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Validity of Students Worksheet Based Guided Inquiry with Diagram V on the Ecosystem Material and the Environment Influences for X Grade of Senior High School Students

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Abstract **– The preliminary interview with one of the teachers and two students showed that students' worksheet had some weaknesses. It has not directly led the students to a problem, or it has not given a stimulus for the students. It also did not provide the columns for the investigation results and for concluding observation. Moreover, it has not led the students into scientific approach. In the cognitive, affective, and psychomotor domains, students got unsatisfying result. To deal with the problems, the students' worksheet is developed based guided inquiry with diagram V. The aim of the research is to show the process of developing students' worksheet based guided inquiry with diagram V for the tenth grade students, which is valid, practical, and affective. The type of the research is development research using Plomp model. The development stages consist of the initial stage of investigation, the development stage or prototype stage, and the assessment phase. The instruments of data collection used are validity sheet, practicality sheet by teacher and students, observation sheet used by the researcher to access the affective domain, psychomotor score sheet, multiple choices test to access the cognitive competence of the students. The result shows that students' worksheet based guided inquiry with diagram V which is developed is valid, practical, and affective. Therefore, it is able to be implemented in the wide scope.**

Keywords **–Development; Guided Inquiry; Diagram V.**

I. INTRODUCTION

Teaching materials are used to assist teachers in implementing the learning activities systematically arranged. One of the teaching materials used by teachers is Worksheet Students (LKPD) LKPD is used guide learners to conduct an inquiry or problem-solving. The result of research interviews with biology teacher is Elfira Safiarni, S.Pd, dated February 27, 2017 is known that, in the biology of learning, teachers use at each meeting LKPD however, not contain activities and referrals.

Components used LKPD title covers teachers, competence, teaching materials and questions. Worksheets learners who use certain deficiencies were found, *first*, LKPD arranged directly drove learners conduct an investigation without preceded by directing learners to a problem, *the* second, LKPD not provide a column for the results of their investigation to conclude observations column.

The importance of LKPD is their sheets contain tasks that must be done by learners. Activity sheets contain steps to solve a problem. Response learners who have been using LKPD used by teachers in SMAN 1 Sungai Limau note that the work steps in LKPD unclear, LKPD less attractive, unattractive LKPD color and sample images less clear. LKPD contains a number of information and steps to be taken by learners. According Widjajanti (2008: 2) LKPD benefits in the learning process, namely; (1) directs the learning process through the steps; (2) speed up the learning process; (3) help the learner more actively in the learning process; (4) a more effective learning; (5) improve the thinking ability of students.

The curriculum at the high school level material contained ecosystem and environmental changes. This material should get a satisfactory value for the material is directly related to the lives of learners, materials ecosystems and environmental changes also require learners to process,

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reasoning and presents it in the realm of the concrete, the concepts being taught is not rote but be understanding because this material is material related to everyday life, but in reality, the results of daily tests (cognitive) learners mengdapatkan unsatisfactory results as in Table 1.

Table 1. Results of Average Daily Lifestyle of Students on ecosystem material and the environment influences Change for the Last 2 Years.

No.	School Year	Average	KKM
1	2014/2015	60	75
2	2015/2016	39	75

Source: Subject Teacher of Biology.

Based table 1shows that the average content of ecosystems and environmental changes still do not get satisfactory results, it is because learners assume that this material is easy because it can be seen directly in everyday life so it does not need to learn. The low results obtained by the learner can be overcome by using implement a model which could increase the activity, motivation and learning outcomes of biology students. One model that can be applied is a model of guided inquiry.

