Validity of Students Worksheet Based Problem-Based Learning for 9th Grade Junior High School in living organism Inheritance and Food Biotechnology.

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Abstract. Based on preliminary research of students worksheet used by teachers has several disadvantages such as students worksheet arranged directly drove learners conduct an investigation without preceded by directing learners to a problem or provide stimulation, student's worksheet not provide a concrete image and presentation activities on the students worksheet not refer to any one learning models curricullum recommended. To address problems Reviews these students then developed a worksheet based on problem-based learning. This is a research development that using Ploom models. The phases are preliminary research, development and assessment. The instruments used in data collection that includes pieces of observation/interviews, instrument self-evaluation, instruments validity. The results of the validation expert on student worksheet get a valid result the average value 80,1%. Validity of students worksheet based problem-based learning for 9th grade junior high school in living organism inheritance and food biotechnology get valid category.

1. Introduction
Science is a very interesting subject to study, because most of the concepts of the lesson material can be viewed directly by the students in their daily lives. Therefore, the process of learning science should be conducted through a scientific approach. Learning to use this approach refers to a theory that learning is a scientific process. Learning to use this approach refers to a theory that learning is a scientific process. It is adapted to Permendikbud RI No. 103 [1] that a scientific approach based learning is more effective results compared with traditional learning. The process of learning to use a scientific approach to touch three domains, namely the attitude, knowledge and skills.

Learning science emphasis on direct experience to develop the competencies that students are able to understand the nature around through the process of "figuring out" and "do", it will help students to gain a deeper understanding. Skills in finding out or doing is called the inquiry process skills or "inquiryskills" [2].

By Permendikbud RI No. 58 [1], science learning process in junior high school from the viewpoint of the study of biology so that the presentation concepts of science in integrated science teaching materials in junior highs school begins with biological phenomena that exist around the students and discussed with a review of the three areas of study (biology, physics, and chemistry).

Biology is one branch of science teaching. It can be said biology is the science which studies the symptoms through a series of processes known to the scientific process, which is built on the basis of the scientific attitude and the results are manifested as a scientific product. Jihad and Abdul Haris [3]
explains that the competence of the biology subject are grouped into two aspects: first, understanding the concept and its application, and secondly, that the scientific work. While aspects of the assessment are grouped into understanding and application of concepts and scientific performance.

The one of materials that are known to help students understand and apply the concepts of the lessons is students worksheet. Sa'idah [4], which conducts research based integrated science about development students worksheet based problem-based learning through lesson study ecosystems and environmental conservation theme. The results of the expert appraisal to get a score of 3.9 which is included in the category feasible.

Students worksheet considered to have a function in the learning process. Prastowo [5] revealed that students worksheet has four functions, namely; First, students worksheet as teaching materials that can minimize the role of educator, but more make active students. Second, students worksheet as teaching materials that facilitate learners to understand the given a lesson. Third, students worksheet as teaching materials concise and rich task to rehearse. and, fourth, students worksheet given facilitate the implementation of the teaching to the learner.

Students worksheet to be developed is based students worksheet problem based learning. Based on the opinion of Syafii and Ruhizan [6] that the application of learning models of problem based learning in a teaching materials can actually enhance your troubleshooting skills, achievements of learners and learning products of learners. Based on research Sungur [7] the effect of problem-based learning students academic achievement and performance skills in a unit on the human excretory system was investigated. Students in the experimental group appeared to be more proficient in the use and organisation of relevant information, in constructing knowledge and moving toward better conclusions. According to Ram, et al [8], Problem-based learning (PBL) is a constructivist pedagogy in which students learn in small groups by working on real-world problems.

2. Method Development
The research is a development research using Plomp model. This development model consists of three stages of development is investigation phase (preliminary research), phase of development and manufacture of prototypes (development or prototype), and the phases of assessment (assessment). The evaluation method used in the study as proposed by Tressmer, 1993 in Plomp [9], self-evaluation or screening, expert review, one to one evaluation, and small group evaluation. The evaluation method to expert review.

Subject tests on validity problem based learning worksheet are 3 expert to review students worksheet be developed. The instruments used in data collection that includes pieces of observation/interviews, instrument self-evaluation, instruments validity. Data validity processed using the following equation:

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\text{Value} = \frac{\text{obtained scores}}{\text{maximum score}} \times 100\%
\]  

(1)

Based on the values obtained, the set of criteria validity as seen in Table 1.

| Value (%) | Category of Validity |
|-----------|----------------------|
| 0-20      | Invalid              |
| 21-40     | ValidLess            |
| 41-60     | Enough Valid         |
| 61-80     | Valid                |
| 81-100    | Very Valid           |

Table 1. Categories Validity Students Worksheet.

Modification from [10]
3. Results and Discussion

3.1. Initial Investigation Stage (Preliminary Research).

According to interviews with three science teachers, data showed that the main teaching materials used by teachers is a book teachers and students from Kemendikbud book, where students use the book as a handle in the learning process. According to the teachers of all the activities and the learning process is already contained in a book teacher and student books. According to teachers, an activity sheet on a student book contains activities that are less clear so that students feel confused to do what must be done for example on the activity sheet activity 7.1. where an activity sheet contains commands that confuse learners like to investigate the attachment of ear, ability unify the tongue and the type of thumb that family members can not be seen through photos. In addition, the presentation is not based on one model of learning that is recommended in the curriculum in 2013, it caused not optimal learning process is carried out, so that many learners who looked passive in learning.

Based on an analysis conducted by researchers student worksheets result that there are some weaknesses in an activity sheet that is used. The first, Student worksheet learners are prepared immediately drove learners conduct an investigation without preceded by directing learners to a problem or to provide stimulation to the learners. Second, students worksheet only provide field investigations without providing command perform data analysis and draw their own conclusions, Third, student worksheet not provide images of concrete, some pieces of the activities there are no pictures, it should be at the genetic material and biotechnology worksheet should display an image corresponding to the material as a stimulus for students to be able to provide motivation and real-life examples that can be seen by learners.

