



The Development of Student Worksheets (LKPD) Based-On Natural Exploration (JAS) Plant Materials Grade X SMA

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Abstract

This study aims to determine the validity and feasibility of the Student Worksheet (LKPD) based-on Exploring the Surrounding Nature (JAS) for Class X High School Plant Materials. This LKPD is a teaching material used for observation activities, contains material, activities and activity guides that are carried out by students independently by utilizing the surrounding environment, and evaluation questions. Research on LKPD development with a JAS approach refers to the development procedure according to Sugiyono (2016) which is adapted to research needs. The procedure for developing LKPD with a JAS approach includes potentials and problems, data collection, product design, design validation, design revisions, product trials, product revisions, and limited production. The results of this study include qualitative data obtained from the validity of the LKPD instrument with the JAS approach and student responses. The results of LKPD validity obtained from media expert validation are 93.73% with very valid criteria, material expert validation is 85.15% with valid criteria, and biology teacher validation is 94.32% with very valid criteria. The level of validity of the JAS components by media expert validators is 95.83% with very valid criteria and by material expert validators 87.50% with valid criteria. Student response data is used to determine student responses to the JAS Approach LKPD and LKPD can be used in online learning. LKPD can be used in online learning with the category of student responses being very positive and the average score of responses reaching 3.31. Thus, the LKPD with the JAS approach is stated to be able to be implemented in learning activities. However, it is still necessary to conduct further trials to determine its effectiveness as an alternative biology teaching material and to determine the ability of LKPD to increase students' motivation to carry out activities during online learning.

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PRELIMINARY

Online learning is a solution for ongoing learning activities during the Covid-19 pandemic. The Covid-19 pandemic in Indonesia has been going on since March 2020 until now. The Covid-19 pandemic has an impact on the entire community in various fields such as social, economic, tourism and education. Circular (SE) issued by the government on March 18, 2020, all activities in all sectors are temporarily postponed in order to reduce the spread of the corona virus, especially in the education sector. The Minister of Education and Culture of the Republic of Indonesia issued Circular Letter Number 4 of 2020 concerning the implementation of education policies in the emergency period of the spread of COVID-19 which explains that the learning process is carried out at home through online learning in the context of preventing the spread of COVID-19.

Online is an acronym for the word "in the network" which means connected to a computer network, the internet and so on. Online learning is learning that is done without going through face-to-face directly by using applications on electronic media that are connected to each other through the internet network. Online learning is one solution to keep learning and teaching activities going during the Covid-19 pandemic.

Purwanto et al (2020, p. 5) conducted a study that aims to identify obstacles to the online teaching and learning process due to the covid-19 pandemic. The obstacle faced in online learning apart from being related to internet connection is the absorption of student learning that is not maximum due to the saturation of students. Another obstacle faced is the limited time in delivering the material so that the material being studied is not conveyed properly and is not absorbed by students which causes learning outcomes to be not optimal, and there are no real activities that make students motivated to study independently. During online learning, students are more focused on learning with their cellphones, students are less ready to take part in online learning and are less focused on learning.

Learning biology means trying to get to know living things and life processes in the environment. Biology learning should take advantage of the surrounding environment as a learning resource. Utilizing the surrounding environment as a learning resource will encourage students to carry out activities so that students are actively involved in gaining knowledge. In order to encourage students to carry out real activities by utilizing the environment as a learning resource, teaching materials are needed with an appropriate approach and can be used by students independently. Appropriate teaching materials are Student Worksheets (LKPD-Lembar Kerja Peserta Didik-Indonesia) with the Surrounding Nature Exploration Approach (JAS). Prastowo (2015, p. 204) in his book explains that LKPD is printed teaching materials used in the learning process, containing a summary of the material, instructions and steps for activities carried out by students. The JAS approach is a learning approach that utilizes the surrounding environment as a learner-centered learning resource.

LKPD contains practical activities carried out by students. The activities carried out are able to provide real experience making it easier for students to understand the material. The contents of the LKPD include a summary of the material, instructions and experimental steps, and productive questions. Rohmawati (2018, p. 243) reveals that as a biology teaching material, LKPD is used for observation, research and experiment activities in solving problems related to living things and the environment. Zakaria et al (2017, p. 57) explained that making a good LKPD must have components including, 1) the title of the experiment, 2) a brief theory of the material, 3) tools and materials, 4) experimental procedures, 5) data and observations, and 6) statements and conclusions.

LKPD validity is the level of feasibility which indicates that the LKPD meets the specified criteria and has quality. According to Danial (2018, p. 7) the criteria for a decent and quality LKPD are that the LKPD has a high level of validity or validity. Student worksheets (LKPD) must meet various requirements including didactic requirements, construction requirements, and technical requirements (Darmojo in Widjayanti, 2012, p. 2), as well as the feasibility standards of teaching materials according to the National Education Standards Agency. LKPD covers aspects of content feasibility, linguistic aspects, presentation aspects, and graphic aspects.

