

CONCLUSION

Based on the analysis of the research results, several conclusions can be drawn as follows: (1) Students need interactive mushroom learning multimedia in high school. (2) Interactive multimedia developed in android applications can be the right solution for use in learning mushroom biology material in class X in face-to-face and distance learning. So that researchers can conclude in this study that an android-based interactive multimedia is needed on mushroom material to make it easier for teachers and students in biology learning activities in class X SMA.

REFERENCES

A Lee, W.W., & Owens, D.L. (2004). *Multimedia based instructional design*. Pfeiffer.

Akinbadewa, B.O., & Sofowora, O.A. (2020). The effectiveness of multimedia instructional learning packages in improving middle school students' attitudes towards biology. *International Journal of Educational Studies, 2*(2), 119–133. Retrieved from https://doi.org/10.46328/ijonse.19

Dewantara, R.B., Suarsini, E., & Lestari, S.R. (2020). Analysis of the needs for the development of problem-based learning interactive multimedia on high school biology materials. *Journal of Education: Theory, Research, and Development, 5*(6), 749. Retrieved from https://doi.org/10.17977/jptpp.v5i6.13587

Fitriani, L., & Krisnawati, Y. (2019). Development of booklet media based on macroscopic fungal diversity. *BIOEDUSAINS: Journal of Biology and Science Education, 2*(2), 143–151. Retrieved from https://doi.org/10.31539/bioedusains.v2i2.977

Hamdani, S.A., Prima, E.C., Agustin, R.R., Feranie, S., & Sugiana, A. (2022). Development of android-based interactive multimedia to improve critical thinking skills in learning materials. *Journal of Learning Science, 5*(1), 103–114. Retrieved from https://doi.org/10.17509/jsl.v5i1.33998

Hamimi, L., & Sari, R. (2020). Development of proof teaching materials for high school students. *488 (Aisteel)*, 113–119. Retrieved from https://doi.org/10.4108/eai.17-10-2018.2294081

Haviz, M., Karomah, H., Delfita, R., Umar, M.I.A, & Maris, I.M. (2018). Revisiting generic science skills as 21st century skills in biology learning. *Indonesian Journal of Science Education, 7*(3), 355–363. Retrieved from https://doi.org/10.15294/jpii.v7i3.12438

Humairah, N., & Sitorus, M. (2020). Android multimedia-based interactive development for high school students. *488 (Aisteel),* 113–119. Retrieved from https://doi.org/10.2991/assehr.k.201124.027

Khairani, F., Ningtias, I.W.U, & Destini, F. (2021). Analysis of interactive multimedia needs for e-learning lectures in basic education courses. *Basicedu Journal, 5*(6), 5530–5541. Retrieved from https://doi.org/10.31004/basicdu.v5i6.1582

Maryuningsih, Y., Hidayat, T., Riandi, R., & Rustaman, N. (2019). Developing gen-21c in smartphones to cultivate 21st century skills in biology teacher candidates. *JPBI (Journal of Indonesian Biology Education), 5*(3), 415–424. Retrieved from https://doi.org/10.22219/jpbi.v5i3.9714

Nofitasari, A., Lisdiana, L., & Marianti, A. (2021). Development of android-based my biology app learning media material on the food digestive system as a learning resource for ma students. *Journal of Innovative Science Education, 9*(3), 70–78. Retrieved from https://doi.org/10.15294/jise.v9i2.38670

Putri, D.P.E., & Muhtadi, A. (2018). Development of android-based interactive chemistry learning multimedia using mayer's principle on reaction rate material. *Journal of Educational Technology Innovation, 5*(1), 38–47. Retrieved from https://doi.org/10.21831/jitp.v5i1.13752

Sakiah, N.A., & Effendi, K.N.S. (2021). power point-based interactive multimedia needs analysis for algebra material in middle school mathematics learning. *JP3M (Journal of Research in Mathematics Education and Teaching), 7*(1), 39–48. Retrieved from https://doi.org/10.37058/jp3m.v7i1.2623

Sari, I.K., Anwar, Y., & Meilinda, M. (2021). Profile of biology teaching and learning materials from a scientific literacy perspective. *JBPIO (Jurnal Pendidikan Biologi), 6*(2), 133–141. Retrieved from https://doi.org/10.31932/jpbio.v6i2.1080

Serang, D., Nomleni, F.T., & Tnunay, P. (2021). Development of picture card learning media based on the concept map of mushrooms at SMP negeri 16 kota kupang for the 2018/2019 academic year. *Indigenous Biology: Journal of Biological Science and Education, 4*(1), 31–36. Retrieved from https://doi.org/10.33323/indigenous.v4i1.126

Setiyadi, H., Harmanto, & Ahmadi, F. (2019). Development of android-based interactive media to improve civics learning outcomes in grade 3 SD. *303*, 35–39. Retrieved from https://doi.org/10.2991/icpeopleunnes-18.2019.8

Su Ling, L., Vincent, P., & Lajium, D. (2020). Evaluation of student perceptions of the biology class learning environment. *International Journal of Education, Psychology and Counseling, 5*(36), 94–113. Retrieved from https://doi.org/10.35631/ijepc.536007

Taufiq, M., Amalia, A.V., Parmin, P., & Leviana, A. (2016). Design of a science mobile learning eclipse phenomenon with an android-based inventor app with insight into conservation 2. *Indonesian Journal of Science Education, 5*(2), 291–298. Retrieved from https://doi.org/10.15294/jpii.v5i2.7375

Triyanti, M., & Suswati, E. (2015). The use of interactive multimedia in learning nervous system biology materials to improve learning outcomes and activities of class XI students of SMAN 4 lubuk linggau.

Utami, K., & Akhyar, M. (2023). Potential implementation of android-based interactive multimedia for student learning activities. *15*, 507–518. Retrieved from https://doi.org/10.35445/alishlah.v15i1.2641

Wibowo, Y.G., & Sadikin, A. (2019). Biology in the 21st Century: Transformation in the biological sciences and education in support of sustainable development goals. *JPBI (Journal of Indonesian Biology Education), 5*(2), 285–296. Retrieved from https://doi.org/10.22219/jpbi.v5i2.7956