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Original Research Article

Practicality of Biological E-Handout on Mushroom Materials for High School Students

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Abstract

The purpose of this study is to describe the practicality of the mushroom material e-handout which was developed to train students' critical thinking skills. This study uses the R&D method with the ADDIE model. The stages of the ADDIE development model are carried out through 5 stages, namely Analyze, Design, Development, Implementation, and Evaluation. The e-handout is written in a communicative language, equipped with pictures and illustrations that can attract students and contain critical learning activities. Small group test subjects were conducted on 9 students and field tests were conducted on 25 students. Data obtained from practicality instruments were analyzed descriptively. The results of student responses got a value of 90% with the criteria of strongly agreeing and the results of the implementation of 84% with very good criteria. This shows that the developed e-handout is practical for developing critical thinking skills.

Keywords: Practicality, E-Handout Biological, Mushroom Materials.

A. INTRODUCTION

The development of science and technology in the 21st century has changed the characteristics of students, thus requiring an orientation and an innovative way of learning. One of the significant effects of technology on 21st century learning is the ease of access to learning resources. This is in line with Function National education is to develop abilities and shape the character and civilization of a dignified nation in the context of educating the nation's life, aiming to develop the potential of students to become human beings who believe and are devoted to God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent, and become a democratic and responsible citizen (UUno.20/2003). Education is important for sustainable development *(*SD) because it empowers the community and strengthens the nation. It is a powerful "counterweight" to reduce the differences made by class, race and culture, and opens the door for everyone to move out of poverty (Putra, 2019).

The success of the learning objectives is largely determined by the learning process and the development of teaching materials. So far, the reality in schools is that the availability of teaching materials is still considered the only teaching material used by teachers and students. This causes the development of teaching materials is still very rarely done by teachers. To overcome these problems, e-handout teaching materials can play a role in learning in innovative forms to support 21st century students' skills, especially critical thinking skills. Students' disinterest in printed books is partly due to the fact that the supporting pictures are less attractive so students are lazy to read and the appearance of the books used by the teacher has not been able to attract interest in reading from the students used so that the characteristics of students today tend to prefer playing *smartphones* rather than playing with smartphones. Reading books as a medium of learning. Based on these problems, the author wants to provide an alternative in the form of learning *e-handouts*, by using this *e-handout* it is hoped that students will be more motivated in learning and able to practice critical thinking skills. Therefore, it will be effective when transferring the function of the learning book to *a smartphone* by making an *e-handout for* Biology learning. E *-handouts* are handout teaching materials that are displayed in a format that is expected to increase interest and motivation, this is because e-

handouts involve displays, images, audio, video, and animation.

Biology material for class X in the 2013 curriculum contains material related to mushrooms. The scope of the material is quite a lot to be an obstacle for students to remember and understand the material, so it is necessary to have teaching materials that help students' understanding. According to Putra's research (2019), students' views on Biology learning can be more enjoyable through learning activities by solving problems, starting to formulate problems, make designs, and think critically which is supported by the results of a needs analysis questionnaire. The development of Biology teaching materials for class X IPA SMAN 6 Banjarmasin which is filled by Biology teachers can be concluded that the mushroom material requires the development of teaching materials because this material is difficult for students to understand and rarely encountered directly. During the COVID-19 pandemic, where learning was carried out online through electronic media, it was not possible for students to use laboratories at school to observe microscopic objects, so that electronic teaching materials were needed that could support students' distance learning.

Someone who has the ability to think critically is not easy to accept an idea from others, because each idea will have advantages and disadvantages, and have other negative effects. That is why critical thinking skills are very important for life (TF. Wijayanti, 2016). Educators should pay attention to reading interest, metacognitive skills, and critical thinking in learning because it will affect cognitive learning outcomes (Antika, 2015).

Based on the results of the questionnaire analysis of student needs on the development of Biology teaching materials for class X SMAN 6 Banjarmasin, it is known that students at the school choose mushrooms as material that requires additional interesting teaching materials. So far, most of the teaching materials used are still using textbooks. In the 2013 curriculum syllabus, the basic competencies required are relatively high, namely students are expected to be able to analyze the structure and body of mushrooms and require students' critical thinking skills. According to the Director General of GTK Kemdikbud (2020), learning in the current *new* normal era needs to be oriented to the needs of students.