The Surrounding Nature Exploration Approach is one of the innovations of the biology learning approach that utilizes the surrounding environment as a learner-centered learning resource (Ngabekti et al, 2017, p. 8). The JAS approach consists of several components that are implemented in an integrated manner. The components of JAS are: exploration, constructivism, scientific process, learning community, bioedutainment, and authentic assessment (Akhmadi, 2010, p. 61). Alimah and Mariyanti (2016, p. 20) explain that the use of the surrounding environment in the natural exploration approach (JAS) can be in the form of the physical, social, cultural, and technological environment as objects of biology learning that are studied through scientific work.

LKPD with the approach to Explore the Surrounding Nature (JAS) is a teaching material used for

observation activities, containing material, activities and activity guides that are carried out by students independently by utilizing the environment around their residence as a source of learning and evaluation questions. The LPKD approach to Exploring the Surrounding Nature consists of several elements including titles, basic competencies, learning objectives, instructions for use, supporting materials and information, activities or work steps, and assessments. The LKPD with the Surrounding Nature Exploration (JAS) approach contains components in the JAS learning approach that make students carry out real activities in obtaining their knowledge.

Based on this description, the researcher intends to develop an LKPD with an Environmental Exploration Approach (JAS) for Class X High School Plant Materials, which can be used in online learning during the Covid-19 pandemic.

METHOD

This research is a development research with reference to research and development procedures according to Sugiyono (2016, p. 407). Research and development aims to find, develop and produce certain products. Purnama (2013, p. 21) explains that the products produced can be in the form of hardware and software such as books, modules, packages, learning programs and learning aids. According to Haryati (2012, p. 14) research and development is different from ordinary research. Research usually produces suggestions for improvement, while research and development produces products that can be directly used. This research procedure has 8 stages which were modified from the research and development procedures of Sugoyono (2016). Includes 1) potential and problems, 2) data collection, 3) product design,

The instruments used in this research are validation sheet instruments and student response sheets. The data in this study are qualitative data obtained from the LKPD validation instrument with the JAS approach and student responses. Validation data is used to determine the validity of the LKPD based on JAS. Student response data is used to find out the LKPD with the JAS approach can be used in online learning. The validity data were analyzed using the percentage validation formula (%) using the following formula. After the validation percentage is obtained, then it is interpreted according to the modified criteria from Purwanto (2009, p.82) in Table 1.

$$\text{Validation Percentage} = \frac{\text{total score}}{\text{max score}} \times 100\%$$

Table 1 Validity Criteria

Percentage	Criteria
90% - 100%	Very Valid
80% - 89%	Valid
60% - 79%	Quite Valid
0% - 59%	Invalid

Student response data were analyzed using the formula for the average student response as follows. The results of calculating the average student responses are then interpreted into qualitative criteria according to Riduwan (2015, p. 102) in Table 2.

$$\text{Average Response} = \frac{\text{total score}}{\text{max score}}$$

Table 2 Student Response Criteria

Average Response	Criteria
3.25 - 4	Very Positive
2.5 - 3.25	Positive
1.75 - 2.5	Pretty Positive
1 - 1.75	Not Positive

RESULTS AND DISCUSSION

This research was conducted from February to July 2021. The test subjects in this study were 30 students of SMA N 1 Bergas Grade X MIPA 1. The research was conducted online because it was still in the emergency response period for the Covid-19 pandemic. This research was conducted through Google Classroom and WhatsApp learning applications, using laptop and smartphone media.

a. LKPD Development Stages

The development of LKPD with a JAS approach was carried out in accordance with the development research procedure according to Sugiyono (2016) which was modified according to the needs of this research. Potential learning resources in the environment of students in the form of a diversity of green plants that are still commonly found in the Bergas sub-district, Semarang Regency. Problems and obstacles faced during online learning due to the Covid-19 pandemic became the background for developing LKPD with a JAS approach for Class X High School Plants. This LKPD is designed in accordance with the Basic Competence (KD), the environmental exploration approach guidelines (JAS), and the criteria for a good LKPD. LKPD products with the JAS Approach to Plant Materials consist of cover, title, table of contents, introduction (LKPD identity, KD, learning objectives, and instructions for using LKPD), plant material (Bryophyta, Pteridophyta, and Spermatophyta), activity (title of activity, purpose of activity, tools and materials, working method, result sheet), biosupplement, and evaluation (multiple choice questions and descriptions). The results of the validation obtained several suggestions for improvement of the developed LKPD, from suggestions for improving the design of the LKPD being improved and producing LKPD products that are ready to be tested.

- 1) The illustration of the image is further clarified with descriptions according to the content being discussed.



Figure 4.7 Contradiction between captions and pictures. a) the initial design before the repair and b) the LKPD product after the repair with repairs, drawings that match the descriptions and adding citation sources to the drawings.



