The Mushroom Interactive Student Worksheet Based on Discovery Learning as Teaching Materials for Class X High School Students

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Article Info	Abstract
	The 2013 curriculum requires students to understand various subject matter actively and independently. One of the materials that make it difficult for students to learn is the mushroom material. For this reason, it is necessary to apply a discovery learning model to mushroom material. In addition, the process of learning biology at SMA N 1 Kebumen has not yet utilized technology optimally. The LKPD used is still in printed form and is sourced from textbooks only. So we need an interactive electronic LKPD with varied learning resources. The purpose of this study was to analyze the validity and effectiveness of interactive teaching materials. The research method, namely Research and Development, uses steps to a small scale. The subjects in this study were 15 students taken using the "purposive sampling" technique for class X MIPA D with a ratio of 5:5:5 including students with high:medium:low abilities. The results showed that the validity of the mushroom interactive teaching materials was valid based on the average material validator score of 72.3% and the media validator average of 96.66% the criteria were very valid. Mushroom interactive teaching materials were effectively applied by obtaining a classical completeness score of 93.33% and an average N-gain value of criteria. Teacher responses obtained an average score of 96.66% very positive criteria and student responses obtained an average score of 90.58% very positive criteria. The conclusion of this study is that interactive teaching materials are valid and effective to be used as teaching materials for class X SMA students.

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INTRODUCTION

Biology is one of the foundations of science and technology. Biology is the science of interactions and natural phenomena around us. Biology focuses on providing real experiences to improve the ability of educators so that they can develop new strategies in teaching. This of course can increase student motivation. This results in the activeness of students when participating in learning increases (Triyanti & Nulhakim, 2018).

Utilization of teaching materials can make the teaching and learning process more interesting. With teaching materials, students become easy to learn the existing material. That way, students don't just rely on the teacher's explanation. Students are free to deepen their own knowledge. Teaching materials used during learning can produce a more active and communicative learning atmosphere and reduce teacher dominance throughout education. With the existence of teaching materials, it can be a liaison between teachers and students. In this case, the teacher acts as a facilitator, so that the use of teaching materials can help teachers deal with the problem of limited student absorption and the teacher's ability to manage learning in the classroom (Rozalia et al., 2019).

Teaching materials must have an attractive and unique form, content, and presentation method. Students' interest increases in learning the material that has been delivered by the teacher. The teacher has a way of delivering material that must be adapted to the tendencies, ages and needs of students. In presenting the material the teacher should start with a contextual case, so that students find it easy to understand and learn the material. The teaching material in question is the student worksheet. Innovative teaching materials are all materials (both tools, information or texts) that are made systematically, and can show the competencies that students must have as a whole which will be used during learning activities. This can make students interested in learning the material that will be given by the teacher (Rozalia et al., 2019).

The learning system in the network or commonly called online is a learning system that is carried out online by utilizing the internet network, between teachers and students not directly face to face. Even though students are at home, the teacher is obliged to ensure that learning activities continue to run well. The solution, teachers are required to be able to make innovations using online media (Ramadhani, 2020).

During a pandemic, online learning requires student worksheet and the right learning model that can help students learn independently. For this reason, teacher innovation is needed in order to provide interactive and meaningful learning. The interactive student worksheet is an alternative media. This media can be used as a support in the teaching and learning process which contains material and lots of practice questions. This media can be classified into computer-based media. This is because to run it requires a computer/ laptop/cellphone that allows students to increase their knowledge independently about learning materials just by pressing the button on the application display (Herawati et al., 2017). According to the research results, learning by applying the discovery model results in increased student understanding (mastery of the concept) and students become active during learning (Anisa et al., 2017).

According to research conducted by Utomo in 2016 the application of the discovery learning model can increase the learning motivation of students in Biology subjects. Students become more interested and enthusiastic in participating in teaching and learning activities. In addition, learning by discovery has a positive impact, namely it can improve student achievement. The ideal condition for learning the 2013 curriculum is that the teacher acts as a facilitator and makes students more active during learning. Students not only listen to the teacher's explanation but must be able to analyze the material provided by themselves (Hanadi, 2017).

