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Development LKPD Based on Problem Based Learning on Atomic Structure Material Phase E High School

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ABSTRACT

This development research has produced teaching materials in the form of LKPD LKPD Based on Problem Based Learning on Atomic Structure Material Phase E High School. The results of the development of teaching materials that have been designed are tested for validity and practicality to meet the requirements of an LKPD. This LKPD development research uses the R&D (Research and Development) method, namely research and development, with the 4-D model. This 4-D model has 4 stages, namely: (1) define, (2) design, (3) develop and (4) disseminate. This development stage is only carried out up to the develop stage. This study used instruments in the form of validation questionnaires consisting of content and construct validation questionnaires and practicality questionnaires. Validation was conducted by 5 validators, consisting of 3 chemistry lecturers from FMIPA UNP, and 2 chemistry teachers from SMAN 15 Padang. Practicality testing was conducted by 2 chemistry teachers of SMAN 15 Padang and Phase E students from SMAN 15 Padang. Testing of this LKPD will generate data that will be analyzed using Aiken's V formula. Based on the results of the analysis, it can be summarized that the resulting LKPD is a teaching material product that is categorized as valid based on the V value of 0.86. Practicality testing obtained data results in the form of NP values from teachers and students totaling 90% and 91%, which is categorized in the very practical category.

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1. Introduction

Learning is a step in education to provide opportunities for students to develop the talents and potential of students so that they become qualified individuals who are useful in living in society, nation and state [1][2]. Various efforts have been made by the government, to improve the quality of education such as changes in curriculum structure. The curriculum used now is the independent curriculum. The independent curriculum is a curriculum with various intracurricular learning so that students are more optimal and have concepts and strengthen their competencies [3]. The independent curriculum aims to realize an innovative and more student-centered learning process [4][5]. This is certainly inseparable from the role of the teacher.

A teacher certainly has his own strategy to plan the learning process to be more fun and certainly interesting, therefore a teacher must use media that can motivate and increase interest in learning. Learning media should be in line with the character and development of students [6][7]. Learning media is often used by educators to provide lessons is print media. In the learning process, print media is used in the form of modules, books, LKPD, handouts, and charta[8][9]. Print media often used in the learning process is LKPD.

LKPD is in the form of sheets containing tasks, where students are required to do the tasks listed on the LKPD and facilitate student and teacher communication in discussing scientific knowledge [10][11]. LKPD provides steps that must be followed by students to find concepts [12]. One of the learning models that helps students find concepts is the Problem Based Learning model.

Problem Based Learning is an active learning model where students are actively involved in the learning process through problem solving[13][14][15]. This is in line with the opinion that Problem Based Learning is student-centered learning, so it can encourage students to learn and work cooperatively to train critical thinking in finding solutions [16][17]. Therefore, this learning model can be used as a basis in developing LKPD. One of the suitable lessons using the Problem Based Learning model is chemistry learning because chemistry is very closely related to everyday life.

Chemistry learning is very important to learn because it covers all aspects of life in the environment[18][19]. Chemistry plays an important role in life because in human life every day cannot be separated from chemical substances. Chemistry learning is expected to be able to master the scientific process, scientific attitudes, concepts, principles, chemical theories and the application of chemistry in everyday life[20][21][22]. Chemistry subjects have their own difficulties in each material, the difficulty of the material can be used as a determination for development or research.

Based on observations at UNP Development High School, SMAN 12 Padang and SMAN 15 Padang, the same information was obtained that for the material of atomic structure students have difficulty in this material. This is evidenced in the distribution of student questionnaires found that in the sub-material development of atomic theory, 51% of students do not understand this material while 16% of students find it difficult to understand this material, in the sub-material of atomic constituent particles, 46% of students do not understand this material while 18% of students find it difficult to understand this material, and in the sub-material of electron configuration 52%.

The results of interviews with chemistry teachers at UNP Development High School, SMAN 12 Padang, and SMAN 15 Padang found that they have used learning models in the learning process, namely discovery learning and guided inquiry. It can be seen that the three schools have never used the Problem Based Learning learning model on atomic structure material. Teaching media that has been used in the form of LKPD which has not used the Problem Based Learning model in learning atomic structure.

