

Validity of Biology Student Work Sheet Based on Problem Based Learning for Student Class XI

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Abstract – Curriculum 2013 has one of the approaches used in general that the scientific approach (approach scientific method). The scientific approach is also very appropriate to be applied in the process of biological learning. There are several materials that are studied in biology learning, each with a character and different difficulties. The strategy that can be done to overcome the difficulties of learning and provide meaningful learning for students is to apply the appropriate learning models. Learning models are suitable for use in the learning process for the material system is a model of *Problem Based Learning*. In the process of learning as learning models, use of teaching materials for the learning process better. Teaching materials in the form of a worksheet that contains tasks to work by learners who are made according to competence to be achieved. The purpose of this study was to make Student Worksheet based on *Problem Based Learning* for student class XI and to know its validity. This research and development using Plomp model. Student Worksheet based on *Problem Based Learning* validity were obtained from the results of validation using 3 expert validator. The results showed that the didactic aspect scored 78% with valid criteria, the construct aspects value of 80.8% with very valid criteria, technical aspects scored 81% with very valid criteria and the average overall three aspects scored 83.0% with very valid criteria. Student Worksheet based on *Problem Based Learning* was successfully developed with the validity criteria are very valid.

Keywords – Validity, Student Work Sheet, *Problem Based Learning*

I. INTRODUCTION

The curriculum is one of the educational resources that can provide a significant input in the process of realizing the potential quality of the later development of learners. Completion of applied current curriculum is the curriculum of 2013. Curriculum 2013 is a refinement of the competency-based curriculum that starts from 2004 and 2006. The curriculum 2013 is a curriculum that made the learners into scientific thinking. Curriculum 2013 has one of the approaches used in general that the scientific approach

(approach scientific method). The scientific approach is the combination of the learning process is focused on the exploration, elaboration and confirmation furnished by observing, ask, to reason, to try and communicate. Learners are able to find the concepts taught himself, so as to position learners as a learning center.

The scientific approach is also very appropriate to be applied in the process of biological learning. Biology is the science related to the life of the originally acquired and developed based on experimental observations or

experiments (inductive) but in the subsequent development of biology were also obtained and is developed based on deductive theory. There are several materials that are studied in biology learning, each with a character and different difficulties.

Based on the results of interviews conducted in SMAN 1 Sitiung, SMAN 1 and SMAN 1 Koto Baru Pulau Punjung found several problems in the learning process in schools. *First*, the material is considered difficult by students is a matter about existing systems in the body (65% motion system, circulatory system and digestive system 85% to 75%). Difficulties learners in the study material are also in line with the system of learning outcomes obtained. Values assigned to study biology at SMAN 1 Pulau Punjung are 80. The achievements learning completely criteria on the material of locomotion system as much as 35.5%, while 64.7% did not complete, complete circulatory system as much as 25.6%, while incomplete 74.4% and completion of digestive system as much as 45.3%, while did not 54.6% complete. by because it is one strategy that can be done to overcome the difficulties of learning and provide meaningful learning for students is to apply the appropriate learning models. *Secondly*, the issue of emotion tututan teachers understand the curriculum in 2013, dimna the 2013 curriculum teachers must understand in developing teaching materials that one of them is *the Student Work Sheet*. Development of *Student Work Sheet* teachers are still not familiar with in accordance with the curriculum because of 2013. Accordingly, it is appropriate for the development of *student work sheet* for the learning process in accordance with the curriculum of 2013. Thirdly, learners have difficulty in proposing and formulating hypothesis, there are still many students who less active in the discussions as well as difficulties in connecting learners optimal information. This is in line with the curriculum in 2013 explained that the use of appropriate learning models is a strategy of how learning evaluation can help learners develop itself in the form of information, ideas, skills, values and ways of thinking to increase the capacity to think clearly, wisely and build social skills and commitment. *Fourth*, the interview in the Arbor Island SMAN 1, SMAN 1 and SMAN 1 Sitiung Koto Baru, it is known that in each school have used the *Student Work Sheet* as teaching material in teaching biology (including material systems). *Student Work Sheet* used by students is designed by teachers or students adapted from the book. As one media, ideally *Student Work Sheet* can support learning model used by teachers. To achieve these objectives, of *the Student Work Sheet* also have the same approach / learning model is similar to that done. Based on observations and

