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How to Validity Handbook in Introduction and Laboratory Techniques Oriented PBL

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Abstract – The problems found in the introductory and laboratory techniques courses are the practical handbook used so far are not complete in terms of the practical component of the lab, the contents of the handbook does not yet reflect the overall coverage of the material, many students who do not understand and are not yet skilled in using laboratory tools and materials because of the lack of practical activities contained in the handbook. The study aims to produce a valid laboratory handbook. This research is a development research. This developed using the 4D model. In this research only develop stage that is validity. Data obtained from the questionnaire validity and assessed from several aspects of the characteristics, quality elements, issues, and stages PBL. Data were analyzed by percentage technique and processed descriptively. Based on the results of validity obtained from the questionnaire by the validator obtained a mean of 100%. The conclusion of this research is the result of the handbook for introductory and laboratory technique oriented PBL is very valid.

Keywords: Handbook PBL Validity.

I. INTRODUCTION

Introduction and laboratory technique is one of the subjects that must be mastered by students in the study program of biology STKIP PGRI West Sumatra. This course discusses supporting materials and supporting course activities undertaking laboratory and field activities, including laboratory knowledge and equipment, laboratory organization, equipment, and materials maintenance, work safety, introduction and use of chemical tools, reagent making, preservatives and making field work proposal.

The lecture activities consist of face-to-face activities and practicum activities. At the time of the lab, so far students have had a practical handbook. Practical handbook used by students have not been sufficient. Among the problems found in the handbook that is, not yet complete handbook used so far in terms of appearance and components of a good laboratory handbook and feasible to use, the contents of the practical handbook has not reflected the overall coverage of the material, so there is a practice that does not include the material lectures. As a result, students do not master the use of tools and materials in a practical activity, the number of students who do not understand and not skilled in using laboratory tools and materials. This is due to the lack of practicum activities contained in the practical handbook. The results are not all students are able to use and apply the use of tools and materials in the laboratory well, so they do not have a good stock as a prospective teacher in work and develop an activity in the laboratory. Ability in developing laboratory activities School biology is an essential basic competency for prospective teachers [1]. This, students must master and develop activities that occur in the laboratory.

The problem is also found in the presence of students who do not know how to handle the problems that occur the laboratory, which eventually resulted in them not skilled in implementing the practice for the courses they will take the future. In the course of lecturing, the students also lack understanding of the concept for each lecture material that is

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taught every time a face-to-face meeting. So that impact on the final outcome of their lectures on the introduction of laboratory techniques. Practicum activities can provide a real learning experience to students by developing basic skills in working laboratories such as scientist, as well as giving students the opportunity to participate actively so as to obtain information and scientific skills by means of observation [2].

Based on the problems found, then conducted research on "Validity Handbook Oriented Problem-Based Learning For Introductory and Laboratory Techniques Courses". Problem Based Learning is a learning that makes the problem as a basis or basis for students to learn. In problem-based learning, real and complex problems can motivate students to identify and examine concepts and principles they need to know to develop the problem. In Problem Based Learning, students work in small teams, acquire, and communicate, and incorporate information in processes that resemble or resemble inquiry. So with the development of practical guidance-oriented Problem Based Learning (problem based learning), students can understand the concept and use the tools, materials and everything required in lecturing the introduction of laboratory techniques can be mastered well, and do not make students rigid in implementing the lab for the course which will be taken next semester. Using the PBL model that has orientation, organization, and investigation, presentation, analysis and evaluation stages will assist students in finding and finding their own material or answers learned according to the problem which is given [3]. Thus, it is possible that no material is left behind to be put into practice. Research on PBL has been done also by Mujiyati, et al with the title The Strategies to Improve Social Solidarity of Senior High School Students through History Module Based on Problems and the result of the history of module based on problems is effective to improve the social society [4]. The purpose of this study is to produce a practical guide to problem-oriented learning practicum for introductory courses and validatory laboratory techniques.

II. Research Method

This research is research and development with a procedural model. The research was conducted using the development model that is a 4-D model. At this stage only done the development, stage is to validate the handbook that has been made with questionnaire validity. The subject of the validity test is validators consisting of the material validator, media, and learning strategy.

The research instrument used is a validity sheet, modified from Zahara [5]. Analysis of data collection using descriptive analysis method with the formula percentage by Riduwan [6]:

$$\text{Percent Value} = \frac{\Sigma \text{ Scores earned}}{\Sigma \text{ High Scores}} \times 100\%$$

The achievement level of the validity category using Purwanto classification [7] in Table 1.

