

Validity of the QuizWhizzer-Based Assessment Instrument for Measuring Middle School Students' Multirepresentation Ability

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Abstract

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Science learning at school provides benefits for students. Students can immerse themselves in nature in solving real-life problems using the multi-representational abilities that have been applied in learning. Multirepresentation ability is the ability to re-represent the same concept in different formats in physics concepts. Teachers have an important role in learning activities at school. Teachers are required to always think creatively, be innovative, and have the ability to invite students to play an active role in classroom learning. One assessment instrument (test) that can be used is QuizWhizzer. QuizWhizzer is a game that can be used in learning, with the aim of making students feel happy and not bored while learning, as well as helping teachers present material that is more interesting and not boring. QuizWhizzer is used as a medium for testing an assessment instrument. Assessment instruments have an important role in learning, namely to find out how high students' understanding of the material is. The assessment instrument consists of one aspect, namely valid. The instrument can be tested if it has passed the validation stage by the validator. If the instrument has been said to be valid then it can be tested on students.

Keywords: Assessment Instruments, Multirepresentation, Science Learning, Question Validation.

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INTRODUCTION

Natural Sciences (IPA) is a science that studies natural phenomena and phenomena related to everyday life. Based on the Law on the National Education System no. 20 of 2003 Article 37 Paragraph 1 states that the curriculum at elementary, middle and high school levels must contain Natural Sciences (IPA). Discussions on Natural Sciences (IPA) are intended to develop students' knowledge, understanding and analytical skills of the surrounding natural environment (Rizkika et al., 2021).

Science learning at school provides benefits for students. Students can immerse themselves in nature in solving real-life problems using the multi-

representational abilities that have been applied in learning. Multi-representational abilities can be obtained through a process of learning stages to deal with various problems in the real world, so that science learning can be used as a facility for students to understand and deepen the natural surroundings (Arini et al., 2021).

Multiple representation ability is the ability to re-represent the same concept in different formats in physics concepts. Multirepresentation involves interpreting physics problems that are given several symbols, for example by writing the problem in verbal form and then illustrating it using pictures or graphs using mathematical formulas which are used to determine the answer using numbers. This multi-representational ability is divided into four representations, namely verbal, pictorial, graphic and mathematical to understand and solve problems (Oktaviana et al., 2020).

One aspect of education is scientific teaching, students are taught the ideas and principles of physics verbally, and are introduced to physics formulas (Mahayani et al., 2018). One of the science materials that can measure multi-representational abilities is simple business and planes which are discussed in class VIII SMP/MTS. Simple aircraft can be interpreted as tools to make someone's work easier in carrying out daily activities, some examples of simple aircraft are scissors, seesaws, well buckets, etc. In this journal, businesses and simple aircraft are used as material to be tested because they relate to multi-representation capabilities (Hotimah et al., 2022).

Teachers have an important role in learning activities at school. Teachers are required to always think creatively, be innovative, and have the ability to invite students to play an active role in science learning. One assessment instrument (test) that can be used is QuizWhizzer. QuizWhizzer is a game that can be used in learning with the aim of making students feel happy and not bored while learning, as well as helping teachers present material that is more interesting and not boring. QuizWhizzer has several various features or templates that are useful for attracting students' interest (Iskandar et al., 2022).

The QuizWhizzer-based assessment instrument has good quality or is suitable for use. The feasibility of an instrument is said to be feasible if it has criteria, namely validity. Validity is a measure that indicates the level of validity of an assessment instrument (Lestari et al., 2020). The validity of the QuizWhizzer-based assessment instrument aims to determine the level of validity of an assessment instrument developed before testing. A question is said to be valid if it contains several indicators such as the use of clear language, the content is appropriate to the material discussed, and gets a positive response from students.

RESEARCH METHOD

This research is development research conducted in November 2023. The research subjects were class VIII C students at SMPN 2 Ajung. The method used refers to Sugiyono (2009), namely the development of Research and Development using the Borg and Gall model which aims to create a QuizWhizzer-based assessment instrument that is useful in measuring students' multiple representation abilities. The Borg and Gall model is divided into several stages, namely the needs analysis stage, planning, product design, expert validation,

revision, initial product testing, initial product revision, final product testing, and final product revision. The first stage is the needs analysis stage by seeking information from various media, according to Mahardika (2020) who explains that multi-representation skills can help students in the learning process and building concepts, as well as solving problems verbally, mathematically, graphically and pictorially. The second stage is planning to provide strong information about the product to be developed. This stage is carried out by determining the number of test items that will be tested on students based on the results of the analysis of the material in the student's book. The third stage, namely product design, aims at the process of preparing question grids and research rubrics. In this research, QuizWhizzer media is used to make it easier for teachers to create assessment instruments with various interesting templates. The fourth stage is expert validation, where this product is validated by 3 validators including 2 lecturers and 1 teacher. The fifth stage is the revision of the product design. The revision was carried out because there was validator input and suggestions on the assessment instrument so it needed to be improved. The next stage of testing the initial product and final product aims to determine the level of student ability.