Based on this description, the researcher is interested in making research on developing Problem Based Learning Based LKPD. It is hoped that this learning media can be useful reading material, provide insight, and attract students' interest. Through the title: "Development of Problem Based Learning based LKPD on Atomic Structure Material Phase E High School".

2. Experimental

The type of research conducted is Research and Development (R&D). The research and development method is a research method. Development research is a method or process that is useful for validating and developing products [23][24]. Development will be carried out in research, namely the development of teaching materials in the form of Problem Based Learning-based LKPD on Phase E Atomic Structure.

The research method used is the 4-D model which is divided into 4 stages, namely defining, designing, developing, and disseminating [25][26]. Define is the stage of defining and establishing the conditions required for learning development by adjusting it to the learning needs of students[27][28]. This Design stage is useful for designing learning tools or products that will be made. The Develop stage is expected to produce LKPD on atomic structure material based on Problem Based Learning which is valid and practical and can be useful in the learning process[29][30]. Disseminate is the last stage in the development procedure, this stage has the aim to show or advertise the products that have been produced at the development stage[31][32]. The Disseminate stage was not carried out in this research due to the lack of costs owned by researchers. The 4-D research procedure is limited to 3 stages of the Four-D Models as shown in Figure 1.

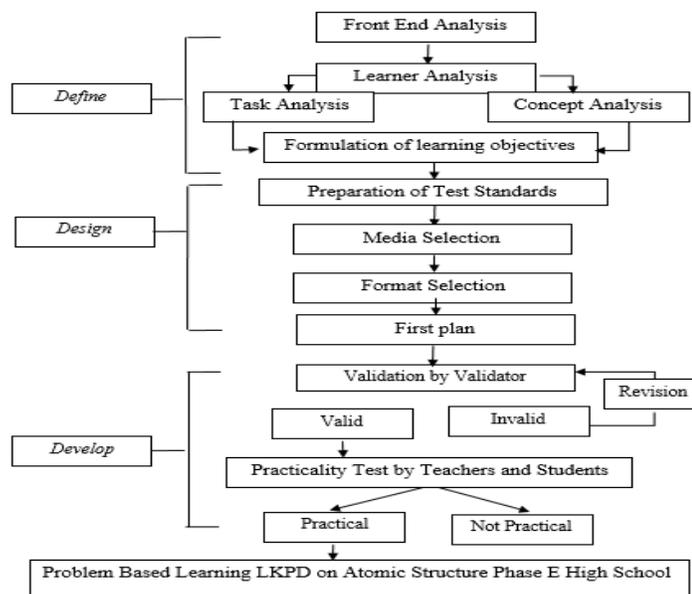


Figure. 1. Development For 4-D Models

The data collection technique of this research is divided into two, namely:

The first is the validation analysis, namely the validator is given a validation questionnaire then after the validator fills in the validation questionnaire, the validation questionnaire is analyzed using the Aiken'V formula [33][34]. The second is the analysis of practicality obtained from giving teacher response questionnaires and

learner response questionnaires which are analyzed using a formula that has been modified by Purwanto[35][36].

3. Results and Discussion

3.1 Validity

The validity of the LKPD was carried out by experts as validators followed by revision. The validation test was carried out in order to determine the validity of the Problem Based Learning-based LKPD teaching materials developed. validity assessment on teaching materials is carried out on four aspects which have components of content feasibility, language components, presentation components and graphic components[37]. The validity test was carried out using a validation sheet conducted by 5 validators, including 3 Chemistry lecturers FMIPA UNP and 2 chemistry teachers SMAN 15 Padang. The overall validation results can be seen in table 1.

Table 1.The Overall Validation

Aspects assessed	V	Category
Content Feasibility components	0.84	Valid
Language component	0.92	Valid
Presentation component	0.82	Valid
Graphic composition	0.86	Valid
Total	0.86	Valid

The validation value of Problem Based Learning based LKPD on atomic structure material for all components obtained a value of 0.86 with a valid category. The assessment obtained from the validation test results shows that the Problem Based Learning-based LKPD on atomic structure material that has been produced is said to be valid.

