Development of an Assessment to Measure Science Process Skills for the Interaction of Living Things with Their Environment in Junior High School

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Abstract

This study aims to develop an assessment to measure science process skills in the interaction of living things with their environment. The research method used is a research and development method consisting of 8 steps, namely research and initial information collection, planning, initial product format development, small-scale trials, product revisions, initial trials, and final products. The trial subjects in this research and development are expert subjects, namely assessment experts, material experts and linguists, as well as the subjects of class VII SMPN students in Bengkulu City as product users. Data were analyzed descriptively qualitatively and quantitatively. Feasibility assessment by three validator experts developed on the assessment aspect of 89%, material aspect of 93%, and language aspect of 93%, overall was declared very feasible with an average of 92%. This shows that the assessment of science process skills to measure science process skills is stated to be very suitable to be used to measure the level of students' science process skills. The assessment developed to measure Science Process Skills (KPS) is the science assessment, where in the development of the science assessment it uses formative assessment because this assessment is given to every lesson and can be carried out on sub-subjects or each subject. In the development of this formative assessment, multiple choice tests were developed.

INTRODUCTION

In the 2013 Curriculum the learning process emphasizes providing direct experience to learn and develop competencies to care, examine, and understand the natural surroundings scientifically. Education is also the right and obligation of every Indonesian citizen. This is explained in the National Education System Law No. 20 of 2003 Article 5 Paragraph 1 states that every citizen has the same right to obtain quality education. The 1945 Constitution Article 31 Paragraphs 1 and 2 also explains that every Indonesian citizen has the right to education, and every citizen is obliged to attend basic education and the government is obliged to pay for it (Kartika, Ardia Tita, et al., 2020).

The most basic ability as a basis for mastering higher abilities and science skills is the ability to understand concepts. Understanding the concept of Science provides an understanding that the materials taught to students are not just rote. By understanding the concept of science students are expected to be able to better understand the concept or subject matter itself, the interrelationships between concepts, and use concepts in solving problems. Understanding the concept is one of the goals of learning science that absolutely must be

achieved because understanding a concept is very supportive for understanding the next concept, or in other words understanding a concept is a prerequisite for understanding the next concept. However, reports from international studies show the real reality of the quality of our education, especially at the junior high school level. So it can be said that people who have a positive self-concept towards themselves then maintain their abilities with positive feelings towards themselves, towards doubts about their abilities. and challenges in life, as well as resulting in low self-assessment in relation to others (Walid, Putra, & Asiyah., 2019).

This is in accordance with the results of a survey from TIMSS (Third International in Mathematics and Science Study) in 2015 showing that the ability of Indonesian students in the field of Science is 36th out of 49 countries surveyed. Meanwhile, the 2018 PISA (Programme International for Student Assessment) survey report states that the performance of Indonesian students for Science is ranked 70 out of 77 countries evaluated (Stadler, Matthias, et al., 2020).

In the 2013 curriculum, it is explained that student assessment in the learning process is closely related to thinking skills. Students' thinking skills can be trained through providing meaningful experiences in the learning process. Students' thinking ability in building new concepts in science learning can be trained through the development of Science Process Skills (Skills) (Walters, Yvonne, & Soyibo., 2001). Science Process Skills (KPS) are very important for every student as a provision to use the scientific method in developing science to acquire new knowledge or develop existing knowledge. The concept discovery process involves basic skills through scientific experiments that can be implemented and improved through laboratory activities as science process skills (Murniasih, L., et al., 2013).

The results of observations made by researchers in three junior high schools, namely SMP 1 Bengkulu City, SMP 8 Bengkulu City and SMP 19 Bengkulu City in class VII the material for the interaction of living things with their environment which contains Science Process Skills (KPS) is relatively low, this is evidenced by the analysis of the questions presented. conducted at SMPN 5 Bengkulu City shows that the average percentage of the Science Process Skills (KPS) indicator is 29% while from SMPN 8 Bengkulu City shows an average Science Process Skills (KPS) indicator of 23% while from SMPN 19 Bengkulu City it shows that the average percentage of the Science Process Skills (KPS) indicator is 19%.

Based on the description of the background of the problem, the researchers are interested in developing an Assessment of Science Process Skills for the Material of Interaction of Living Things with Their Environment in class VII at SMPN in Bengkulu City, so the title of this research is "Development of an Assessment to Measure Science Process Skills on the Interaction of Living Things with Their Environment. In SMP in Bengkulu City".

METHODS

This study uses the development model according to Borg & Gall which was developed by Sugiyono. Borg & Gall states that the research and development (R&D) approach to education includes ten steps. Of the ten steps that exist, the researcher will limit it according to the needs of the research and development carried out. After simplifying the research and development procedure into eight steps only until the development stage. The research steps are as shown in the chart below:
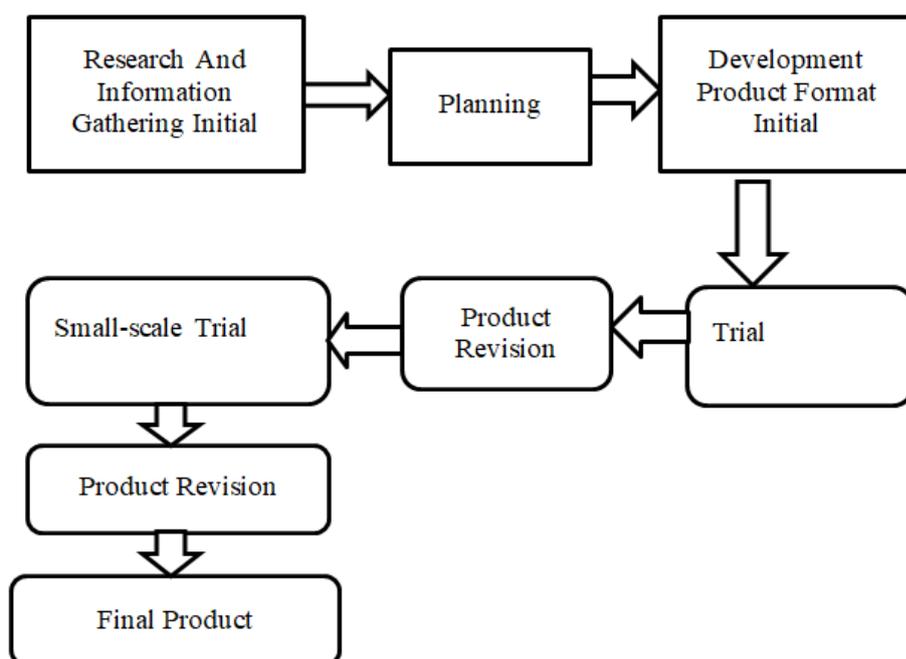
Figure 1. Research steps

