THE VALIDITY OF THE DEVELOPMENT OF HIGH SCHOOL BIOLOGY TEACHING MATERIALS BASED ON PROJECTBASED LEARNING ON HUMAN DIGESTIVE SYSTEM MATERIALS

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THE VALIDITY OF THE DEVELOPMENT OF HIGH SCHOOL BIOLOGY TEACHING MATERIALS BASED ON PROJECT-BASED LEARNING ON HUMAN DIGESTIVE SYSTEM MATERIALS

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ABSTRACT

This study aims to obtain high school biology teaching materials based on project-based learning (PjBL) on valid material for the human digestive system. This research is a research and development (Research and Develop) or known as R & D research which adopts the development model by Thiagarajan, namely the 4-D model which consists of 4 stages including define, design, develop and disseminate. However, this development research is limited to the validation stage. The validity test in this study is a theoretical validity carried out by 3 validators who are experts in their fields. The instrument used is an expert validation questionnaire with a Likert scale which has 4 alternative answer choices, namely 1 = less, 2 = enough, 3 = good, and 4 = very good, and the data were analyzed by adding up the scores of each validator. The research results obtained from high school biology teaching materials based on project-based learning (PjBL) on the human digestive system material that has been developed meet the valid criteria with an average value of 3.75 which indicates a very valid category. So it can be concluded that high school biology teaching materials based on project-based learning on the human digestive system material that has been developed are very valid.

Keywords: Biology Teaching Materials; Human Digestive System; PjBL; Validity

1. INTRODUCTION

Learning biology in high school (SMA) is certainly not without problems. Some of the problems found in biology learning based on the biology teacher's perspective are 1) related problems from student factors, 2) facilities and infrastructure, 3) learning materials, 4) teacher factors, 5) students' family condition factors (Priyayi, D. F., 2018). Some biology materials or topics at the high school level fall into the difficult category based on the student's perspective. Digestive system material in humans at the high school (SMA) level is one of the difficult biology topics with a moderate level of difficulty category (Mardin, H., 2017).

For this reason, in overcoming the difficulties of learning biology for students, several efforts are needed, including the teacher should teach biology by connecting topics with everyday life, and the teacher's teaching abilities and classroom management skills must be further improved (Mardin, H., 2017). In terms of the ability of teachers to connect biology topics with the daily lives of students and the ability of teachers to teach and manage classes, media is needed in delivering the material, one of which is by using teaching materials.

Teaching materials are all materials that are made consisting of aspects of knowledge, skills, and attitudes that must be learned by students in order to achieve learning objectives which are arranged based on the learning objectives to be achieved, the abilities and development of students in accordance with the needs and interests of students (Leksono, S. M., 2015). Based on the subject, teaching materials are divided into 2 groups, namely 1) teaching materials that are made intentionally for learning and 2) teaching materials that are not intentionally made but can be used for learning. Teaching materials based on technology are divided into 4, namely printed,

audio, audio-visual, and interactive multimedia teaching materials (Bahtiar, E. T., 2015). Good teaching materials are those that are prepared based on the needs and the applicable curriculum that allows students to easily learn independently (Magdalena, I., 2020).

Based on the needs of students to overcome learning difficulties, it is necessary to design media and teaching materials that are able to overcome these learning difficulties. The project-based learning (PjBl) learning model is known to have a syntax with stages 1) start with the big question; 2) design a plan for the project; 3) create a schedule; 4) monitor the students and the progress of the project; 5) assess the outcome; 6) evaluate the experience (Nurhayati, A. S., & Harianti, D., 2015) which is able to improve learning outcomes and students' critical thinking skills (Prayogi, S., & Asy'ari, M. (2013). By making teaching materials Based on project-based learning, it is hoped that students' learning difficulties on the material of the digestive system in humans can be overcome.

2. METHODOLOGY

This research is a research and development (Research and Develop) or known as R & D research that adopts the development model by Thiagarajan, et al., (1974) which is a 4-D model consisting of 4 stages including define, design, develop and disseminate. However, this development research is limited to the validation stage. This study aims to obtain high school biology teaching materials based on project-based learning (PjBL) on valid human digestive system materials. The teaching materials developed are in the form of project-based learning (PjBL)-based biology textbooks for class XI high school students on the human digestive system. The validity test in this study is a theoretical validity carried out by 3 validators who are experts in their fields. The instrument used is an expert validation questionnaire with a Likert scale (Ridwan, 2011) which has 4 alternative answer choices, namely 1 = less, 2 = enough, 3 = good, and 4 = very good. Furthermore, the data were analyzed by adding up the scores of each validator.

Furthermore, the validity value is calculated using the formula:

$$\bar{V} = \frac{\sum_{i=1}^{n} RA_i}{n}$$

Information:
V = Validation average score
RA_i = Aspect validation average score
n = Many aspects

Source: Khabibah in Wardianti, Y., & Jayati, R. D., (2018).

The criteria for determining the level of validity can be presented in table 1 below.