analysis it is found that although *Student Work Sheets* are not yet using the PBL approach, but in fact all of the syntax is in the learning model PBL is already contained in *Student Work the Sheet*. However, of the five syntax in PBL, syntax organize learners to problems, develop the work and analyze and evaluate the problem solving has not developed properly.

All learning media problem can be resolved by the application of learning in the *Student Work Sheet* is expected to optimize the learning conditions of students' participants in achieving the learning objectives. *Student Work Sheet* used in the learning process can lead learners to organize together in groups. Therefore, the developments of *the Student Work Sheet* that can stimulate thinking motivate learners in solving problems.

Teaching materials in the form of Student Worksheet is a worksheet that contains tasks to work on learners who are made according to competence to be achieved. Use of *Student Work Sheet* can save time teaching and training students to learn independently. *Student Work Sheet* serves as an alternative to introducing a teacher in teaching and learning activities. Moreover, it will increase the interest of learners if they are developed in an interesting way. Besides LKPD allows teachers to explain the learning materials. This is in accordance with Prastowo (2011) that the function of teaching materials for teachers that can save time teachers in teaching. Worksheet Students (LKPD) based on *Problem Based Learning (PBL)* is developed in order to form the learners in solving problems in real life. Moreover, it can make the students argued.

This is in line with the development of *the Student Work Sheet* should be supported by the learning model that is *Problem Based Learning (PBL)*. According Ethrington (2011) *Problem Based Learning* a positive impact on the motivation of teachers to teach the concept of matter in the context of the real world. *Problem Based Learning* is a learning approach using real-world problems as a context for students to learn about critical thinking and problem solving skills, as well as to acquire the knowledge and the essential concepts of the course material and subject matter. According Savery (1995) that the learning model *Problem Based Learning* is menutut learners to think in solving problems. PBL also can understand learners in learning concept that is very valuable for the participants' ddik. *Problem Based Learning* support increasing students' critical thinking.

This is in line with the order to determine whether or not the student *work sheet* developed *student work sheet* to go

through several stages of testing one of them are validity (Asrizal et al., 2014).

The validity of the said term used to test an experimental research both research and research that comes from the English pengembangan. Validitas *validity*, which means truth. Logical validity refers to the conditions for qualified teaching materials valid reasoning based on those results, while a teaching materials can be said to have empirical validity if it was in the test of experience. Specification in the preparation worksheet learners consists of didactic terms, terms of construct and technical requirements (Darmojo in Kaligis in Widjayanti 2008)

II. LITERATURE STUDY

A. VALIDITY

Validity is a term used words to test an experimental research both research and research that originated development. Validates of the English *validity* language, which means truth. The validity of an alignment, i.e. provisions in usability for the understanding of the studied material (Haryanto, 2011). Validity is the most important requirement in a product and a product having a high validity value if the product is able to measure what is actually going to be measured (Purwanto, 2012).

According to Arikunto (2012) states, generally speaking, there are two mcam validitas, namely the validity of the logical and empirical validity. Logical validity refers to the conditions for qualified teaching materials valid reasoning based on those results, while a teaching materials can be said to have empirical validity if it was in the test of experience. Specification in the preparation worksheet learners consists of didactic terms, terms of construct and technical requirements. According Darmojo in Kaligis in Widjayanti (2008) explanation of these terms is as follows:

- 1) Terms didactic, regulate the use of lemabar working learners that are universal, that can be used for learners capable of high or low ability
- 2) Terms CONSTRUCTS, ie the terms that are pleasing to the use of language, sentence structure, vocabulary, tingakt hardship, and clarity of the existing essentially must appropriate in order to understand the learner.
- 3) Technical requirement, namely the aspect of text, images and see