The 2013 curriculum explains the management of good learning, one of which is by applying the right learning model. One of the appropriate learning models applied is discovery learning (Sastradimuhtar et al., 2019). Based on the research, the discovery learning model has a high influence on the mastery of concepts as well as increasing students' learning motivation (Anisa et al., 2017). Learning by discovery leads to an increase in the understanding of high school students' concepts (Setyaningrum et al., 2018). In addition, students' understanding is sought to increase and make students more active in learning by

developing interactive worksheets (Fransiska et al., 2021).

Various and quality learning resources must be provided by the teacher in order to make it easier for teachers and students to increase insight and references in learning. Questions on student worksheet are sourced from textbooks and journals (Rahmawati & Wulandari, 2020). One of the materials that make it difficult for students to learn is Fungi material. This is because when studying the material there are many Latin or scientific names that must be understood by students. This is the cause of students feeling difficult when learning Fungi material (Lubis et al., 2018).

Based on the results of an interview with a biology teacher at SMA Negeri 1 Kebumen, he stated that the biology learning process has not yet utilized technology optimally. The models that have been applied in learning are PBL, PjBL and discovery learning. However, the student used is still in the form of a printed student worksheet so that it has not utilized technology/application. In addition, the practice questions in the student worksheet are still sourced from textbooks, this can reduce students' learning motivation and tend to be lazy to look for other sources when studying. Students are more focused on copying the answers from the textbook. Even though there are many other sources such as research journals that can add insight into mushroom material and can be related to its role in everyday life. Students said that they still find it difficult to learn biological material, one of which is Mushroom material. During a pandemic like now, learning is done online so that ideally the student worksheet as a teaching material can be developed again from a printed form into an interactive form that can be accessed with a laptop so that learning becomes easy to use and interesting. The developed interactive worksheets utilize technology/applications so that students become interested and motivated to learn.

Based on the description above, it is necessary to develop an interactive mushroom worksheet based on discovery learning as a teaching material for class X SMA students. It is hoped that the student worksheet in this study can make students interested in reading and working on the questions contained in it and motivated to learn from various sources.

RESEARCH METHOD

The Research and Development method produces products in the form of valid and effective interactive worksheets. In this study, validity was tested using a questionnaire from material experts and media experts. Test the effectiveness with the results of classical completeness, N-gain scores, teacher and student questionnaire results. The research design used the Pre-Experimental Design in the form of One group pre-test and posttest. The research subjects were students of Class X MIPA D at SMAN 1 Kebumen in the even semester of the 2021/2022 academic year.

RESULTS AND DISCUSSION

1. **Validity of the mushroom student worksheet**

One of the data obtained from the research is data from the validation of material expert lecturers and validation of media expert lecturers. The researcher used the textbook assessment instrument from the 2014 BSNP with modifications and adjustments based on needs. The valid student worksheet is then implemented in learning the biology of mushroom material.

a. **Validity of the student worksheet material**

The validity of the material has the aim of knowing the suitability of the contents of the student worksheet / product developed for the needs of students (Widiyani & Pramudiani, 2021). The validity of the student worksheet material was obtained from the results of a material expert lecturer validation questionnaire. The results get an average score of 72.3 out of a total score of 216.9 so that it is included in the valid criteria. Data on the results of the questionnaire by the validator are presented in Table 1 below:

Tabel 1. Material validator questionnaire result data

No.	Assessment aspects	Rating score (%)
1.	Validity of contents	72.5
2.	Validity of presentation	72.2
3.	Language validity	72.2
Total score		216.9
Average score		72.3
Criteria		Valid

Worksheets are teaching materials that contain material sheets and questions that are used by students in the learning process. The purpose of the student worksheet is to make students active, help students develop concepts, and improve students' skills (Hasrawati et al., 2019). Student worksheet has a function as a teaching material is to minimize the role of the teacher, make students more active, as a guide for students when doing assignments, and facilitate the teaching and learning process. (Fitriani et al., 2017).

