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Validity of Students Worksheet Using Creative Problem Based Learning Model In Physics Learning On Senior High School

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***Abstract*—The creative thinking ability of students in high school physics learning is still low. One of the contributing factors is the used of student worksheets in school has not included steps in the learning model that improve the creative thinking abilities of students. This study aims to produce a student worksheet using creative problem-based learning model in high school physics learning that is valid. This type of research is research and development. The research instruments included validity questionnaires. Data analysis techniques for validity used the Aiken's V formula. The result shows student worksheets is in valid criteria. Thus, it can be concluded that student worksheets using creative problem-based learning model in high school physics learning meets valid criteria.**

Keywords - Validity, Students worksheet, CPBL, creativity.

I. INTRODUCTION

The ability to think creatively is the highest level of high-order thinking skills or High Order Thinking Skills (HOTS). The ability to think creatively is also required in science, especially in physics. In the 2013 curriculum, it is explained that the results of the competence of attitudes, knowledge and skills are the creation of productive, innovative, affective, and creative students [1]. The 2013 curriculum applies student-centered learning using a scientific approach. The purpose of applying the scientific approach is so that students can actively construct concepts, principles, and laws found through scientific steps [2]. These steps are observing, asking, trying, reasoning, and communicating [3]. Through these steps students are able to teach themselves actively.

Physics as a science that studies natural phenomena requires students to be able to find concepts through a scientific process. The scientific process can be in the form of exploration, experimentation, and problem solving activities. Exploration is an activity carried out by students to find concepts related to basic competencies according to the syllabus. Experiments are practical activities in the laboratory to prove the truth of the concept [4]. Both of these activities can be carried out independently by students by applying scientific thinking skills.

The teacher's role is as a facilitator, motivator, and a source of learning [4]. Teachers are expected to be able to provide information needed by students in learning such as books, modules, worksheets, and so on. These resources can be designed by the teacher himself according to the appropriate criteria according to the curriculum or obtained from certain authorized distributors. The goal, of course, is to support classroom learning so that students are able to fulfill all competencies with good learning outcomes.

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Reality on the ground is not as expected. Student learning outcomes are still low. This can be seen from the results of the Middle Semester Examination (UTS) for 11 grade in the 2018/2019 academic year SMA N 1 Padang. The average score of UTS class XI MIA 6 was 45.1; class XI MIA 7, namely 51.5; and class XI MIA 8, namely 57.2. The Minimum Completeness Criteria (KKM) in the school is 80. This means that the three classes have not yet reached the KKM. This is of course a problem for the development of education in schools, so it is necessary to examine the causes of the low learning outcomes of these students.

The results of observations made on teachers and students in schools in the city of Padang indicate several problems which are the factors causing the low learning outcomes of students in schools. The results of observations from questionnaires distributed to teachers showed teacher performance related to teacher identification and completeness of facilities and infrastructure with an average of 74.2%, passing standards for achieving the competencies required in the 2013 curriculum with an average of 59.8%, difficulty analysis Learning related student worksheet and the model applied in learning with an average of 53.3%, and the analysis of the creativity of students covering the creative aspects of knowledge and skills with an average of 49.2%. Furthermore,

Student worksheet is one of the learning resources used in learning. Student worksheet are sheets that contain basic competencies (KD) from the material presented and contain guides to activities and tasks that will be carried out by students. These tasks can be in the form of theoretical tasks and practical tasks [5]. Theoretical assignments can be in the form of a collection of practice questions that must be completed by students, while practical assignments are in the form of practicum in the laboratory. The function of student worksheet is as an enrichment material for student learning outcomes to expand the material studied in class [6]. The preparation of student worksheet contains at least 8 components, namely: title, KD to be achieved, completion time, tools and materials, brief information, work steps, tasks that must be done, and reports that must be made [7].

The use of student worksheet as a learning resource has become commonplace. However, the student worksheet used did not meet the proper criteria according to the curriculum. Based on the results of interviews with SMA N 1 Padang teachers, it was found that the student worksheet used as a learning tool was not yet effective for use during practicum and question processing. The student worksheet is developed by teachers who teach without paying attention to the steps of the learning model applied in it. The student worksheet that was developed were the practicum student worksheet and the student worksheet a collection of practice questions. The student worksheet is arranged in the form of a sheet containing the procedure for implementing the practicum which is presented briefly and only contains the title, work steps, data tables, and questions that must be completed by students. The questions presented in it are only simple questions related to practicum that have been done by students. Literally, students have indeed carried out scientific activities through the practicum, it's just that student worksheet has not included the right model so that scientific activities have not been carried out optimally to meet competency attainments.