B. WORK SHEET DEVELOPMENT OF STUDENTS (LKPD)

Definition of Activity Sheet Students is sheets of ebfrisi work to be done learners. The sheets are typically in the form of instructions, the steps to complete a task. Activity sheet

Students a steamy print instructional materials contain task sheets which contains instructions, measures to finish tasks. LKPD can be a guide for the development of cognitive exercises and guidelines for practice and guide the development of the cognitive aspect to develop all aspects of learning in the form of manual experiments and demonstration (Trianto, 2007). Activity sheet Students contains teaching materials are packaged in terintegrasi to enable learners to learn the material on their own.

Student Worksheet (LKS) which amended terms on curriculum 2013 to Worksheet Students (LKPD) is a collection of tasks learners united in sheet form. Majid (2012) states that the *students work sheet* in a sheet that contains tasks to work on learners. LKPD must be made according to its competence to be achieved. Prastowo (2011) states that the worksheet learners is one resource that contains a summary of the material, and instructions for performing tasks which refer to the competencies that must be achieved by learners.

LKPD usefulness in the learning process will have an impact on both teachers and learners. According Prastowo (2011) classifies LKPD by function as follows: (1) LKPD to help learners find a particular concept, (2) LKPD to help learners apply and integrate the various concepts that have been found, (3) LKPD that serves as a study guide, (4) LKPD which serves as a reinforcement, (5) LKPD that serves as a practical guide.

Preparation of LKPD contains materials and assignments to be completed learners independently or in groups that are intended to achieve the expected goals. LKPD compiled based format and specific structure. Ministry of Education (2008) describe the structure LKPD are: (1) The title, subject, semester, place, (2) Directive learn (instructions learners or teachers), (3) Competence to be achieved, (4) indicators, (5) supporting information, (6) The tasks and measures and (7) evaluation and response or feedback on the results of the evaluation.

C. PROBLEM BESIDE LEARNING (PBL)

Problem Based Learning is a learning model that is used to stimulate students' thinking to a higher level, and focus on real-world problems, including learning how to learn. The use of real-life problems as a context for students' thinking can help them not only solve problems, but also grasp the knowledge and the essential concepts. *Problem Based Learning* is also one technique that can be taught lessons using contextual learning model (Shafi'i, 2013).

According to Hirca (2011) that the learning model *Problem Based Learning* nice applied in the process, because it cans menutut learners to think in solving problems. PBL also can understand learners in learning concept that is very valuable for the participant's ddik. *Problem Based Learning* support increasing students' critical thinking. Syllabus, lesson plans, and other related teaching aids successfully developed and validated by local experts. When implemented, no significant differences in terms of the effects of students (knowledge, attitude, and ability to think). Biological or related science teachers can use this design to improve the quality of teaching biology (Haryadi, 2015).

Model application *Problem Based Learning* can help create learning conditions that originally only the transfer of information from teachers to students to further emphasizes the learning process to construct knowledge based understanding and experience gained either individually or in groups (Setyanto, 2015). The main objective of the learning model *Problem Based Learning* is not the delivery of a large number of knowledge to the students, but rather on the development of critical thinking skills and problem solving skills and also develops the ability of learners to actively construct their own knowledge (Hosnan, 2014).

III. METHODS

This type of research is research development (*development research*). Another term that is often used for research and development is the research design (*design research*), this term is used by Plomp. Research development is the effort to develop and produce a product in the form of materials, media, or learning strategies used to overcome the problems in the classroom and not to test the theory.