Guided inquiry learning involves students in real investigations with the problem confronts learners with how the investigation *(investigation),* to help learners identify conceptual or methodological issues in conducting the investigation and asks students to design ways to overcome the problem (Kemendikbud, 2014: 59). The main purpose of guided inquiry develop intellectual skills, critical thinking, and being able to solve the problem scientifically (Dimyanti and Mudjiono, 2006). Model guided inquiry has advantages that, through guided inquiry can prolong the process of memory, the knowledge gained from the ideas of its own, while the disadvantage of not efficiently used in learning by the number of learners who, for they will spend a lot of time to help learners find the concept certain.

the application of biological LKPD based guided inquiry learning will be more effective for learners construct knowledge when combined with V. LKPD based guided inquiry combined with V diagrams can help learners to express the meaning of learning provided by focusing the question before learning implemented, so as to encourage students to think.

In accordance with the study conducted Agustia (2015: 7) that the diagram V can increase the biological competence of learners of cognitive, affective and psychomotor.

Based on the above, the researchers have conducted research with the title Development Students Worksheet Based Guided Inquiry with Diagram V on The Ecosystem Material and The Environment Influences for X Grade Of Senior High School Students.

II. REVIEW OF LITERATURE

1. Worksheet Students (LKPD)

Depdiknas (2008:24) says that, LKPD containing sheets of tasks to be undertaken by learners. LKPD including printed teaching materials to guide learners who are used to conduct an inquiry or problem-solving. Thus, the sheets LKPD are a guide to resolving the issue through investigation.

2. Model Guided Inquiry

Inquiry word derived from the English language is *to inquire* which means to ask or investigate. The question is at the core of inquiry based learning. Questions can lead to an investigation in an effort to understand the learners in the learning material.

According Kemendikbud (2014: 59) argues that the core of inquiry learning is to involve students in problem investigation real confronts learners with how the investigation *(investigation),* to help learners identify problems conceptual or methodological in investigating and ask students devise ways to overcome problem. Through guided inquiry, the students learn to be a scientist in formulating knowledge.

Stages (syntax) used in designing inquiry-based learning by Joyce and Weil (2000) (Kemendikbud, 2014: 66-68) as follows. (1) The identification and determination of environmental space issues (2) Plan and predict the outcome, (3) Research for data collection (4) Interpretation of the data and develop conclusions (5) reflection.

3. Diagram V

1977 Gowin find a helpful tool to help people understand the structures of knowledge and understanding of the structure of the process of understanding the concept of knowledge is called the diagram V. Novak and Gowin (1984 in Agustia, 2015: 14) explains diagram V is a strategy that could help learners better understand the nature and purpose of laboratory activities, ie build new knowledge from existing knowledge.

Diagram V useful for planning and implementation of a research or experiment, and to evaluate the report. Diagram V has a conceptual side (thinking) and methodological side

(work). Both sides are actively interacting during the use of focus or research question. The tip of the V contains the event or object being observed. Both sides of the V diagram emphasizes two aspects are interdependent study science, the theory *(thinking)* and practice (doing).

4. LKPD Based Validity

a. Validity

Validity is a situation that is a portrait of an instrument's ability to measure something that is to be measured. Trianto (2010: 269) describes a valid instrument is an instrument capable of measuring what people want and can mengukapkan the data of the variables studied properly.

Indicators used to declare that the products produced valid, can be used the following indicators.

1) Aspect of Presentation

Aspect is a presentation discussing the aspects related LKPD identity completeness and content of LKPD developed.

2) Aspects of Feasibility Contents

Contents feasibility aspect is a requirement that discusses the concept of conformity with the applicable curriculum so good LKPD used to measure the ability of learners.

3) Aspects of Graffiti

Aspects of aspect of graffiti a condition associated with things such as text, images and display LKPD.

4) Aspect of Language

Aspect of language is a requirement that relates to the use of the writing language, sentence structure, simplicity of words and appropriate, so it is understandable by learners.

III. METHODOLOGY

This type of research is the development of research using a model of Plomp. Validity of students' worksheet based guided inquiry with diagram V is.