The data taken is the results of experts related to the QuizWhizzer-based assessment instrument. The assessment instrument validation process was carried out by 3 validators, namely 2 science education lecturers and 1 junior high school science teacher. The assessment given by the validator from the validation sheet includes aspects of material, construct, language and appearance of the instrument. The instructions for filling out the validation sheet are that the validator gives an assessment score of 1-4 for each question item in each aspect. The validator provides suggestions and notes for improvement in the columns provided by the researcher. The research was conducted using a sample of 24 class VIII C students at SMPN 2 Ajung.

RESULTS AND DISCUSSION

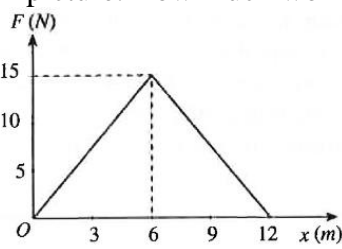
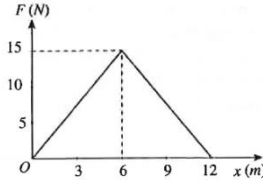

This development research resulted in a QuizWhizzer-based assessment instrument for business materials and simple aircraft. Researchers developed an assessment instrument consisting of 20 multiple choice questions. The question items developed include cognitive levels C4 (Analyzing) and C5 (Evaluating), apart from that a grid of question items and an assessment rubric have also been developed.

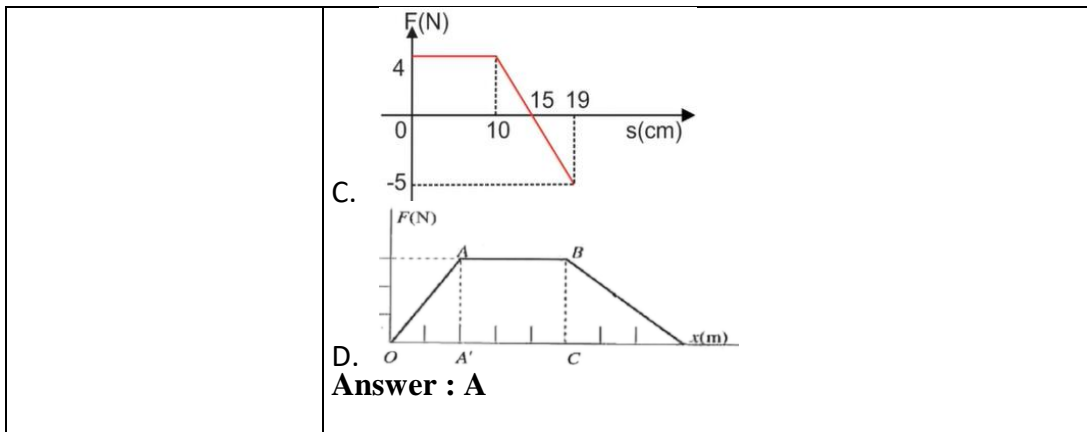
Researchers developed one type of question, namely multiple choice, to make it easier for students to understand and answer the questions. According to Yuniar, et al. (2015) on multiple choice questions has advantages compared to essay questions. The advantages of multiple choice questions are that they help students remember and make it easier for students to do their assignments, they are objective and have a high validity value. However, it also has disadvantages, namely making it easier for students to answer questions easily and questions that students can guess.

The aim of the research is to produce a valid QuizWhizzer-based assessment instrument on simple business material and airplanes. Researchers use simple business and airplane material because this material has a high level of

difficulty because there are calculations and this material can be applied in the surrounding environment so that students are able to solve problems in the surrounding environment. Apart from that, this simple business and airplane material includes multi-representational abilities which consist of several aspects, namely verbal, picture, graphic and mathematical representation.

According to Azwar (2016), one of the characteristics of a good question is that it is valid. Test questions that are declared valid are obtained through the validation stage. The validation stage has an important role for an instrument to be declared feasible and can be used at the next stage. Question validation is divided into two, namely expert validation and empirical validation. Expert validation results were obtained from the three validators providing suggestions and input for the progress of the instrument being developed. The following is input from the validator and the results of improvements can be observed in table 1.

Validator Suggestions and Input	
Before	<p>1. The graph of the force (F) acting on an object against the displacement of the object (X) is as shown in the picture. How much work is done by this force...</p>  <p>A. 90 Joule B. 80 Joule C. 70 Joule D. 60 Joule Answer : A</p>
After	<p>1. An object experiences motion because of a push. The work used by the object is 90 joules. Which graph shows the movement of this object....</p>  <p>A.</p>  <p>B.</p>



The validation results obtained from the three validators were then analyzed. Analysis of validation results was carried out by averaging each question item. Analysis of reliability results can be seen from Cronbach's alpha value. A test with a high Cronbach's alpha value means the reliability is also high so that the instrument developed is suitable for use. As for the reliability data in the final product trial, Cronbach's Alpha value was obtained at 0.616, so that the assessment instrument assisted by QuizWhizzer was considered reliable in the high category.