LKPD development based on *Problem Based Learning* (PBL) using the model of Plomp. This development model consists of three stages of development, namely the initial investigation phase (*preliminary research phase*), phase of development and manufacture of prototypes (*development or prototype phase*), and the phases of assessment (*assessment phase*) (Plomp, 2013). In the initial investigation fae (*preliminary research phase*) carried out the analysis of problems and needs, curriculum analysis, and analysis LKPD to get an overview of the development of products that will be developed. The next phase to develop and manufacture prototypes (*development or prototype phase*) to do some tahapan such as: protoipe I, Prototype II, III prototype, and the prototype IV. In the assessment phase (*assessment phase*) conducted trials on actual classroom.

In the phase of development and produce of prototypes (*development or prototype phase*), based LKPD development *Problem Based Learning* (PBL), the development stage of the validity of the test carried out at the prototype stage II by examining the expert or experts. Validation based LKPD *Problem Based Learning* (PBL) is carried out by three (3) persons in accordance with its team of experts and studies respectively. The test results are then used to revisions that LKPD based on *Problem Based Learning* (PBL) has actually been meeting the needs of users and can be applied to the actual class.

Analysis of the validity of using the data validity LKPD obtained from the analysis of instrument data collectors in the form of data collection questionnaire filled by the expert or experts. The data analysis begins by providing scoring for each item. Scoring is based on a Likert scale with provisions such as Table 1.

Table 1. Category and Item Score LKPD Likert Scale
Validity Based *Problem Based Learning* (PBL)

Score	Category
4	Strongly Agree (SS)
3	Agree (S)
2	Disagree (TS)
1	Very Disagree (STS)

Source: Joseph (2007)

Then the result scoring by percentages

Based on the validity of the value obtained, it was determined criteria-based assessment of the validity LKPD *Problem Based Learning* (PBL) provided in Table 2.

Table 2. Category Validity Based LKPD Problem Based Learning (PBL)

validity Value (%)	Category
0-20	Invalid
21-40	Less Valid
41-60	Enough Valid
61-80	Valid
81-100	Very Valid

Source: Riduwan (2009)

IV. RESULTS

Validation based LKPD *Problem based Learning* (PBL) is based on grains -butir expert validation instrument based measures based LKPD preparation of *Problem based Learning* (PBL), then generated based LKPD *Problem based Learning* (PBL) in biological materials. LKPD based on *Problem Based Learning* (PBL) were then validated by experts. LKPD validity based on *Problem Based Learning*

(PBL) includes didactic aspects, aspects of the construct, and technical aspects. Validator involved in this validation process is Dr. Darmansyah, ST, M. Pd as a technology expert, Mr. Dr.Abdurrahman, M.Pd as a linguist, Dr. Ramadan Sumarmin, M.Si as subject matter experts.

The results of the validation LKPD based on *Problem Based Learning (PBL)* is as follows:

Analysis validation lkp based *problem based learning (pbl)* in the matter of biology class xi sma

A. DIDACTIC

INDICATORS	validator			AVERAGE	PERCENT OF	CATEGORY
	1	2	3			
1	3	3	3	3.0	75%	Valid
2	3	4	3	3.3	83%	Very Valid
3	3	3	3	3.0	75%	Valid
4	3	4	3	3.3	83%	Very Valid
5	3	3	3	3.0	75%	Valid
AVERAGE-RATA	3	3.4	3	3.1	78%	Valid

B. CONSTRUCTS

INDICATOR	validator			AVERAGE	PERCENT OF	CATEGORY
	1	2	3			
1	4	4	3	3.7	92%	Very Valid
2	4	3	4	3.7	92%	Very Valid
3	3	4	3	3.3	83%	Very Valid
4	3	3	4	3.3	83%	very Valid
5	3	4	4	3.7	92%	very Valid
AVERAGE	3.4	3.6	3.6	3.5	88%	very Valid

C. TECHNICAL

indicator	validator			average	percent of	category
	1	2	3			
1	3	3	3	3.0	75%	Valid
2	3	4	3	3.3	83%	Very Valid
3	3	3	4	3.3	83%	Very Valid
4	3	4	3	3.3	83%	Very Valid
AVERAGE	3	3.5	3.2	3.3	81%	Very valid

Criteria validation of didactic aspect, aspect and aspect CONSTRUCTS technique performed by experts / specialists can be seen in chart 1.