Based on the 2013 revised 2016 curriculum, there are four suggested learning models, one of which is the Problem Based Learning (PBL) model. PBL is a learning model with steps that guide students to find solutions to a problem independently. In principle, the main purpose of PBL is to motivate students and explore creative thinking skills in solving problems [8]. However, in practice, students are still not able to independently develop these abilities so that PBL is considered to still have weaknesses.

Applying creative elements in learning is an idea to maximize the results of applying the PBL model. There are 4 creative elements that are used as a guide in applying the model, namely fluency in providing answers to problems in the right way; flexibility in solving problems in various ways; the novelty of ideas, methods and language used in answering the problem; and elaboration skills, namely developing, detailing, and enriching a mathematical idea [9]. Basically, all these elements train students to improve creative thinking skills and be able to pose and solve problems. These creative elements are applied in the PBL model so that students are able to pose and solve problems with creative thinking skills. Furthermore, this model is called Creative Problem Based Learning (CPBL).

The creativity of students increases by applying the elements of creativity in learning based on the results of research [9]. This is in line with the opinion that the application of creative problem solving learning models can improve problem solving abilities [10]. In this study, it is stated that the model that puts forward the creative element has a significant effect on the problem-solving abilities of students. In addition, the application of the context-PBL model can improve the abilities of students in various aspects according to the results of the study [11]. So, the purpose of this study is to produce a student worksheet using a valid Creative Problem Based Learning model.

II. METHODS

The method used is Research and Development (R&D) with a 4D development model. The test subjects in this study were students of class XI SMA N 1 Padang. The research instrument was a creative thinking test sheet and a validation sheet. The creative thinking test is a test to determine the level of creative thinking skills of students. This test is a TTCT torent test which is centered on science so it is known as the Scientific Creativity Structure Model (SCSM). Each item on this test is used to measure indicators of creative thinking on students' thinking abilities using scoring techniques per each item [12]. After the results are obtained, the test results are categorized as in Table 2.

Table 2.Creative Thinking Test Analysis Categories [13]

Category	Interval%
Very Good (A)	90 <N ≤ 100
Good (B)	75 <N ≤ 90
Enough (C)	60 <N ≤ 75
Less (K)	≤ 60

The validation sheet contains statements filled in by the validator as an expert in their field. The practicality sheet contains the statements filled in by the teacher and students as observers by giving the statement a value. The data were collected in August 2020. The data from the validation results were analyzed using the Aiken's V formula. The results of the analysis were then categorized based on the V values obtained. If the V value is smaller than 0.667 then student worksheet is declared invalid, and vice versa if the V value is equal to 0.667 then student worksheet is declared valid [14].

III. RESULT AND DISCUSSION

A. *Result*

The results obtained include the results of the creative thinking test to measure students' initial creative thinking abilities, validation by experts, and practicality by teachers and students of SMA Negeri 1 Padang. The results of the students' creative thinking test analysis can be seen in Figure 1.

