Validity of student worksheet oriented on POE model assisted digital practicum tool

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Abstract. This study is motivated by the media, learning resources and learning models in schools are still not in accordance with the 2013 curriculum standard. One of the learning models that match the 2013 curriculum suggestion is the POE model (Prediction, Observation, Explanation). Therefore, in this study is to develop qualified Student Worksheet based on POE model supported by digital practicum tool. LKPD is a sheet that contains the task as a guide activity for all aspects of learning that aims to maximize the understanding of learning materials. LKPD is said to be qualified if it has validity criteria. The validity of LKPD is assessed by experts or professionals in their field. The purpose of this research is to know the validity of LKPD oriented model POE assisted by digital practice tool. This type of research is a development study using the ADDIE model, where validity is at the development stage. The research instrument used is questionnaire validation sheet. Data analysis used is descriptive analysis. The result of validity is obtained by LKPD oriented POE model which is assisted by digital practice tools with validity criterion with an average score of 0.86.

1. Introduction
Various educational system developments have been undertaken by governments in the process of achieving educational goals. One of them is the improvement of Curriculum KTSP into Curriculum 2013. Curriculum 2013 emphasizes on the learning that activate learners, develop students' thinking ability, creativity and independence of learners to achieve the three expected competencies, that is knowledge, attitude and skill by using scientific approach or approach scientific. According to Kemendikbud 2013 [1], scientific approach or scientific approach in learning Curriculum 2013 includes 5M (i.e. observing, questioning, associating, experimenting, and communicating).

One of the subjects that can develop thinking ability is the subject of physics. Physics subjects can develop the ability to think systematically. Physics learning process is more emphasis on conceptualization and mastery of knowledge and skills. Effective Physics Learning to achieve all competencies simultaneously, ie to train theories to apply to real problems (cognitive), to train the planning activities independently (affective), and to train the use of certain instruments (psychomotor) is a practicum activity. There are several model and learning material that can be applied for effective physics learning such as interactive learning material [2] and game for learning [3].

Reality in the field, based on the assessment of the learning outcome of the midterm examination of students of class XI MIA 4 in SMA N 1 Padang Lesson Year 2017/2018 there is a mismatch of expectations with what happened at school. Competence of learners can be seen in Table 1.
Table 1. Competence of Student Class XI MIA 4 SMA N 1 Padang

| Competency | Average Value |
|------------|---------------|
| Attitude   | 94.53         |
| Knowledge  | 70.02         |
| Skills     | 76.45         |

Based on Table 1 it can be seen that the competence of learners knowledge is lower than the competence of skill and skill competence is lower than the attitude competence.

Based on the results of needs analysis conducted in SMA N 1 Padang, on the performance analysis obtained 85.42% of teachers have prepared the learning tool well, 69.44% of teachers have used the learning model in accordance with Curriculum 2013, 54.16% of teachers using media and learning resources in accordance with the Curriculum 2013 and 88.88% of the school environment support the convenience of the learning process. From the analysis results obtained, the media and learning resources used by teachers and learning models used are still not in accordance with government standards in the Curriculum 2013.

Learning resources used are Student Work Sheets (LKPD) that made by the teacher. From the aspect of the content not seen KI, KD, Indicator, and the deepening of the material has not complied with the expected LKPD standard that contains the title, identity in the form of KI, KD, indicator, learning objectives, supporting information, material exposure, tasks, problem solving steps and assessment. In Permendikbud 21 Year 2016 [4] learning materials are recommended to contain knowledge of facts, concepts, principles and procedures. But it shows that there is no material presented by the teacher, but directly to the practice manual. The workings contained in the practice manual in LKPD directly in the form of commands to be performed by learners. This is not in line with the expected achievements in the Curriculum 2013, which gives birth to independent and creative learners.

LKPD is a teaching material designed in such a way and is expected learners can find a concept independently. To be able to develop a good LKPD, educators must be careful and have adequate knowledge and skills [5]. Because an LKPD must meet at least criteria related to the achievement of basic competencies that must be mastered by learners. This means an LKPD will be meaningful if learners are easy to use and can improve competency achievement.