3.1. Development of Prototype I

The development of the prototype 1 to design a student worksheet based guided inquiry with diagram V. Completed designed and then self-evaluation using check list. The evaluation itself aims to examine the errors that are still found in the result of the student worksheet based guided inquiry with diagram V.

3.2. Development of Prototype II.

Phase II prototype validation and expert review of the content of LKPD developed. The Validity of students worksheet based guided inquiry with diagram V views of an expert assessment (expert review) feasibility in terms of content, language, presentation and aspect of graffiti.

IV. RESULT AND DISCUSSION

4.1. Result

Results obtained in the initial investigation stage be used as guidance in developing LKPD based guided inquiry with diagram V. The results of the development is done at this stage is as follows.

4.1.1 Prototype I (design)

This phase, researchers design and construct biology learning LKPD adjusted measures include diagrams guided inquiry V. LKPD designed with *Microsoft Office Publisher 2007*. Characteristics LKPD prepared based on several aspects as follows.

a) Aspect of Presentation

Aspect of presentation made based guided inquiry steps include diagram V is to identify problems, plan and predict the outcome, an investigation for data collection, data interpretation and gather conclusion, refkesi, and diagram V.

b) Aspect of Feasibility Content

LKPD developed is tailored to KI and KD are predetermined in the content standards. LKPD developed load titles in accordance with their respective submatrix, Core Competence (KI), Basic Competency (KD), and indicators of learning, worksheets learners, and exercise.

c) Aspects of language

LKPD developed using the rules of correct language in accordance with Spelling Indonesian (EBI). making it easier for learners to use and understand LKPD developed.

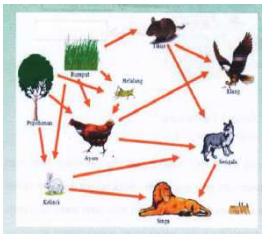
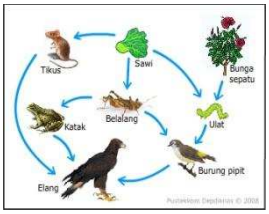
d) Aspects of Graffiti

Student worksheet based guided inquiry with diagram V using A4 size paper. LKPD created using *Microsoft Office Publisher 2007*. *The* font used in LKPD is *Maindra GD* with size *font* 12-26 and spacing of 1.5.

After the design and manufacture of Student worksheet based guided inquiry with diagram V is done, the next stage evaluation (self-evaluation). *Self-evaluation* focused on the

apparent mistake by researchers at LKPD have been made. The following Table 2 will be shown in the form of LKPD before and after repair.

Table 2. Results of Self-Evaluation.

Before Improvement	After Improvement
Image replaced with images ever seen in the environment of the learners. 	Already corrected by replacing the image is wrong with the picture on the environment of the learners. 

4.1.2 Prototype II (Design)

LKPD repaired, subsequently validated by three experts consisting of Indonesian experts, media experts learning and teaching materials experts. LKPD validation results of the experts can be seen in Table 3 below.

Table 3. Results of Validation LKPD Developed

No.	Aspect Validated	%	Category
1.	**Feasibility Content**	75.0	Valid
2.	Language	83.2	Very valid
3.	Presentation	78.5	Valid
4.	Kegrafikaan	80.0	Very Valid
Average		80.0	Very Valid

Table 3 above, it is known that LKPD scores 80.0 categorized as very valid.