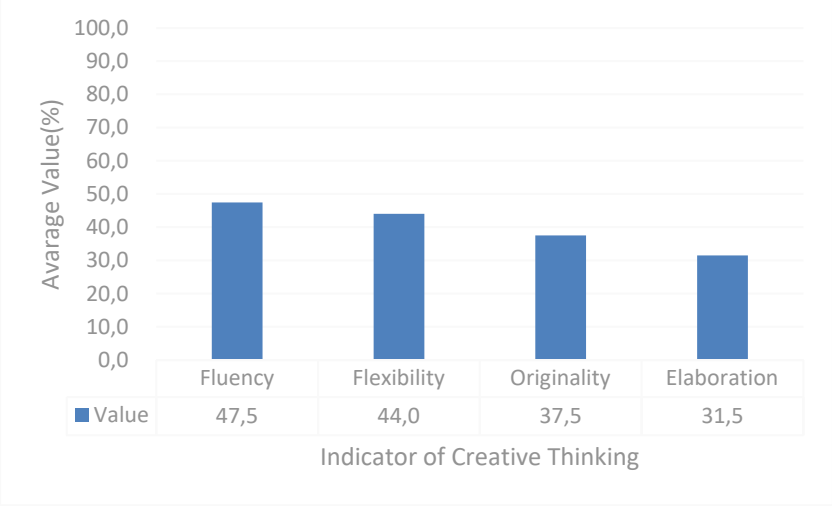

Figure 1. Graph of Students' Creative Thinking Test Analysis Results

Based on Figure 1, it appears that each indicator of creative thinking is still in the poor category. Paying attention to this, the creative thinking skills of students need to be improved. For this reason, the element of creative thinking needs to be integrated into the learning model applied in the developed student worksheet.

Furthermore, the developed student worksheet was tested for validity and practicality. Before being used, the instrument for assessing the validity and practicality of the product was first assessed by three experts using the validity and practicality instrument assessment sheet. Instrument validators in this study include YN, RW and RM. The results of the product validity and practicality assessment sheet are shown in Table 3.

Table 3.Validity Results of the Instrument Validity and Practicality Assessment Sheet

Instrument	Validator Name	Aiken's V value	Category
student worksheet Validity Instruments	YN RW RM	0.863	Valid
student worksheet Practical Instruments	YN RW RM	0.856	Valid
Average		0.86	Valid

Based on Table 3, the average value of the student worksheet validity instrument assessment and the practicality of student worksheet by a large validator of 0.86 are in the valid category. Thus, the instrument of validity and practicality of student worksheet can be used even with a few revisions such as adding questions about grammar. Practicality instruments can be used with a few revisions, namely some items must be adjusted for the purpose and improve the same questions on the instrument.

Next is the validation of the product that has been developed, namely student worksheet. The student worksheet that has been designed is validated by three experts. Product validators in this study include YN, RW and RM. Expert review of student worksheet using a creative problem-based learning model includes content validity (student worksheet components and the feasibility of student worksheet content), construction, language, and graphics. The results of the validator's assessment for each component of the student worksheet validity are presented in Table 4.

Table 4. student worksheet Validity Results

No.	Component Validity	Expert Validator	
		Aiken's V value	Criteria
1.	Content Validity: student worksheet components	0.852	Valid
2.	Content Validity: the feasibility of the content of the student worksheet	0.778	Valid
3.	Presentation	0.857	Valid
4.	Language	0.840	Valid
5.	Graphics	0.861	Valid
Average		0.837	Valid

Based on Table 4, it can be seen that the average value of the student worksheet validity of all expert validators is 0.837. This means that student worksheet using a creative problem based learning model for high school physics learning is in the valid category.

B. *Discussion*

The results of the creative thinking test, which were compiled based on the TTCT test given to students, showed that the creative thinking abilities of students were still low. These things are related to the ability of fluency, flexybility, originality, and elaboration, which are elements of the ability to think creatively. The ability to think creatively plays an important role in preparing students to become good problem solvers and to be able to make mature decisions and conclusions that can be accounted for academically [15].

In addition, the creative thinking skills of these students can be grown by applying a problem-based learning model [16]. To make this happen,

The product validity test is carried out by an expert / validator by providing an assessment of the product using an instrument. The instrument used for product validation must also be validated first. Instrument validation is carried out to measure the extent to which the measuring instrument / instrument is appropriate in measuring what is being measured [17]. Based on the results of instrument validation, the product validity test sheet used is valid, which means it is appropriate to measure the validity of the developed student worksheet product.

Furthermore, product validation is carried out. Validation is carried out to obtain acknowledgment and validation of the suitability of the device to the needs so that it is feasible and suitable for use in learning [18]. The feasibility of student worksheet is seen in terms of content, presentation, language, and student worksheet graphic. Based on the results of the student worksheet validation assessment by the expert / validator, it was found that the student worksheet was valid / feasible to use. Teaching materials are needed by teachers to master effective learning and to improve student performance in the learning process [19]. For this reason, teachers need to look for and pay attention to teaching materials that are in accordance with the demands of the curriculum and are able to improve the performance of students actively in solving problems in learning physics.