Wibowo (2018) describes some of the advantages of e-handouts, among others, students feel comfortable learning by not just staring at the writings in printed books; eliminate boredom and boredom; ease of accessing teaching materials; and supporting independent learning. This research is based on the need for electronic handouts that are needed for students as alternative learning resources that have easy access to independent study and are able to train students' critical thinking skills. This e-handout is expected to be an independent teaching material for high school / MA students that is feasible, practical and effective to use to motivate students to study biology and practice their critical thinking skills.

B. METHOD

The research method used in this research is R & D research. The development research model used is the ADDIE model which consists of 5 steps, namely analyze, design, develop, implement and evaluation. The steps carried out are as follows:

1. Analysis Stage
   At this stage the researcher analyzes the feasibility of the product in its development process. Needs analysis is used for observation and literature study.

2. Planning Stage
   The design step is carried out by determining targets, assessment tools, quizzes, and analysis related to learning concepts, lesson plans and media selection. This phase is carried out sequentially. The product will be developed containing pictures and materials about mushrooms that are designed according to the needs of students based on the analytical questionnaire given. Making e-handouts by utilizing information technology in the form of flipbook and web applications. The design stage begins with designing product concepts such as compiling an attractive cover, selecting KI and KD, indicators to be achieved, concept maps and several links related to mushroom material, and other aspects compiled and made in the form of e-handouts.

3. Product development stage
   The development stages include the activity of compiling and creating e-handouts by installing the flipbook program. Then collect essential materials and design flipbook sheets. At the development stage, it aims to produce an e-handout of product results after being validated by media and material experts. With the aim of knowing the extent of the feasibility of the product made through expert assessment and advice. After that, a revision was made to the product before being tested which was obtained until the product was declared good and feasible.

4. Implementation Stage
   The steps taken at the implementation stage are that the revised e-handout is tested on students, it can be seen the feasibility of the developed e-handout through a questionnaire provided to determine student responses to the developed e-handout product so that in the future it will be improved even better by referring to the result data. student assessment.

5. Evaluation Stage
   This evaluation is used to find out the overall process to what extent the e-handouts that have been prepared can be said to be feasible to apply. This stage is used by revising the product based on the results of the scores and suggestions of the material expert team and student responses. At each step of the ADDIE model, a formative evaluation is carried out. The use of the evaluation step becomes a correction at every development step so that the resulting e-handout is good according to the revision.

Table 1: Category of Practicality Assessment

Percentage	Criteria
85 – 100	Very good
70 – <85	Well
60 – <70	Currently
50 – <60	Not good
< 50	Not very good

Source: Akbar (2013)

Data on the implementation of the use of e-handouts were analyzed descriptively with the following formula:

$$\text{Skor} = \frac{\text{Total Skor yang diberikan}}{\text{Total Skor}} \text{ X } 100\%$$

Then the results will be analyzed with the following categories:

Table 2: Implementation Test Category

No.	Score	Category
1.	50 - 60%	Not very good
2.	60 - 70%	Not good
3.	70 - 85%	Well
4.	85 - 100%	Very good

Source: Adapted from Arikunto (2010) in Sepriyan (2018)

C. RESULTS AND DISCUSSION

E-handout practicality data mushroom material was obtained from the results of small group tests and field test results. Based on the aspects of the indicators used for appearance, convenience, attractiveness and usefulness, they get good responses. This is because there are elements of video, animation and pictures that attract students' attention and strengthen student motivation.

Table 3: The results of the practicality of small group tests and field tests

No.	Statement	Small Group Test		Field Test	
		Yes	Note:	Yaa	Note:
1.	This e-handout motivates me to study.	100.0	Very Practical	100.0	Very Practical
2.	I can learn actively and independently with this E-handout.	100.0	Very Practical	100.0	Very Practical
3.	I can understand the material presented easily.	100.0	Very Practical	100.0	Very Practical
4.	With this e-handout I get the mushroom material clearly	100.0	Very Practical	100.0	Very Practical
5.	I can understand the material with the help of good quality pictures and videos	100.0	Very Practical	100.0	Very Practical
6.	I can read the text in the E-handout easily because the type and size of the font chosen is right.	100.0	Very Practical	100.0	Very Practical
7.	I like the overall look of the e-handout because it has the right color composition.	100.0	Very Practical	90.0	Very Practical
8.	I can solve the problem well.	100.0	Very Practical	90.0	Very Practical
9.	Through this learning I was trained to think critically.	100.0	Very Practical	100.0	Very Practical
10.	I can read learning texts on media easily.	100.0	Very Practical	100.0	Very Practical
Average		**100**	**Very Practical**	**98**	**Very Practical**