Of the ten steps that exist, the researcher will limit it according to the needs of the research and development carried out. After simplifying the research and development procedure into eight steps only until the development stage.

RESULTS AND DISCUSSION

The product produced by researchers is in development (Research and Development) to measure science process skills, namely questions with material on the interaction of living things with their environment in class VII SMP. The procedure for developing this problem uses assessment development based on Borg and Gall. As for the steps, namely, collecting information and research, when the researchers conducted pre-research in 3 Junior High Schools (SMP) Bengkulu City, from the day of observation the researchers found out that the level of students' science process skills was still low, this was known when the researchers adjusted assessment used by the school with indicators of science process skills. The next stage that the researcher did was the research planning stage, where the researcher conducted a literature study to find the subject of the interaction of living things with their environment, to then make questions based on science process skills.

The next stage, which is carried out is the product development stage, at this stage the researcher develops an assessment product measuring science process skills, which is contained in the evaluation questions with indicators of science process skills. Next, the researcher conducted a limited trial validation phase, the product that had been designed was then validated with several experts including assessment experts, linguists, and material experts. The development carried out by the researchers resulted in an assessment product to measure the ability of science process skills on the subject of the interaction of living things with their environment which was adapted to the 2013 curriculum (K-13). Below are the results of the validation obtained by the experts, namely as follows:

1. *Assessment Experts*

Based on the results of the assessment development to measure science process skills that have been carried out, it is known that the results of the validator to obtain results of 89%. So from the results of the validator referring to the conversion table, it can be concluded that the assessment to measure the developed science process skills is

feasible to use or can be tested on students and no longer needs to be revised by researchers.

2. *Material Experts*

Validation is used to assess the materials that have been prepared in the assessment to measure science process skills. The learning aspect is assessed to determine whether the material presented is in accordance with KI and KD as well as learning objectives that include material in one semester. While the content aspect is to find out whether the content of the material is clear in its presentation. The results of the validation assessment from material experts can be seen in the table below.

Table 1. Questionnaire Expert Material

Validator	Number of Items	Ideal	Score Obtained	%	Qualification	Description
1	9	45	42	93 %	Very Eligible	Needs Revision

The results of the learning expert scores are categorized as X> 81% (very feasible), 61% < X 80% (adequate), 41% < X 60% (quite decent), 21% < X 40% (less feasible), and X 20% (very less feasible). The percentage of the final product is 93% with very decent criteria.

3. *Linguist*

Aspects of language use to assess the vocabulary used, conformity with good and correct Indonesian language rules. This assessment aims to see whether or not the assessment is used for students. The results of the validation assessment of linguists can be seen in the table below.

Table 2. Questionnaire Language

Validator	Total Item	Ideal	Score Obtained	%	Qualification	Description
1	9	45	42	93%	Very Eligible	Needs Revision

So from the results of the validator referring to the conversion table, it can be concluded that the assessment to measure the developed science process skills is feasible to use or can be tested on students and no longer needs to be revised by researchers.

The material experts get an average percentage of 93% with a decent category. Prior to the validation of the questions, the sentences used were still ambiguous. Then after validation, the questions that have been made have been well formulated, most of them have referred to the science process skills and the material asked according to the grade level. So the question is worthy to be tested. This is in accordance with KI, KD, learning indicators and indicators of science process skills, questions and answers are formulated correctly, the material asked is in accordance with the measurement objectives, level, type of school and grade level. In the teacher's response, obtaining an average percentage of 92% with a very decent category. The science assessment based on science process skills developed is in accordance with the question grid and the language used is good and correct.

CONCLUSION

Development of an assessment to measure science process skills was carried out based on eight of the ten stages of Borg & Gall. And the development of science process skills on the material of the interaction of living things with the seventh grade environment in

Bengkulu City, the questions developed are in accordance with the steps for preparing good questions.

The feasibility of a science assessment to measure science process skills can be seen from the results of expert validation, namely, assessment experts by 89% in the very appropriate category, material experts by 93% in the very appropriate category and linguists in 93% in the very appropriate category and In the teacher's response, obtained an average percentage of 92% with a very decent category. The science assessment based on science process skills developed is in accordance with the question grid and the language used is good and correct. So the question is worthy to be tested.

SUGGESTIONS

Based on the results of the research, analysis of discussions and conclusions, several suggestions can be made as follows:
1. Making a science process skills assessment requires a team, so that the questions developed are more creative and varied.
2. Making science questions based on science process skills needs more references, so that the questions developed can produce good quality questions.

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