Figure 4.8 Distinguish the morphological structure of antheridium and archegonia, do not use up or down because in the picture it is not visible. a) initial design before repair and b) LKPD product after repair with the addition of morphological structure images of antheridia and archegonia.

2) Image clarity, image size, image layout and sample images that are close to students.



Figure 4.9 The size of the image is less large and less proportional, use examples of images that are close to students and add citation sources to the image. a) the initial design before the repair and b) the LKPD product after the repair with the improvement of a clearer and more proportional image and the addition of citations to the image.

3) In the evaluation section, use pictures that are around students and for grouping/classification use pictures that reflect the special characteristics of the classified plants.



Figure 4.10 Use pictures to make them more contextual and not just memorizing. a) initial design before repair and b) LKPD product after repair with additional drawings.

b. LKPD Validity and Eligibility

The LKPD validation data is used to determine the validity of the LKPD with the Surrounding Nature Exploration (JAS) approach. The validity of the LKPD in terms of media validation, material validation and biology teacher validation. The results of the validation/assessment of the LKPD validity test can be seen in table 3.

Table 3. Results of Validation/Assessment of LKPD Validity Test

Validator	Validation/Assessment		Percentage	Criteria	Average Percentage	Criteria
	Aspects/Terms	Score				
Media Expert Validator	Graphic Eligibility	112	93.33%	Very Valid	93.75%	Very Valid
	Language Eligibility	45	93.75%	Very Valid		
	Conformity with the JAS approach	23	95.83%	Very Valid		
Material Expert Validator	Content Eligibility	45	80.35%	Valid	85.15%	Valid
	Serving Eligibility	25	89.28%	Valid		
	Instructional Eligibility	18	90%	Very Valid		

	Conformity with the JAS Approach	21	87.50%	Valid		
Biology Teacher	Didatic	47	97.92%	Very Valid		
	Construction and technical	36	90%	Very Valid	94.32%	Very Valid

Based on the results of the validation test, the LKPD with the approach to Exploring the Surrounding Nature (JAS) class X SMA material developed was declared very valid by the media expert validator with a media expert validation percentage of 93.75%, declared valid by the material expert validator with a validation percentage of 85, 15%, and was declared very valid by the biology teacher validator with a validation percentage of 94.32%. From the aspect of conformity with the JAS approach, the LKPD with the Environmental Exploration Approach (JAS) Plant Materials Class X SMA is declared very valid with a percentage of media validators which is 95.83% and declared valid with a percentage of material validators which is 87.50%. Thus the LKPD with the Surrounding Nature Exploration Approach (JAS) for Class X High School Plant Materials is declared feasible to be tested on students with several improvements.

c. Student Responses to LKPD Approaching JAS

Student response data to the LKPD is used to determine if the LKPD can be used properly by students. Student response data was obtained from the student response sheet instrument. Student response sheets were given to 30 students of SMA N 1 Bergas. Student responses include several assessment indicators, namely material, language, and interest. The results of the recapitulation of student responses to LKPD can be seen in table 4.

Table 4.3 Results of Recapitulation of Student Responses to LKPD

No.	Assessment Aspect	Rating Indicator	Average Score	Criteria
1.	Student Response	Material	3.30	Very Positive
		Language	3.29	Very Positive
		Interest	3.34	Very Positive
		<i>Average percentage</i>	3.31	Very Positive

Student responses are assessed from several indicators, namely material, language, and interest. Based on the results of the analysis of student response data, the average score of student responses was 3.31 with the response category being very positive. Thus, it can be said that the LKPD with the plant material JAS approach that was developed is very supportive in the online learning process. The LKPD approach JAS plant material supports online biology learning, this is reinforced by the assessment item number 17, namely LKPD supports online biology learning, with the average student response reaching a score of 3.27 with a very positive category, which indicates that students agree that LKPD with the JAS approach to plant material can be used to support online learning activities. LKPD is able to motivate students to carry out activities in learning, this can be seen from the assessment item number 18, namely LKPD is able to motivate me to carry out activities in the surrounding environment, with the average response of students achieving a score of 3.17 with a positive category, which indicates that students students are motivated to carry out activities to take advantage of the surrounding environment in learning using LKPD with the abbreviation of JAS plant material. Thus, the LKPD with the approach to Exploring the Surrounding Nature (JAS) Plant Materials for class X SMA can be used in online learning activities and can motivate students to carry out activities during online learning activities.

CONCLUSION

Based on the results of the research conducted, it can be concluded that the Student Worksheet (LKPD) Approaching Natural Exploration (JAS) Plant Material Grade X SMA was declared very valid by media expert validators, material experts, and biology teacher validators. LKPD Approaches to Explore the Surrounding Nature (JAS) Grade X High School Plant Materials can be used in online learning. Further

research is needed to examine its effectiveness as an alternative to biology teaching materials and to increase students' motivation and learning outcomes.

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