Validity of student worksheets based on inquiry based learning models assisted by tracker application

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Validity of student worksheets based on inquiry based learning models assisted by tracker application

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Abstract. This study aims to determine the validation of student worksheets based on inquiry based learning models assisted by tracker application on momentum and impulse material of high school physics learning. This research method uses research and development with a model Plomp. A data collection instrument using a validity sheet previously validated bay three validators. The results of the validation analysis sheet show worksheet based on inquiry based learning models assisted by tracker application developed with a valid criteria.

1. Introduction

Physics is one of the subjects that plays an important role in the advancement of science and technology. The physics learning process is expected to be in accordance with the demands of the 2013 curriculum. However, the reality in the field revealed that there are some schools that are still not in accordance with the expectations and efforts of the government in improving the quality of education. In accordance with observations that have been made at MAN 2 Padang, where observations were made by distributing questionnaires to two physics teachers and students of class X MIA2. The results of the preliminary analysis show that the teaching materials used in the learning process still use teaching materials from the publisher, not yet developed by the teacher. The LKPD from the publisher used also does not yet have a complete component. The use of LKPD is also only for material that is easy to analyze because of the limitations of tools and media. Teachers still often apply teacher centers on the grounds that physics materials are difficult to learn independently by students and many need to be explained. In this method the teacher dominates the process of transferring knowledge by acting as a giver of information and students as recipients of information and students are directed to the ability to memorize information. Next, the students stated that the LKPD from the publisher used in the learning process was less interesting. Students have not been given a media that supports the explanation of physics material by the teacher.

While the results of the analysis of students, students have difficulty in understanding physics material during the learning process in the classroom. Difficulties are also caused by students not understanding the LKPD from the publisher and the LKPD used by students who have not been able to help find concepts from the material being studied. Students also find it difficult to develop concepts independently based on their experience to find problem solving on issues or problems faced. This happens because the learning process has not utilized the surrounding environment as a learning object. Learners more easily understand the concepts of physics material from the process and results of the

practicum carried out by the students themselves. Students are very excited to be directly involved in the investigation process. In processing data using the application.

Based on the problems that have been stated previously there have been several solutions that have been carried out by previous researchers, including [1] investigating the development of e-modules based on group investigation assisted by tracker applications. Researcher's development still has some limitations, not all students can bring laptops so that when they understand the material descriptions students cannot learn with their own style and must follow the ways of group friends, time is limited enough to understand the concept because of the limitations of the laptop used.

Besides that, there is no LKPD that can help students to carry out learning activities using tracker. The use of LKPD is very important to improve student competencies during the learning process. The learning process will be carried out well if the LKPD is accompanied by the appropriate learning model. One learning model that can be used to motivate learning, activeness of students and be directly involved in the learning process is an inquiry-based learning (IBL) model. IBL is a series of learning activities that involve maximally all the ability of students to search and investigate problems in a systematic, critical, logical and analytical manner so that they can formulate their own findings with self-confidence. Some advantages of IBL are: IBL is flexible and open so it is easy to implement [2], can improve understanding, process skills and attitudes of students because it is directly involved in conducting experiments [3] encouraging students to learn science , finding their own concepts from the material to be studied [4] and developing students' abilities in complex environments, especially in developing technology [5]. From some of the advantages of the IBL, IBL-based LKPD can be applied in the learning process.

In the learning process, especially physics, there are several concepts that are difficult to visualize in real terms, one of them is Momentum and Impulse material. In this material there is an explanation of phenomena that exist only in ideal conditions. So that students will not encounter cases in accordance with this material in their daily lives. To make it easier for students to understand the material, an application is needed that can help students understand. One application that can help students is the tracker application. The tracker application is a freeware application that has several advantages such as providing a simple and easy way to understand the process of moving objects [6] being able to capture videos of a life event and analyze it easily [7], helping to understand the principles and phenomena nature more deeply and make physics more interesting [8].

Based on the problems that have been described, it is necessary to develop an inquiry-based learning LKPD (IBL) assisted by tracker applications to overcome the impact of problems in the field. The purpose of this study is to produce an inquiry-based learning (IBL) LKPD assisted by a tracker application with a valid criteria.

2. Methods

This type of research is R & D using the Plomp model which consists of the preliminary research, development or prototyping phase and assessment phase. The data of this study are data validity. This instrument is in the form of a validity sheet. The validity sheet is used to determine the validity or failure of the developed LKPD. This validity sheet uses a questionnaire in the form of a list of questions. The validation sheet is filled by the lecturer / expert. The validation sheet contains indicators which include substance substance, contract substance, language substance and graphic substance. From the validator's assessment, the researcher will obtain input and obtain the level of inquiry based learning LKPD validity (IBL) assisted by the tracker application.

