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Validity of student's worksheets based on project based learning assisted tracker application

Susri Lismidarni* and Yohandri

Physics Department, Faculty of Mathematics and Natural Sciences, Universitas Negeri Padang, Jl.Prof Hamka, Padang 25131, Indonesia

*susrilismidarni@gmail.com

Abstract. This research was motivated by demands of the curriculum 2013 which states that learning physics should ideally be presented by presenting facts, objects, or the phenomenon of physics directly to students. For this reason, it was necessary to develop an innovation in the form of developing learning models, learning resources and learning media that are in accordance with demands of the curriculum 2013, including learning resources in the form easily understood LKPD and can help students to learn independently, project based learning with a scientific approach to improve student's skills and tracker applications are the use of technological development so that students could be internationally competitive. The purpose of this study was to validity of student's worksheets based on project based learning model assisted tracker application with valid criteria. This type of research is development research using plomp model with stage preliminary research, development or prototyping phase, and assesment phase (semisummative evaluation). The result of the analysis of students need a LKPD as a learning resource and a project based learning model as a learning model and technology utilization with a tracker application. The result of the development stage was produced by a valid LKPD with a criteria ($\geq 0,6$) and used in the implementation stage.

1. Introduction

Physics learning ideally presented by presenting the facts, objects, and phenomenon of physics it self directly to students. Physics learning should be able to take advantage of current and increasingly advanced technology. The result of the initial analysis for performance analysis regarding teacher identification are in curriculum 2013 listed in KI-2 as the competence of students attitude for independence aspects of educators skill having deeper orientation to providing knowledge. In the aspect of needs the media, and learning resource used by educators in learning are not in according with the standard set in the curriculum 2013. Learning that still teacher centered does not encourage students to build up their initial knowledge and learners are less active in learning so that it is difficult and boring to assume physical learning. This also becomes a low factor in student learning outcomes and activities in learning. One the models predicted to able to overcome this is the *project based learning models*. *Project Based Learning* are models that have the potential to increase student learning activities and motivations because they have characteristics that help students design procecess to detemine results train students responsibly in managing information carried out on a project and students produce a real product the results of student themselves were then presented in front of the class[1].

The design of the curriculum 2013 learning system states that *project based learning* is a model that is used as a suggestion for students to acquire a new set of knowledge of learning skilll through a series



of activities designed to plan and produce certain product. One advantage of the *project based learning* models is that it's excellent models for developing the basic skill that students must possess including thinking skill, decision making skill, creativity skills, problem solving skills well as being seen to be effective in developing student's self confidence and self management. With starts with a problem to answer a problem or answer a question identified by working on a project. This aims to understand the concept and principal related to the material and problems that will be solved by students.

The problem is sometimes there is a phenomenon that can be seen easily by student's in the real world but cannot be easily analyzed by students. Therefore a new breakthrough is needed in learning how to develop LKPD using a learning model that facilitates students to investigate the phenomenon by utilizing technological one of which is tracker video analysis application. This application was developed by open sources physics using a Java framework simple tracker has the ability to track the motion of an object so that the information needed can be analyzed. In learning activities students are trained to use mobile phone to record physical events move recordings with the tracker software and analyze further[2].

As for convenience and superiority of the tracker software to explain the pattern of relationships between physics and determined the value of physical quantities. The advantages of the tracker software include providing a lot of representation of experimental data [3] capable of capturing videos of life events, and analyzing them easily [4] helping to understand principal and natural the physical more attractive[5]. Physics teacher who use this software certainly feel the easy and superiority of the software to analyze video movement of object.

Based on the description above the *project based learning* models is estimated to able alternative in physics learning that can develop student's sciences process skill and it is expected the student learning outcomes will be better. The research wants to validity of student's worksheets based on *project based learning* assisted *tracker* application the fulfilling valid criteria.

2. Method

Research carried out in development research used to produce certain products and test the effective of these product[6]. Development of research design plomp that will steps of development to carried out *preliminary research, development or prototyping phase, and assesment phase (semisummative evaluation)*. The starting point of development research is the identification of educational problems obtained through previous research information. The evaluation design analysis and revision activities are repeated until the balance between goals and realization is achieved.

Data collection techniques conducted in this study were interviews (questionnaires), questionnaires, observations and a combination of the three. While the scale used is the Likert scale. Scale of assessment criteria questionnaire items as in Table 1. While the stages of data collection in this study, in detail are shown in Table 2.

Table 1. Criteria for Assessment Questionnaire

Answer	Value
If in one indicator meets 3 references	4
If in one indicator meets 2 references	3
If in one indicator meets 1 references	2
If there is no reference in one indicator	1

Table 2. Stages of data collection

Activity	Data collection technique	Respondents
Preliminary Research (Needs Analysis)	The selection of the type of teaching material is the Student Worksheet	Research team
Expert validation	Angket media feasibility (To find out the feasibility of the product according to media experts and material experts	Media experts and material experts

Limited Trial

User response questionnaire (To find out the initial response of the student's assessment of the product)

3. Results and Discussion

The validation that will be measured in this research is the validity content, construct, language and graphics. This validity aims to measure the validity of the LKPD develop. LKPD is declared valid if the results of the experts' validation sheet state that the content and format in the LKPD related to each other and the language used is in accordance with EYD. Validity test is carried out by several experienced experts to assess the weakness and strengths of LKPD that are developed. Validation also refers to togetherness and the usefulness of conclusions. Conclusions made based on the instrument score the higher the validity of LKPD, the better conclusions drawn and the better the level of meaningfulness and usefulness. LKPD is said to be valid if it really measures something that is to be measured. The summary of the validation values of all for each component of validation concluded that LKPD based on *project based learning* assisted *tracker* application with the scientific approach is presented in Table 3.

Table 3. Data from validation by media experts

Aspect	Presentation	Category
Content Aspects	0.75	Valid
Construction Aspects	0.81	Valid
Language Aspects	0.76	Valid
Graphic Aspects	0.82	Valid

Based on the results of the validation that has been done, it can be concluded that LKPD based on project based learning assisted tracker application with the scientific approach is in the valid category. This is evidenced by the value of each aspect at a value $\geq 0,6$.

4. Conclusion

Based on the results of research and development carried out starting from the analysis phase, design stage, development stage, implementation stage, and evaluation stage obtained Student Worksheet (LKPD) based on project based learning assisted tracker application is valid.

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