Expert validation of the assessment instrument contains a table of product feasibility and descriptions of suggestions made by 3 validators. Expert validation results are analyzed in the following ways:

$$V_a = \frac{TS_e}{TS_h} \times 100\%$$

Information :

V_a: Expert validation

TSe: Raw score obtained

TSh: Highest score in the validation sheet

The range of validity levels is as follows:

Table 2. Validity Criteria

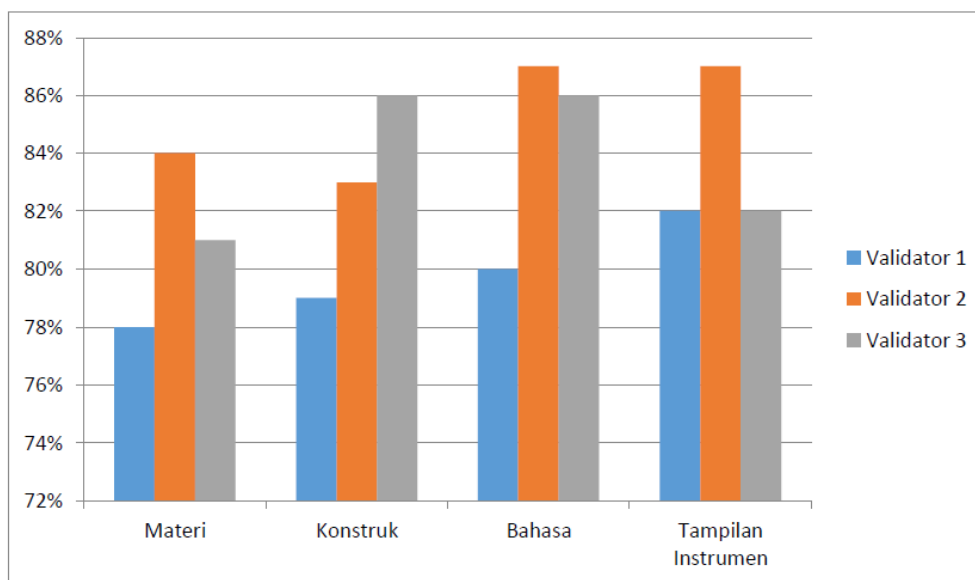
Evaluation	Validity Criteria
84 < V ≤ 100	Very Valid
68 < V ≤ 84	Valid
52 < V ≤ 68	Quite Valid
36 < V ≤ 52	Invalid

(Arthana, 2005)

Based on data analysis that has been carried out, the validity of the QuizWhizzer-based assessment instrument shows a total average percentage of 83%, which means the product is valid. The results of research from expert validators on each aspect also show valid and very valid categories, such as the material aspect obtained 81% valid category, the construct aspect obtained 83% valid category, the language aspect obtained 84% very valid category, the instrument display aspect obtained 84 % category is very valid. Based on the mean percentage value obtained, it shows that the QuizWhizzer-assisted assessment instrument is suitable for use without revision. Can be seen in table 3.

Tabel 3. expert validation

No	Assessment Aspect	Percentage of Validators			Percentage	Category
		1	2	3		
1.	Material	78%	84%	81%	81%	Valid
2.	Construct	79%	83%	86%	83%	Valid
3.	Language	80%	87%	86%	84%	Very Valid
4.	Instrument Display	82%	87%	82%	84%	Very Valid
	Average	80%	85%	84%	83%	Valid



Gambar 1. Kurva Validasi Ahli

This development research produces a QuizWhizzer-based assessment instrument to improve students' valid multiple representation abilities. Where the instrument can be said to be suitable for testing on students, because expert validation has been carried out. In the question validation process, there was one question that was not good, so it needed improvement by adding several pictures. The instrument created contains several aspects related to multi-representation abilities, namely verbal representation, image representation, graphic representation, and mathematical representation.

Instruments can be tested if they have been validated by a validator and obtained valid results. Analysis of validation results is carried out by finding the average of the three validators' assessment results and then calculating the average. Based on the validation results, the results obtained were that the material aspect obtained 81% in the valid category, the construct aspect obtained 83% in the valid category, the language aspect obtained 84% in the very valid category, the instrument display aspect obtained 84% in the very valid category. With indicator questions can be used without revision.

The material aspects in the multiple choice questions are that the questions correspond to the indicators, the test items correspond to basic

competencies, the content of the material asked is appropriate to the school level and class level, there is only one correct answer. The construction aspect consists of the question items being formulated clearly and concisely, there are clear instructions on how to do the questions, the question items do not contain double negative questions, the graphs/images used are clear and easy to understand. The language aspect consists of the use of clear and straightforward language. The instrument display aspect consists of the template used, creativity in designing the instrument, and the songs used in the process of working on the questions.

CONCLUSION

The expert validation results received a valid assessment by three validators who came from 2 science education lecturers and 1 junior high school science teacher. The validity of the questions was found to be 20 valid questions and suitable for use for testing. Thus, the QuizWhizzer-based assessment instrument for measuring multi-representational abilities is said to be valid, reliable, and suitable for use as an evaluation question after learning science material on Business and Simple Aircraft.

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