The results of the assessment on the feasibility component of the content after analysis using the Aiken'V formula obtained a result of 0.84 with a valid category. This shows that the LKPD developed is in accordance with the learning outcomes of the atomic structure, the LKPD is in accordance with the learning objectives (TP), the use of the learning model is in accordance with the material, the contents of the LKPD can add insight into the knowledge of students, the LKPD is in accordance with the exercises with the material in the LKPD. The LKPD developed is in accordance with the CP and TP in the independent curriculum.

The results of the Aiken'V analysis on the linguistic component of 0.92 are valid, meaning that the LKPD developed has used good sentences and so as not to cause confusion, the language used is easy to understand, and the instructions and information conveyed are clear.

The results of the Aiken'V analysis on the presentation component of 0.82 are valid, which means that the LKPD developed is in accordance with the learning objectives (TP), the order of presentation is based on the syntax of Problem Based Learning, illustrations of images and videos in accordance with the atomic structure material and LKPD contains the concepts of atomic structure material.

The results of the Aiken'V analysis on the presentation component of 0.86 are valid, which means that the LKPD developed by the type and size of the font used is correct and readable, the layout and appearance on the cover and between sections in the LKPD are interesting, the layout of the content in the LKPD is organized, the appearance of illustrations, images and graphics is appropriate, and the overall LKPD design is attractive.

3.2. Practicality

LKPD that have been revised in accordance with improvements and suggestions from validators are carried out practicality tests to determine the level of practicality of LKPDs. The practicality of LKPD is related to the ease of using LKPD. The developed LKPD must fulfill the practicality aspect. The practicality test was conducted by 2 chemistry teachers of SMAN 15 Padang and 10 students of Phase E of SMAN 15 Padang against the LKPD that had been developed. The practicality test that has been obtained is then analyzed using the percentage of practicality. The results of the practicality test of teachers and students are as follows.

Table 2.Practicality of the teachers response

Aspects assessed	NP	Category
Ease of Use	93%	Very practical
Learning Time Efficiency	90%	Very practical
benefits	90%	Very practical
Total	91%	Very practical

Table 3.Practicality of the student response

Aspects assessed	NP	Category
Ease of Use	90%	Very practical
Learning Time Efficiency	90%	Very practical
benefits	91%	Very practical
Total	90%	Very practical

Based on tables 2 and 3, the results of teacher practicality obtained 91% with a very practical category and the practicality of students obtained 90% with a very practical category. The assessment obtained from the practicality test results shows that the Problem Based Learning-based LKPD on atomic structure material that has been produced is said to be very practical.

The results of practicality based on teacher assessment on the aspect of ease of Problem Based Learning LKPD on atomic structure material have a value of 93% with a very practical category and the results of the assessment of students obtained 90% with a very practical category. meaning that the LKPD developed is in accordance with the material presented clearly and simply, the instructions for using the LKPD can be understood, the questions presented are clear, the commands written on the LKPD are clear, overall the LKPD is easy to understand and the language used is easy to understand, the LKPD has a practical size to carry.

The results of practicality based on teacher assessment on the aspect of Learning Time Efficiency of Problem Based Learning LKPD on atomic structure material have a value of 90% with a very practical category and the results of student assessment obtained 90% with a very practical category.

The results of practicality based on teacher assessment on the aspect of the benefits of Problem Based Learning LKPD on atomic structure material have a value of 90% with a very practical category and the results of student assessment obtained 91% with a very practical category, meaning that LKPD helps students in understanding and applying concepts, LKPD helps students understand and apply the concept of problem-based learning.

4. Conclusion

The results of research and development conducted by the author have resulted in the development of Problem Based Learning-based LKPD on the material of atomic structure phase E SMA using the 4-D development model. This LKPD has been validated which has an average V value of 0.86 with a valid category and has been practiced with a teacher's practicality value obtained 91% very practical category and the practicality value of students obtained 90% very practical category.

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