In addition to LKPD, according to Permendikbud 22 Year 2016 [6] on process docking, core activities in the learning process must use learning models, learning methods and learning resources tailored to the characteristics of learners and subjects. The learning process in the 2013 curriculum should apply a scientific approach consisting of observing, questioning, trying / gathering information, reasoning and communicating. One of the recommended learning models is the discovery model. The sequence of discovery learning process model is (1) Teacher propose problem and learners predict why problem happened (2) Learners solve problem, learners can solve problem based on observation about what happened 3) The new concept is described, providing an explanation of the conformity between what is predicted and what happens [7].

One of the learning models that has the same steps as the sequence of discovery models is the POE learning model (Prediction, Observation, Explanation). The learning of this model uses the three main steps of the scientific method: (1) prediction or prediction, making allegations to a Physics event; (2) observation, ie doing research, observing what happened; (3) explanation is to provide an explanation, especially explanation of the suitability between allegations and what really happened [8]. In accordance with the 2013 Curriculum recommendation, these POE model learning steps are not out of steps of the learning process that apply a scientific approach. In addition, based on the sequence of steps, the POE model is a learning model to improve the knowledge, attitude and skills of learners.

Based on the background of the problems that have been described, the authors have developed LKPD which can improve the competence of learners through problem solving and practicum by
following technological progress and based on scientific steps. Therefore, the authors develop LKPD-oriented POE learning model on the dynamics of rotation material assisted digital practicum tool.

2. Methods
The type of research that will be conducted is research and development or Research and Development (R & D). The development is a process used to develop and validate educational products [8]. Research and Development [9] is defined as a deliberate, systematic, purposive / directed research method for finding, formulating, improving, developing, producing, testing the effectiveness of products, models, methods/services of certain procedures that are superior, new, effective, efficient, productive and meaningful. Furthermore, states "research and development methods are research methods used to produce a particular product and test the effectiveness of the product" [10]. So, R & D will produce a valid, practical, and effective product. R & D research begins with research activities to obtain information about the needs of users and in the implementation of product trials followed by development activities to produce products namely LKPD. In this development research, the product that will be developed is LKPD based on POE Learning Model using digital practicum tool on physics learning material of class XI rotational dynamics of Senior High School with valid criteria. Digital instrument very useful implemented in physics learning [11,12].

The development model used in this research is the ADDIE development model. This model stands for Analysis, Design, Development, Implementation and Evaluations [13]. This model consists of five phases or main stages according to its name, which is analyzing, designing, developing, implementing and evaluating. These five phases need to be done systematically. The technique of collecting data for validity test is a validity sheet for experts / experts to determine the validity of the product. The type of data in this study is primary data, ie data taken directly from the results of observation of questionnaires to learners. Assessment of products based on questionnaires that have been filled by experts analyzed to determine the extent of the validity of the products developed. Validity analysis using Likert Scale with steps:

a. Gives score for each item very good answer (4), good (3), enough (2), and less (1).

b. Sums up the total score of each validator for all indicators

c. Giving validity value using Aiken's V formula i.e.

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

\[ s = r - lo \]

\[ lo = \text{The lowest validity score (in this case = 1)} \]

\[ c = \text{The highest validity score (in this case = 4)} \]

\[ r = \text{The number given by the validator} \]

Category Of Validity Can Be Seen In Table 2 Below:

| No | V Value | Criteria |
|----|---------|----------|
| 1  | ≥ 0.6   | Valid    |
| 2  | < 0.6   | Invalid  |

3. Results and Discussion
Validation performed includes: content validation, construct validation and language validation. The validation of the content is valid by the validator because the developed learning device is in accordance with the material that should be presented. While the construct validation according to [15]
is to test the validity of the construction can be used expert opinion. So, in this study, validation assessments are emphasized on content validation, constructs and languages whose instruments are arranged in a list of ratings by validators designated. According to [16] an instrument is said to be valid if the instrument can be used to measure what should be measured.