Product evaluation based on the questionnaire filled in by experts was analyzed to determine the level of validity of the products developed. Data collected from this study is the result of inquiry-based learning (IBL) LKPD validation assisted by tracker application. Product validation techniques use the Likert scale 1-4, with provisions such as Table 1.

Table 1. Scoring Using a Likert Scale

Percentage	Category	Scores Achievement Indicators
1	Strongly Disagree (STS)	0 – 25
2	Disagree (TS)	26 – 50
3	Agree (S)	51 – 75
4	Strongly agree (SS)	76 – 100

Validator assessment of each statement was analyzed using the Aiken's V formula is:

$$V = \frac{\sum s}{[n(c-1)} \quad (1)$$

Information :

s = r – lo
lo = The lowest validity score (in this case = 1)
c = The highest validity score (in this case = 4)
r = The number given by the validator

For the category of indicators achievement based on the final values are in Table 2.

Table 2. Category Validity

Category	**Interval**
≥0,61	Valid
<0,61	Invalid

(modified from Azwar, 2015)

3. Results and Discussion

3.1. Results

Validation was carried out by experts using a validation sheet for the developed LKPD. The validation sheet is filled by three lecturers. Before validating the LKPD, an assessment of the instrument will be used to validate the LKPD. Appraisal of instruments using a validation sheet consists of instruments of validity and practicality. Appraisal of instruments using a validation sheet which includes indicators of clarity in filling out the validation sheet, statements according to indicators, objectives, not meaningful, simple and easy to understand assessment format and language used in accordance with the rules of Indonesian language that are good and correct.

Based on the results from the validation instrument, the validity test of the LKPD can be carried out, while the validity is carried out on four components consisting of content feasibility, presentation feasibility, language feasibility and graphic feasibility. The validity of expert validators for each component of the LKPD validation can be seen in Table 3.

Table 3. Value of LKPD Validity from Validator

No	**Aspect**	**Value V**	**Criteria**
1.	LKPD Component	0,81	Valid
2.	Content Feasibility	0,93	Valid
3.	LKPD Construction	0,74	Valid
4.	LKPD language	0,84	Valid
5.	Integrity of LKPD	0,91	Valid
	Average	**0,85**	**Valid**

Based on Table 3, it can be stated that the developed LKPD is in the valid category with an average value of 0.85, where in the aspects of the contents, constructs, languages, and graphics, the value of V is greater than 0.6. In general, LKPDs are in valid criteria. Several revisions were made to the LKPD in

accordance with the validator's suggestions. Suggestions for improvement of LKPD by expert teams can be seen in Table 4.

Table 4. Suggestions for LKPDs from Validators

No	Validator	Suggestions for Repair
1.	Validator 1	a. Pay attention to the referenced LKPD structure b. Addition of measurement objects in the LKPD
2.	Validator 2	a. Pay attention to activities in each phase of the model
3.	Validator 3	a. Pay attention to conjunctions and grammatical suitability b. Repairing the LKPD cover to make it more attractive

3.2. Discussion

The purpose of the development stage is to produce LKPD with valid criteria. Before conducting development, the LKPD that has been designed must be validated first. States that the purpose of validation is to obtain recognition and validation of the suitability of the device with needs so that it is appropriate and suitable for use in learning [9]. The developed LKPD will be validated by experts who will provide an assessment of the instrument and LKPD. The design of the LKPD consists of the composition of the LKPD in accordance with the principles of its preparation, conformity with the constituent components, work steps that are in accordance with the model of inquiry-based learning assisted tracker application. This is in accordance with the opinion that valid devices contain conformity between each component [10]. The validity of the LKPD is conducted by three Postgraduate Physics lecturers from UNP. In line with the opinion of states that product validity can be done by several employees or experienced experts to assess the weaknesses or strengths of the products produced [11]. Test the validity of the LKPD to assess aspects of content feasibility, construction feasibility, language feasibility and graphic feasibility. The results of validity are processed using Aiken's formula according to[12]. The results of the LKPD validity given by the experts amounted to 0.85 with a valid category. This is in accordance with research stating that LKPD developed with the project based learning model utilizing the tracker application is in the valid category [13].

4. Conclusion

Inquiry-based learning assisted LKPD tracker application has valid criteria. The validity of the LKPD is contained in terms of content, construction, graphics and language use.

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