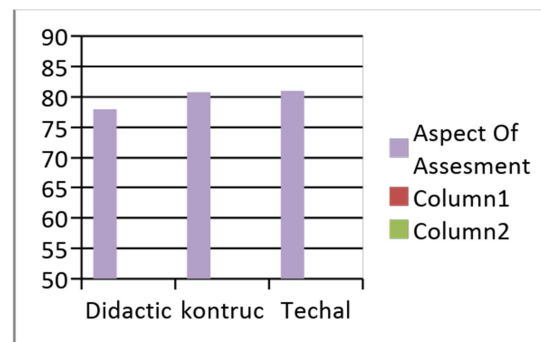


Chart 1. Validation Criteria Student work sheet

V. DISCUSSION

Student work sheet as seen from the aspect didactic already meet the valid category while aspects of the construct and technical aspects that have met very valid category. LKPD validity based on *Problem Based Learning (PBL)* were obtained from the results of validation using expert validation sheet covering kesesuaian based LKPD *Problem Based Learning (PBL)* with basic competencies material Human digestive system. The validity of the didactic aspects scored 78% with valid criteria showed that activity-based learning with LKPD *Problem Based Learning (PBL)* can facilitate presents indicators and clear learning objectives. activities in LKPD presented by adjusting the activities carried out by the subject matter. Activities in LKPD presented systematically and in accordance with the phase of PBL. Category very valid given by experts because it was accord to indicators based on KD, learning objectives are also described based on indicators that have been made. LKPD contains a list of questions related to the concept of matter. The list of questions on the phases develops and present the works adapted to the learning objectives to be achieved learners (Asrizal et al., 2014). The list of questions is set to focus the learner to the objectives to be achieved from the activities undertaken.

The construct validity scored 88% with very valid criteria-based show that LKPD *Problem Based Learning (PBL)* were prepared with a good innovation, can attract and motivate learners and in accordance with operational measures *Problem Based Learning (PBL)*. Category very valid given of several aspects CONSTRUCTS based on the activity on LKPD has direct experience of the learners. Activity on LKPD provides opportunities for learners to carry out activities with the activities of this invention so that

learners actively in the learning process. LKPD activity also provides an opportunity for learners to work together. LKPD activities also help develop social communication skills of learners. LKPD also gives learners the opportunity to ask questions. In addition, in LKPD also displayed a picture that can support material. *Problem Based Learning* is also one technique that can be taught lessons using contextual learning model (Shafi'i, 2013).

The next aspect is the technical aspect which obtain very valid category of experts. Very valid category of assessment experts because LKPD own images and text on the cover that already reflects the content. Pictures on LKPD also can convey the message effectively; captions are in accordance with the image presented on LKPD. Then, the combination of colors used in LKPD is sufficient contrast and sharp and does not disturb the focus of learners when reading LKPD; color images can also foster the attractiveness for learners. The type and size of the letters used is also appropriate.

So, overall LKPD developed already have a valid criterion, so it can be used for the subsequent test phase. According Arikunto (2013), if a data generated from a product is said to be valid, it can be said that the product provides an overview of the development goals correctly and in accordance with reality and real state.

VI. CONCLUSION

Based on the results of research and discussion can be concluded that the instructional material teaching materials in human digestive system has been created in the form of LKPD based on *Problem Based Learning* (PBL). Based LKPD *Problem Based Learning* (PBL) can be used as a learning in innovation by incorporating aspects should be included in supporting learning activities. LKPD berbasis *Problem Based Learning* (PBL), which was developed to have validity in terms of aspects valid didactic aspects and technical aspects CONSTRUCTS valid. LKPD based on *Problem Based Learning* (PBL) can be used in learning to help learners achieve basic competency to improve the competence of learners.

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