LKPD, RPP and practicum tools that have been designed are tested for validity. Validation was done on 3 instruments namely LKPD, practicum and RPP by 3 lecturers from UNP and 2 physics teachers. Validation LKPD done by the validator YD, RA and ZK and 2 physics teachers namely ZS and SR. Validation results are described as follows:

3.1. Instrument validation

Before validating the product, validation of the instrument used to validate the product is developed. The result of instrument validation can be seen in Table 3.

| Instrument Validation | Value V | Category |
|------------------------|---------|----------|
| LKPD                   | 0.86    | Valid    |
| Practicum Tools        | 0.85    | Valid    |
| RPP                    | 0.98    | Valid    |

Based on Table 3 it can be stated that the instrument has been developed in a valid category, where the value of V is greater than 0.6. Thus this instrument can be used.

3.2. LKPD validation

LKPD validity test is performed after validation validity validation test. The instrument assessment uses a validation sheet that includes the following indicators: clarity of the validation of the validation sheet, the statements made in accordance with the indicator, the objectives to be achieved, do not contain multiple meanings, using simple and easily understood scoring formats, and the corresponding language with good and true EBI rules. Validation of learners' workbook-oriented POE Learning Model consists of four aspects: content aspect, construct of grammar and linguistic. The result of LKPD validation-oriented POE Learning Model can be seen in Table 4.

| No | Validation Components | The value of the Validator | Value |
|----|------------------------|----------------------------|-------|
|    |                        | Validator 1 | Validator 2 | Validator 3 |
| 1  | Contents               | 20          | 23          | 22         | 0.87     |
| 2  | Construct              | 24          | 21          | 23         | 0.93     |
| 3  | Channel                | 21          | 19          | 22         | 0.82     |
| 4  | Language               | 20          | 21          | 22         | 0.84     |
|    | Average                |             |             |             | 0.86     |

Based on Table 4 it is stated that the developed LKPD is a valid category, where in the content aspect, graphic and language constructs obtained a large V value of 0.6. LKPD validation results on the content feasibility aspects are in valid category with an average of 0.87, the construct aspect is in valid category with an average of 0.93 and the aspects of graffiti are in valid category with an average of 0.82 and the language aspect 0.84 is also in a valid category with the overall average LKPD declared valid because it obtains a value of ≥ 0.6. This is reinforced by the opinion [17] a product is said to be valid if each indicator is at ≥ 0.6 and not valid <0.6. Thus, LKPD can be used in the learning process.

3.3. Tool Validation
In validation of practicum tool of Conservation Law of Mechanical Energy on rolling object, validation is done on four aspect namely objective, technique of operation, accuracy of usage and working principle. The summation of validation values of all validators for each validation component of the Mechanical Energy Consistency Permit tool on rolling objects with digital displays is presented in Table 5.

### Table 5. Results of Validation of Mechanical Practicum Instruments of Energy Conservation of Mechanical on rolling objects With Digital Display

| No. | Validation Components | The value of the Validator | Value |
|-----|-----------------------|---------------------------|-------|
|     |                       | Validator 1 | Validator 2 | Validator 3 |     |
| 1   | The intended use      | 14          | 15          | 15          | 0.89 |
| 2   | Operating Technique   | 10          | 11          | 11          | 0.85 |
| 3   | Accuracy              | 9           | 10          | 11          | 0.78 |
| 4   | Work principle        | 8           | 7           | 7           | 0.89 |
|     | **Average**           |             |             |             | **0.85** |

Based on the validation results, it can be concluded that the mechanical energy conservation practicum instrument on rolling objects with digital displays is in valid category. This is evidenced by the value of each aspect is at the value of ≥ 0.6. So it can be concluded that LKPD-oriented POE learning model on rotational dynamics material and digital display practicum tool can be used and conducted real test in learning in school.

### 3.4. RPP validation result

The result of RPP validation by entering the POE learning model can be seen in Table 6.