Analysis curriculum focused on core competencies and the basic competency that has been set in the content standards for teaching science. The results are used as a basis for formulating indicators and learning objectives and concepts necessary in the learning activities

3.2. Prototype Development Phase.

The prototype was developed based on aspects of the construct, the feasibility of the content, language and technical.

Construct aspect, student worksheet based learners problem based learning developed which contains five major components based learning problem-based learning models. 1) Orientation of Students in problems, 2) Organizing students to learn, 3) Research guiding individuals and groups, 4) Developing and presenting the works, 5) Analyze and evaluate the problem solving process.

Aspects of content feasibility, Development student worksheet refers to the curriculum tailored to core competencies and the basic competency that has been set in the content standards for teaching science. The results are used as a basis for formulating indicators and learning objectives and concepts necessary in the learning activities

Aspects of language. The language used in the manufacture student worksheet is Indonesian accordance with the correct spelling. Sentences are prepared form sentences straight forward and clear so that it can be easily understood by students. The language used in students worksheet also adjusted to the level of junior high school language 9th.

Technical aspects. Cover students worksheet created by using Microsoft Office Publisher 2007. On the cover students worksheet, the combination of the colors used are blue and white. On the cover contains the title, base development, author and image products of biotechnology and form outcrossing plant species. The write colour on the identity students worksheet use white colour for more contrast with the background of the cover, the author's identity. The write used is Bernard MT Condensed with writings size is 14-22.
The formative evaluation for Self evaluation. The results of self evaluation are known to be found typing errors and various other errors like the images have no information sources as well as the latin name that is not italic.

3.2.1. Validity Students Worksheet. Students worksheet validation results of the experts can be seen in Table 2 below.

| No. | Aspect Validated       | Average value (%) | Category         |
|-----|------------------------|-------------------|-----------------|
| 1.  | Construct              | 83.0              | Very Valid      |
| 2.  | Feasibility of contents| 80.8              | Valid           |
| 3.  | Technical              | 75.0              | Valid           |
| 4.  | Language               | 81.6              | Very Valid      |
|     | Average                | 80.1              | Valid           |

Based on assessment from construct aspect obtained students worksheet valid. Category valid obtained from expert judgment students worksheet developed due to present indicators and clear learning objectives. The activities in students worksheet integrated using PBL learning model. Learning activities on students worksheet consists of phase to orient students on the problem by displaying a phenomenon problem that has been adapted to the topic material. According [4] the problems presented by causing curiosity of learners. This curiosity will motivate students to learn and to apply knowledge so that students are able to explain the problem. The next phase is to organize students to learn by giving directions or instructions for students to learn in groups. Problems that appear demanding learners to be able to look for solutions to problems by working together. Based on according [11] problem-based learning is an educational approach that challenges students to work together in groups to find solutions to real-world problems and to develop skills to become independent learners.

The next phase of problem based learning is to guide individual and group investigation. In this section presents the activities of learners students worksheet write temporary answer to the problem or phenomenon is presented, as well as directing students to conduct experiments and investigations to be conducted. Based on according [12] activities to formulate the problem to develop scientific thinking and develop creativity in solving problems.

The next activity there are phases develop and present work, by directing learners write the results and the command to answer some questions relating to the results of observations made learners. The next activity there are phases of analyzing and evaluating the process of solving the problem by asking the students to make conclusions from the activities carried out. According [13] drew the conclusion that the activities can develop the ability to think systematically, to express an opinion with clear and concise, and to develop good language skills and correct.

Students worksheet also has a very valid category on the feasibility aspect of the content. Category valid given by experts because separated indicators based competence base, learning objectives are also described based on indicators that have been made. Students worksheets contains a list of questions related to the concept of matter. The list of questions on the phases develop and present the works adapted to the learning objectives to be achieved learners. In comparison to traditional engineering curriculum, the PBL models appear to inspire a higher degree of involvement in study activities and, consequently, a higher level of complex comprehension [14]. A possible drawback is the risk of gaps in specific knowledge areas. Therefore, it is crucial that the students in a PBL curriculum become lifelong learners who have learned to take responsibility for their own learning process.

Category very valid given the contents of the feasibility aspect is also based on the activities of the students worksheet has direct experience of the learners. Based on research Etherington [15] obtained that, The PBL course had a positive impact on the pre-service teachers’ motivation to teach science ideas within a real world context. Activity on students worksheet provide opportunities for learners to
carry out activities with the activities of this invention so that learners actively in the learning process. Students worksheet activities also help develop social communication skills of learners. Students worksheets also gives learners the opportunity to ask questions. And then, in students worksheets also displayed a picture that can support material.

The next aspect is the technical aspects of obtaining a valid category of experts. Valid category of experts review because students worksheet own images and text on the cover that already reflect the content. Pictures on students worksheet also can convey the message effectively, captions are in accordance with the image presented on students worksheet. Then, the combination of colors used in students worksheet is sufficient contrast and sharp and does not disturb the focus of learners when reading students worksheet, color images can also foster the attractiveness for learners. The type and size of the letters used is also appropriate.

The next aspect that received very valid category that language. Students worksheet considered to be valid in terms of the language by experts because students worksheet designed using the rules of Indonesian true even though in some parts there are errors where there is use of punctuation less precise. The language used is adapted to the language level of ninth grade junior high school children so that students easily understand the content students worksheet.

4. Conclusion
Based on explained results and discussion able to concluded the results of the validation expert on student worksheet developed get valid result. The validation based on aspects of the construct, the feasibility of the content, language and technical.

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