Table 1. Category Of Validity

Level of Achievement (%)	Category
90-100	Very valid
80-89	Valid
65-79	Enough
55-64	Less valid
0-55	Very Less valid

III. Result And Analysis

The results of the validity of the Problem-Based Practical Handbook can be seen in Table 2.

Table 2. Test Result of Validity Practical Handbook

No	Aspect	Validity Value (%)	Criteria
1	Characteristics	100	Very Valid
2	Quality Elements	100	Very Valid
3	Language	100	Very Valid
4	PBL Stage	100	VeryValid
	Total	**400**	
	Rata-Rata	**100**	**Very Valid**

The result of data analysis of the validity test based on Table 2 shows that the resulted Problem Based Learning practicability handbook obtained an average value of 100% meets the criteria is very valid. It is reviewed based on the

validity test consisting of three requirements, namely characteristics, elements of quality, language and PBL stages.

Characteristic criteria divided into self-instruction, self-contained, adaptive and user friendly which contains details about the association of practical handbook with the curriculum, the suitability of the material to the needs of the lab, the appropriateness of science and technology and information and guidance that is easily understood by the users especially the students who are all categorized in criteria is very valid indicates that the practical handbook oriented Problem Based Learning is very appropriate to the needs of students. Because practical guides are made to be used by both students and lecturers so that their understanding of the material contained in introductory courses and laboratory techniques is even better. The feasibility of the content in a teaching material can be seen from the preparation of the material done in a systematic and detailed to the concepts presented [8].

In addition, by adjusting to the development of science and technology to make them more adept in using various tools and materials in accordance with the times and also equipped with instructions in every step contained in the handbook.

The criterion of the quality element which is also very valid from the validator which discusses the format, organization, attraction, shape and letter size, spacing and consistency shows hat the presentation of practical handbook in terms of the quality element is made in accordance with standard presentation of proportional practicum in terms of format and systematic. The practical handbook consists of rational (to facilitate learning in particular chapters), objectives (revealing the ability that students will have after practical), guidance (containing direction to students), theoretical descriptions mandatory students practical), activity steps (activity steps can be arranged with the help of drawings or without the use of drawings) [9]. In addition, laboratory guides are also supported by a combination of colors in accordance with the needs of student needs. Besides, the picture presented to support the delivery of materials in accordance with the demands of the curriculum. The image presented is also in accordance with the original form and even the images are taken from the shooting itself. Because of the image in accordance with its function as a medium of message delivery. The presentation of the letters and the size presented is adjusted to its position as a discourse. Suppose that if large, then, the size is made larger and the location of each component of this practical handbook is presented as consistent and proportional so that it can motivate students to use it. Which states that teaching materials act as facilitators between educators with learners and develop motivation of learners during learning activities [10].

Linguistic criteria are assessed by validators with highly valid criteria covering legibility, clarity of information, conformity with good and correct Indonesian language rules and effective and efficient use of language. From the whole aspect, gives an idea that the practical handbook which will be used by students and lecturers is able to give a communicative delivery to the reader so that every activity or information contained in the practical guide can be understood easily for those who use it. Explains that printed material should pay attention to the easy language, involving: the flow of vocabularies, clarification of sentences, clarification of sentences, and sentences that are not too long. Thus easy to understand by students [11].

Criteria of Problem Based Learning stage that belong to the criterion is very valid and concerning the aspect of student orientation on the problem, define the problem and organize student to learn, guide independent and group investment, develop and present the work and reflection and assessment made systematically so that knowledge presented more meaningful. Stage Problem-Based Learning which started from giving problem-related to the achievement of learning first make student's thinking pattern more directed with learning achievement demanded from the problem, after which they are required to find the problem from discourse and in a group or independently find theory related to the problem and discuss the problem and find the solution. Learning using PBL influences the improvement of students' critical thinking skills [12].

To add to their understanding is also given a sola problem-solving and given an assessment to see the level of their understanding. Besides, by giving stages of Problem Based Learning shows that the discovery of new science comes from real life problems and is associated with the theory or principles supporting the problem. Problem Based Learning method is more emphasis on the exchange of opinions and experience sharing in problem-solving [13]. High motivated students will be more interested in exploring knowledge and wanting to know something new to solve real-world problems and relate to existing theories. So in practical activities, every what is done by students will be adapted to the theory and nature. Practical activities are an important part of science lessons. In science lessons, we try to broaden students knowledge of nature and develop their

understanding of the ideas, theories, and models that scientists have found useful in explaining and predicting their behavior [14].

IV. CONCLUSION

Based on the results of research that has been done, it can be concluded that Practical handbook of Introduction and Techniques Laboratory oriented Problem-Based Learning produced to meet the criteria is very valid.

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