### Table 6. RPP Validation Results

| No. | Validation Components  | The value of the Validator | Value |
|-----|------------------------|---------------------------|-------|
|     |                        | Validator 1 | Validator 2 | Validator 3 |     |
| 1   | Feasibility of Content | 81          | 78          | 73          | 0.98 |
| 2   | Construction           | 67          | 65          | 68          | 1.00 |
| 3   | Language               | 10          | 9           | 10          | 0.96 |
|     | **Average**            |             |             |             | **0.98** |

Based on Table 6. it can be stated that the RPP is designed in all three aspects ie content, construct and language aspects are in valid category. Therefore, this RPP can be used in the learning process.

Based on the validation result that has been done, it is found that the developed product included in the category is valid. However, there are some suggestions given by validators. The validators provide suggestions, advantages and disadvantages that are useful for formative evaluation and revision of LKPD.

### 4. Conclusion

LKPD validation results are in valid category, with an average of 0.84 overall LKPD declared valid because it gets value ≥ 0.6. This is reinforced by the opinion [14] a product is said to be valid if each indicator is at the value of ≥ 0.6 and invalid <0.6. Validation of practicum instrument Law of Conservation of Mechanical Energy on rolling object is in valid category with average 0.85 it can be concluded that this tool is suitable to be used in practice activity and also validation of RPP is in valid category with average 0.98 which means that this RPP is feasible for use in the learning process.

### References

[1] Kementrian Pendidikan dan Budaya. 2013. Pendekatan Saintifik. Jakarta: Depdiknas
[2] Tinedi V, Yohandri and Dijamas D., (2018). How Games are Designed to Increase Students' Motivation in Learning Physics? A Literature Review, IOP Conference Series: Materials
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Science and Engineering, Volume 335. https://doi.org/10.1088/1757-899X/335/1/012065
[3] Djamas, D., Tinedi, V., and Yohandri.. (2018). Development of Interactive Multimedia Learning Materials for Improving Critical Thinking Skills. International Journal of Information and Communication Technology Education (IJICTE), 14(4), 66-84. doi:10.4018/IJICTE.2018100105
[4] Permendikbud Nomor 21 Tahun 2016 tentang Standar Isi. 2016. Jakarta: Kementerian Pendidikan dan Kebudayaan
[5] Andi Prastowo. (2011). Panduan Kreatif Membuat Bahan Ajar Inovatif Menciptakan Metode Pembelajaran yang Menarik dan Menyenangkan. Jogjakarta: Diva Press.
[6] Permendikbud Nomor 22 Tahun 2016 tentang Standar Proses. 2016. Jakarta: Kementerian Pendidikan dan Kebudayaan
[7] Suparno, Paul. 2007. Metodologi Pembelajaran Fisika. Yogyakarta: Universitas Sanata Dharma.
[8] Setyosari, Punaji.2013.Metode Penelitian Pendidikan dan Pengembangan. Jakarta : Kencana
[9] Putra, Nusa.2012. Research & Development Penelitian dan Pengembangan : Suatu Pengantar. Jakarta : Rajawali Pers.
[10] Sugiyono. 2010. Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D. Bandung: Alfabeta.
[11] Yulkifli, Zurian Afandi and Yohandri. (2018). Development of Gravity Acceleration Measurement Using Simple Harmonic Motion Pendulum Method Based on Digital Technology and Photogate Sensor IOP Conf. Ser.: Mater. Sci. Eng. 335 , https://doi.org/10.1088/1757-899X/335/1/012064
[12] Yulkifli, Yohandri and Kurniati R.,. (2018). Development of digital viscometer based on sensor technology and microcontroller. J. Phys.: Conf. Ser. 1040 https://doi.org/10.1088/1742-6596/1040/1/012047
[13] A.Pribadi, Benny. 2010. Model Desain Sistem Pembelajaran. Jakarta: Dian Aksara.
[14] Azwar, Saifudin. 2015. Reliabilitas dan Validitas. Yogyakarta : Pustaka Belajar.
[15] Riduwan dan Sunarto. 2009. Pengantar Statistika untuk Penelitian : Pendidikan, Sosial, Komunikasi, Ekonomi, dan Bisnis. Bandung: Alfabeta.
[16] Sugiyono. 2011. Metode Penelitian Kuantitatif, Kualitatif dan R&D. Bandung: Alfabeta.