In addition, varied and quality learning resources must be provided by the teacher. This makes it easier to increase students' insight and references in learning (Rahmawati & Wulandari, 2020). Learning sources are from scientific journals, books, magazines, internet, newspapers, television, and other sources (Adri, 2008). This is in accordance with the contents of the developed student worksheet. The materials and questions in the mushroom interactive worksheets that were developed were not only sourced from textbooks. Learning sources are more varied, namely from textbooks, youtube and journals. According to Lanjar (2011) that teachers are required to be creative in the learning process. The application of videos during teaching and learning activities can make it easier for teachers to provide material and increase student appreciation. This is like the mushroom interactive worksheet that was developed, which has a video in it.

In previous research, student worksheets can improve understanding of the concept of biology subjects (Adnyana, 2014). The worksheets developed apply the discovery learning model. According to previous research, the discovery learning model of science lessons is considered effective in increasing students' understanding of concepts (Destalian et al., 2019). The implementation of discovery learning makes students' understanding of biological concepts increase (Fitriani et al., 2017). Based on the results obtained from the research on the development of mushroom interactive worksheets, namely the validity of the material, an average score of 72.3% was obtained so that it was included in the valid criteria and could be used as teaching materials for class X high school students.

b. Validity of the student worksheet media

Media validity has the aim of knowing the quality of the developed student worksheet (Widiyani & Pramudiani, 2021). The validity of the student worksheet media was obtained from the results of the media expert lecturer validation questionnaire. The results obtained an average score of 96.66 from a total score of 290 so that it was included in the very valid criteria. Data on the results of the questionnaire by the validator are presented in Table 2 below:

Tabel 2. Media validator questionnaire result data

No.	Assessment indikators	Rating score (%)
1.	Size of teaching material	100
2.	The cover design of teaching materials	92,8
3.	Content design of teaching materials	97,2
Total score		290
Average score		96,66
Criteria		Very valid

Interactive student worksheet is student worksheet that utilizes technology/electronic media such as applications as a medium for students so that learning materials can be more lively, can increase creativity and increase student innovation power (Herawati et al., 2017). Mushroom interactive worksheets utilize an application called liveworksheet. This application has many advantages, namely: (1) Easy to use by students and teachers. Teachers can send links to students, so students can easily fill out questions immediately. Teachers can see grades or scores easily; (2) Practical because students can work on student worksheet anywhere and anytime. Thus, this application saves cost and time; (3) A flexible approach due to the current pandemic conditions that allow learning to be done online so that it requires flexible technology, meaning that it can be made with the creativity of the teacher. Teachers can make questions with different variations, which can be in the form of short answers, descriptions, multiple choice, matchmaking, and much more (Sele, 2022).

Based on previous research, the live worksheet student worksheet is in the proper category and can be used in the learning process (Widiyani & Pramudiani, 2021). In the research conducted, the development of mushroom interactive worksheets uses a discovery learning model. This is in line with research that discovery learning makes students' understanding of biological concepts increase (Fitriani et al., 2017). Based on the results obtained from the research on the development of mushroom interactive worksheets, namely the validity of the media, it got an average score of 96.66% so that it was included in the very valid criteria and could be used as teaching materials for class X high school students.

c. Biological concept understanding test results in small scale test

Understanding the concept is important in learning biology. Students have low ability to understand concepts. The reason is that teaching and learning activities are centered on teachers and passive students to build a concept so that it is difficult to understand the material provided (Novianjani et al., 2019). The first indicator of concept understanding here is restating a concept, meaning the ability of students to reveal the concept of mushroom material. The second indicator is classifying objects based on certain properties, which means the ability of students to group mushrooms based on how they reproduce. The third indicator is to provide examples and non-examples, meaning the ability of students to give examples and distinguish those that are not examples of mushrooms. The fourth indicator is presenting concepts in various forms of representation, meaning the ability of students to explain concepts in the form of graphs, tables or pictures. The fifth indicator is developing the necessary or sufficient conditions for a concept, meaning that if there are statements A and B then statement B is a requirement for statement A. The sixth indicator is using, utilizing and choosing certain procedures, meaning the ability of students to solve problems with sequential procedures. . The seventh indicator is applying concepts in problem solving, meaning the ability of students to use concepts when answering questions that have to do with everyday life (Fadlilah, 2013)

Tabel 3. Classical completeness results

No.	Description	Total
1.	Students who are declared complete	14
2.	Students who are declared incomplete	1
Number of students		15
Percentage of classical completeness		93,33%