Table 1. Criteria for Determining the Level of Validity

Range	Category
1,00-1,99	Invalid
2,00-2,99	Less Valid
3,00-3,49	Valid
3,50-4,00	VeryValid

Source: Sari, R. T. (2017).

3. RESULT AND DISCUSSION

3.1 Result

Project-based learning (PjBL) high school biology teaching materials on the human digestive system material that have been designed were validated by 3 expert validators in their

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field. The results of the validation and suggestions given by the validator are used to revise the improvement of teaching materials. The results of the validation data from 3 validators are presented in table 2 below.

Table 2. Teaching Material Validation Results Data

No.	Observed Aspects	Average Rating	Category
1.	Didactic	3,62	Very Valid
2.	Construction	3,76	Very Valid
3.	Technical	3,87	Very Valid
Total Average		**3,75**	**Very Valid**

Based on the data from the validation of high school biology teaching materials based on project-based learning (PjBL) on the human digestive system material by the validator, it can be seen that the didactic aspect obtained the average value of the assessment from the validator of 3.62 with a very valid category. The didactic aspect has assessment indicators which include teaching materials that are developed referring to the applicable curriculum, namely the 2013 curriculum (K13), helping students in understanding concepts and constructing their knowledge and making it easier for students to learn so that the learning process becomes more effective.

The construction aspect meets the valid criteria with a value of 3.76 which is included in the very valid category having assessment indicators including clarity of the identity of teaching materials, containing learning objectives, main points and descriptions of learning materials, clarity of instructions for using teaching materials and language that is easily understood by students. While the technical aspect with a value of 3.87 is a very valid criterion that has assessment indicators including clear and easy-to-read writing, clear images, and in accordance with the material, layout, and arrangement of attractive teaching materials displayed.

The total average assessment of the results of the validation of teaching materials by the validator as a whole is 3.75 which shows that project-based learning (PjBL) high school biology teaching materials on the human digestive system material are in the very valid category so that they can be used for class XI high school students.

3.2 Discussion

Global SchoolNet (2000) in Nurhayati, A. S., & Harianti, D. (2015) explains that project-based learning (PjBL) is a learning approach with the characteristics of 1) students making decisions about work plans; 2) poses problems or challenges to students; 3) solutions to problems or challenges posed are designed by students; 4) access to information to solve problems is done by students collaboratively; 5) continuity of the evaluation process; 6) reflection of activities by students; 7) there is a final evaluation by being tolerant of change. The description of the characteristics and stages of project-based learning can be seen in Figure 1 below.

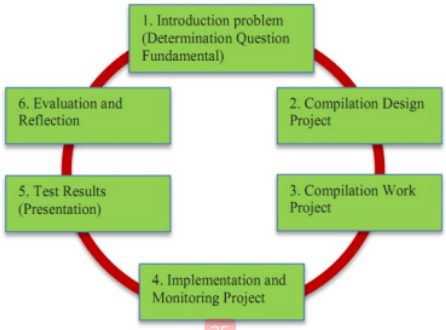

Figure 1. Stages of project-based learning

Project-based learning (PjBL) biology teaching materials on the human digestive system make students able to learn independently. The existence of an evaluation and reflection process at the end of project-based learning (PjBL) requires students to carry out a process of improving the results or changes.

Project-based learning (PjBL) biology teaching materials on the human digestive system material need a little revision based on the results of validation by the validator. Some of the suggestions given by the validator on teaching materials on didactic, construction, and technical aspects. Good teaching materials use language that is easy to understand students as users, systematic material content, and an attractive appearance so that students are happy and interested in using these teaching materials (Wibowo, E., 2018).

For the didactic aspect, what needs improvement is systematically compiling the contents of the digestive system in humans. This of course needs to be done in order to assist students in constructing their knowledge and building their conceptual understanding. As for the construction aspect, the use of language in accordance with the EYD and the use of scientific terms are the concern of the validator for revision. For the technical aspect, several things need to be revised, such as the use of spaces in teaching materials, and sentence structure in the description of the material. It is important to place the pictures correctly and size the writing that is easy to read with the aim that the teaching materials are easy to understand and interesting for students to use. Of course, to make it more attractive, it is necessary to arrange the display of images, writing, and design of teaching materials that are able to make students happy and interested in these teaching materials. This is in line with the research of Wulandari, W., et al., (2017) explaining that it is easier for students to understand the material if the teaching materials have clear and easy-to-read font sizes, interesting pictures, and use uncomplicated sentences. , language and terms that are easy to understand, as well as a systematic presentation of the material will be able to increase the knowledge of students.

After this teaching material was revised based on suggestions and input from the validators so that project-based learning (PjBL) biology teaching materials on the human digestive system material could be used for class XI high school students with very valid criteria.

4. CONCLUSION

Based on the results of the theoretical validity test obtained from high school biology teaching materials based on project-based learning (PjBL) on the human digestive system material that has been developed it meets the valid criteria with an average value of 3.75 which indicates

a very valid category. So it can be concluded that high school biology teaching materials based on project-based learning on the human digestive system material that has been developed are very valid.

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