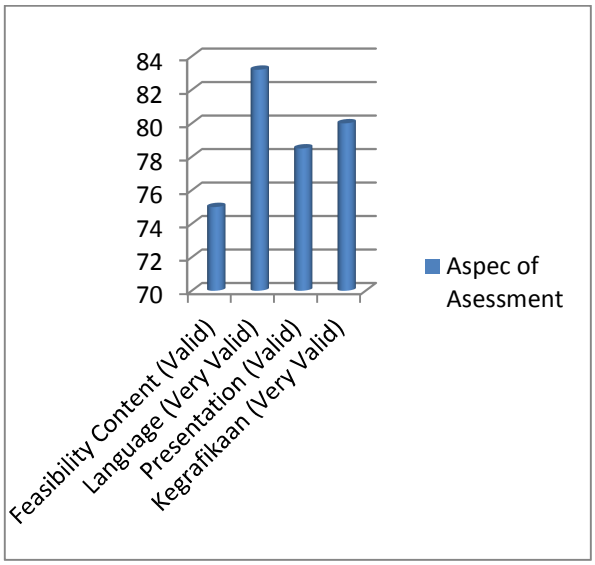


Figure 1. Aspects of Assessment.

4.2 Discussion

validity or expert review involves three lecturers as validator expert and professor of biology as a validator practitioner, in line with the opinions Sugiyono (2007: 41) that, product validation can be done by an expert or experts who are experienced to assess the newly-designed product, so that can know the weaknesses and advantages of the products developed.

Criterion validity is considered by experts consists of four aspects: presentation, appropriateness of content, language and aspect of graffiti. The results of the validation of aspects of the presentation can be concluded that student's worksheet based guided inquiry with diagram V on the ecosystem material and the environment influences for X grade of senior high school students.

Damyanti and Mudjiono (2006) says that the main purpose of guided inquiry is to develop intellectual skills , critical thinking and be able to solve the problem scientifically.

Through the given problem, learners can find their own answers on a given problem and are able to develop critical thinking skills (Hapsari, 2012: 21). The next stage learners develop the ability to identify the questions of students with ideas and scientific concepts, as well as the quantitative relationship that leads to the investigation. According Hapsari (2012: 27) when learners to design and conduct scientific investigations learners are able to develop abilities such as: systemic observations, conduct careful and identify. Once learners to design ideas or ideas that are owned, then

learners carry out investigations to collect data for analysis and draw conclusions.

Maaswet (2009: 19) says that, this crucial stage of drawing conclusions is to connect the various instructions and information facts with the knowledge of various instructions and information facts with the knowledge that has been held to make a prediction on the outcome. LKPD developed there is a stage of reflection that guided inquiry, which in this reflection phase learners to evaluate objectively the form of work on the problems found on LKPD based guided inquiry with diagram V.

The next phase the diagram V which is a learning process that invites learners to link the theory learned by practice worked. According to Novak and Gowin (1984) diagram V is a method that emphasizes two aspects of studying the dependent or related to the theory *(thinking)* and practice *(doing)* that occurred during the lab or in the investigation. LKPD also have a valid category on the feasibility aspect of the although content, some suggestions for improvement. Suggested improvements done on the material. Some of the concepts of matter are wrong that need improvement. Category very valid given by experts because the indicator is adjusted based on KD, learning objectives are also described based on indicators that have been made.

The next aspect is the aspect of graffiti obtaining a valid category of experts. As LKPD designed with interesting and assisted with the image display on the cover that already reflects the content. In accordance with the opinion of Prastowo (2011: 99) that the image is able to provide motivation, that image when selected appropriately can be used to motivate learners to learn.

The next aspect that received very valid category that aspect of language. LKPD considered being valid in terms of the language by experts because LKPD designed using the correct Indonesian rule. The language used was adjusted to the level of high school language class X so that students easily understand the content LKPD. LKPD also use simple sentence structure and clear. Depdiknas (2008: 18) states that the writing LKPD also should pay attention to sentence structure, use of easily understood language and text sequential order.

Overall LKPD developed already have a valid criterion, so it can be used for the subsequent test phase. According Arikunto (2009: 58) says that, if a data generated from a valid product, it can be said that the product provides an overview of the development goals correctly and in accordance with reality and real state.

V. CONCLUSION

Based on the results of research and discussion presented can be summed up some things as follows. Based on the assessment of the developed LKPD experts have valid criteria. Valid categories provided by experts based on content feasibility, presentation, language and aspects graffiti.

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