Mastery learning aims to determine the magnitude of students' conceptual understanding of the material being studied (Bahar & Afdholi, 2013). Mastery learning has two categories. The categories are classical and individual (Utomo, 2016). Classical completeness is seen from the percentage of students who complete (comparing to the KKM score set by the school, which is 75) after using interactive LKPD. The basis for determining product effectiveness is that if the percentage of students' classical completeness is greater than or equal to 75%, interactive worksheets are effectively used (Diana et al., 2019). Based on the

results of the data in Table 3 above, it shows that the implementation of the mushroom interactive student worksheet on mushroom material that has been carried out at SMA Negeri 1 Kebumen is above the established criteria, namely the percentage of 93.33% of students who are declared complete from the concept understanding test. Based on the results of the test scores, there are 1 student out of 15 students of class X MIPA D who get a score below 75. Based on these results, it shows that interactive worksheets are effectively used as teaching materials for class X high school students.

Tabel 4. The results of N-gain

Range	Number of students	Percentage (%)	Criteria	Average
0.75<g<1.0	1	6.66	Very high	
0.5<g≤0.75	7	46.66	High	
0.25<g≤0.5	7	46.66	Medium	Criteria high
0<g≤0.25	-	-	Low	
0	-	-	Very low	

The N-gain analysis aims to see the magnitude of the increase in students' concept understanding test results (Nurrafida & Qosyim, 2019). Product effectiveness can be analyzed using the N-gain value (Yusuf, 2018). Interactive worksheets are effectively used if the concept understanding test scores a medium to high N-gain criterion. Based on Table 4, there are 6.66% of students with very high criteria, 46.66% of students with high criteria and 46.66% of students with medium criteria. The average N-gain of 0.57 is included in the high criteria. Based on these results, it shows that interactive worksheets are effectively used as teaching materials for class X high school students.

d. Results of Teacher and Student Responses

Tabel 5. Teacher response results

No.	Assessment aspects	Answer Score (%)
1.	The graphic aspect	90
2.	Material	100
3.	Aspects of language	100
Total score		290
Average score		96,66
Criteria		Very positive

Based on previous research, that student worksheet got student and teacher responses with very good criteria (Septiani et al., 2013). This is in line with the results of the study, namely that the student worksheet was effectively applied by obtaining the results of the teacher's responses, at least obtaining the results of a questionnaire with positive to very positive criteria. The results of the research written in Table 5 are the results of the teacher's responses from three aspects, namely aspects of graphics, material and language. The graphic aspect got a score of 90%, meaning that the response was very positive. The material aspect got a score of 100%, meaning that the response was very positive. The language aspect gets a score of 100%, meaning that the response is very positive. The average score of 96.66% is included in the very positive criteria.

Tabel 6. Student response results

No.	Assessment aspects	Answer Score (%)
1.	The graphic aspects	91,11
2.	Presentation aspects	88,88
3.	Aspects of language	93,33
4.	Material	90,33
Total score		1.087
Average score		90,58
Criteria		Very positive

The student worksheet that was applied obtained student responses with positive criteria (Fitriyana & Purwasi, 2020). This is in line with the research, namely that student worksheet is effectively applied by obtaining the results of student responses at least obtaining questionnaire results with positive to very positive criteria. The results of the research written in Table 6 are student responses from four aspects, namely aspects of graphics, presentation, language and material. The graphic aspect got a score of 91.11%, meaning that the response was very positive. The presentation aspect got a score of 88.88%, meaning that the response was very positive. The language aspect got a score of 93.33%, meaning that the response was very positive. The material aspect got a score of 90.33%, meaning that the response was very positive. The average score of 90.58% is included in the very positive criteria. The results of the effective mushroom interactive student worksheet study with the acquisition of an average score of 96.66% teacher responses included in the very positive criteria. In addition, the acquisition of an average score of 90.58% of student responses is included in the very positive criteria. Based on these results, it shows that interactive worksheets are effectively used as teaching materials for class X high school students.

CONCLUSION

Based on the research data and discussion, we can conclude that mushroom interactive worksheets are valid to be used as teaching materials for class X high school students.

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