IV. Conclusion

From the results of the research conducted, it was concluded that the development of student worksheet using a creative problem based learning model in high school physics learning had valid criteria. Student worksheet is declared valid based on the results of the validation, student worksheet is feasible and suitable for use in learning.

References

[1] Majid, Abdul. (2014). Implementasi Kurikulum 2013. Bandung : Interes Media.

[2] Daryanto. (2014). Pendekatan Pembelajaran Saintifik Kurikulum 2013. Yogyakarta : Gava Media.

[3] Kemendikbud. (2014). Peraturan Menteri Pendidikan Dan Kebudayaan Republik Indonesia Nomor 59 Tahun 2014 Tentang Kurikulum 2013 di Sekolah Menengah / Madrasah Aliyah. Jakarta: Kemendikbud

[4] Usmeldi. (2016). Pengembangan Modul Pembelajaran Fisika Berbasis Riset dengan Pendekatan Scientific untuk Meningkatkan Literasi Sains Peserta Didik. Jurnal Penelitian & Pengembangan Pendidikan Fisika, 2(1), pp. 1-8

[5] Majid, Abdul. (2012). Perencanaan Pembelajaran. Bandung : Remaja Rosdakarya

[6] Sumiati dan Asra. (2007). Metode Pembelajaran. Bandung : Wacana Prima

[7] Depdiknas. (2008). Panduan Pengembangan Bahan Ajar. Jakarta : Departemen Pendidikan Nasional

[8] Kurniasih, Imas & Berlin Sani. (2015). Ragma Pengembangan Model Pembelajaran. Yogyakarta : Kata Pena

[9] Siswono, Tatag Yuli Eko. (2004). Identifikasi Proses Berpikir Kreatif Siswa dalam Pengajuan Masalah (Problem Posing) Matematika Berpandu dengan Model Wallas dan Creative Problem Solving (CPS). Buletin Pendidikan Matematika, 6(2), pp. 1-16

[10] Udiyah, Ika Nur Mas dan Hernik Pujiastutik. (2017). Penerapan Model Pembelajaran Creative Problem Solving (CPS) terhadap Kemampuan Pemecahan Masalah IPA Kelas VII SMP Negeri 2 Tuban. Proceeding Biology Education Conference, 14(1), pp. 540-544

[11] Baran, Mukadder & Mustafa Sozbilir. (2017). An Application of Context- and Problem-Based Learning (C-PBL) into Teaching Thermodynamics. Springer Science+Business Media Dordrecht. DOI 10.1007/s11165-016-9583-1.

[12] Hu, Weiping dan Philip Adey. (2002). A Scientific Creativity Test For Secondary School Students. International Juornal of Science Education. 24 (4), pp. 389–403.

[13] Kemendikbud. (2013). Peraturan Menteri Pendidikan dan Kebudayaan Nomor 54 Tahun 2013 Tentang Standar Kompetensi Lulusan Pendidikan Dasar dan Menengah. Jakarta: Kemendikbud

[14] Azwar, Saifuddin. (2015). Penyusunan Skala Psikologi Edisi 2. Yogyakarta: Pustaka Belajar.

[15] Yanto, Febri, Festiyed, Mega Iswri, dan Enjoni. (2018). Meta-Analysis: Improving Creativity through Assessment in a Problem-Based Learning Environment. Advances in Social Science, Education and Humanities Research. 178. pp. 23-26.

[16] Eldy, Elnetthra Folly dan Fauziah Sulaiman. (2013). The Role of PBL in Improving Physics Student's Creative Thinking and Its Imprint on Gender. International Journal of Education and Research, 1(6), pp. 1-10.

[17] Yusup, Febrianawati. (2018). Uji Validitas dan Reliabilitas Instumen Penelitian Kuantitatif. Jurnal Tarbiyah: Jurnal Ilmiah Kependidikan, 7(1), pp. 17-23.

[18] Asyar, Rayandra. (2011). Kreatif Mengembangan Media Pembelajaran. Jakarta: Gaung Persada Press.

[19] Asrizal, A. Amran, A. Ananda, F. Festiyed dan R. Sumarmin. (2018). The development of integrated science instructional materials to improve students' digital literacy in scientific approach. Jurnal Pendidikan IPA Indonesia, 7(4), pp. 442-450