Source: data processing results

Table 4: The results of the small group test implementation test and field test

Statement	Small Group Test		Field Test	
	Score	Criteria	Score	Criteria
Read the instructions for use and the introduction of teaching materials well, so that they know the contents of the e-handout, the benefits to be obtained, and how to operate	95	Very good	93	Very good
Operate teaching materials in a coherent manner, starting from the initial menu to doing the pretest in the e-handout	80	ok	96	Very good
Find difficult to understand or new words about mushroom material	85	Very good	88	Very good
Asking friends or teachers for important words or sentences that attract attention and which are not understood.	89	Very good	84	Very good
Read the contents of the mushroom material in the e-handout carefully.	93	Very good	96	Very good
Conduct discussions with friends to better understand the material contained in the e-handout	93	Very good	86	Very good
e-handout makes it possible to make observations or observations around and record them	89	Very good	95	Very good
The e-handout makes it easier to classify the material obtained when making observations and observations	93	Very good	75	Well
Work on the available evaluation questions seriously.	90	Very good	95	Very good
Asking things or materials that have not been understood to the teacher.	93	Very good	96	Very good
Average	**90**	**Very good**	**90**	**Very good**

Source: data processing results

Based on Table 4 above, it is known that the average results of the small group test implementation and the field test showed very good criteria with an average score of 90 and 90. Based on these results, it can be seen that the field test contained statements with good criteria. Statements that obtain good criteria relate to the material contained in the e-handout which is little to allow for classifying the problems that exist in the e-handout. The results of the implementation of the small group test are known to be very well done, students are able to use the e-handout very well as well as in the field test. The overall value of the implementation of this e-handout is included in the very good category shows that the e-handout mushroom material practically practical

The implementation of the learning e-handout was assessed using a questionnaire given to students. In the questionnaire there were 10 statements, where almost all activities were carried out by students well, because most of them had clearly understood the instructions for use so that their implementation could run independently and students had a more active role in learning. With the preparation of good material, it needs to be equipped with interesting pictures and material that is in accordance with the life around it will be effective in learning, Destiana (2020).

The activity of reading the instructions for use contained in the learning e-handout is carried out to find out the contents of the teaching materials and know how to use them properly and correctly. The role of instructions for use in an interactive learning e-handout is very important because it makes it easier for students. Based on the observations, the student's worksheet aims to practice critical thinking skills. This is supported by the results of students' cognitive knowledge in the complete category and critical thinking skills in the high category. This means that all students have a good understanding of the concept of deepening the material presented.

The results of the implementation of a good e-handout indicate that the learning process is appropriate and can increase motivation in learning. Increased learning motivation makes students more active and enthusiastic about following the learning process step by step until it is finished. Based on Laraswati (2019), states that the use of good e-handouts needs to be improved by paying attention to the responses and suggestions of students so that learning objectives can be achieved.

According to the results of filling out the student response questionnaire, most of the students gave a positive response to the aspects asked in the questionnaire. 95% of students are motivated when learning using the learning e-handout. Student and teacher responses can be useful as a reference in improving the product if the product being developed is to be widely distributed (Mulyatiningsih, 2016; Iskandar & Raditya, 2003). 2017). Students can understand the material easily and get additional material about the mushroom concept. All students stated that they could learn actively and independently using the developed learning e-handout. Putra, (2020) said that the factor that influences students' attitudes towards subject matter is the influence of others in

forming their attitudes, in this case the influence of teachers in learning.

The advantages of the developed e-handout include:

a) The e-handout in the form of a magazine attracts students' attention because it has clear videos, pictures, and animations about mushrooms.
b) E-handouts are easy to carry and operate with their smartphone.
c) The material contains varied pictures about mushrooms.
d) Contains questions related to practicing critical thinking in the sub-chapters according to the environment around students

Based on the results of the development of this product, several weaknesses were also found, namely constrained by the COVID-19 pandemic so that trials could not be carried out widely. This product is still using images from the literature because it is rarely found directly for macroscopic fungi and for microscopic fungi it cannot be observed directly using a microscope. However, in the future, it is hoped that the existence of this e-handout will have a positive impact on being able to train students' critical thinking skills so that students can provide solutions to problems encountered in everyday life.

D. CONCLUSION

The e-handout that was developed on mushroom material was stated to be very practical to use based on the results of the practicality of the small group test and field tests as well as the results of the implementation test.

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