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Development of Authentic Assessment in Geometry Learning

Abd Kadir Jaelani[1], Muhammad Hasbi[2*]

[1]Universitas Muhammadiyah Makassar
[2]Institut Agama Islam As'adiyah Sengkang
***Corresponding Author:** muhammad.hasby80@gmail.com

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ABSTRACT

This study aims to describe the process and results of the development of authentic assessment in teaching geometry which refers to the 4-D model. Geometry authentic assessment in this study includes learning achievement tests, self-assessment, portfolio assessment, performance assessment guidelines, self-assessment guidelines, portfolio assessment guidelines, feasibility test instruments, teacher response questionnaires, student response questionnaires, and validation sheets. The research subjects are 8th-grade students of SMPN 2 Barombong, Gowa Regency. The validity test analysis is rationally obtained through two the results of the validation of experts, test reliability both rationally and empirically, and objectivity using the product-moment formula. The results showed that the authentic assessment met the criteria of being valid, practical, and effective. As a consequence, it is suggested that the development of authentic assessment tools for geometry learning be expanded to other resources to make teacher evaluation easier. Furthermore, the study's implications provide teachers with information for conducting authentic assessment formulation in the implementation of learning, especially for students.

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INTRODUCTION

Mathematics grows and develops because of the thought process (Kallia et al., 2021; Schoevers et al., 2019). Therefore, logic is the basis for the formation of mathematics. Logic is the infancy of mathematics, whereas mathematics is the maturity of logic. At first, the branches of mathematics that were found were Arithmetic or Counting, Algebra and Geometry, and so on (Björklund et al., 2021; Garnica & Vianna, 2019). But none of the definitions of mathematics can be generally accepted, or at least acceptable from various points of view. Mathematics is known as a deductive science that studies regular patterns and organized structures. It starts with undefined terms (basic terms, primitive terms) (Chaudhary & Batra, 2021), then on defined elements to axioms/postulates, and finally with

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theorems (Waller & Flood, 2016). Mathematical concepts are arranged hierarchically, structured, logically, and systematically, starting from the simplest concepts to the most complex concepts (Darma et al., 2020).

One branch of mathematics that can be viewed as a deductive system is geometry. Geometry is a mathematical term for an abstract thing with a perfect shape and dimension or any shape understood as a set of specific setpoints (Pereira et al., 2021; Wijaya et al., 2020). The geometry that we have studied so far, mainly at the school level, is Euclidean geometry. So, understanding the concept of geometry needs to be emphasized from an early age in the minds of students to avoid "Definition Circles" (Markovits & Patkin, 2020; Novita et al., 2018; Ulusoy, 2021). There need to be definitions of bases or elements that are not defined. An example is a definition circle, for example, a point is the intersection of two lines, and a line is a connection between two points. This kind of thing is wrong. A definition must be stated in the form of a sentence that contains "if and only if" or "reversible" (can be reversed). For example, "an equilateral triangle is a triangle whose three sides are the same" (Altıparmak & Gürcan, 2021; Stewart, 2017). This should mean: If a triangle is equilateral, then all three sides are equal. If a triangle has equal sides, then the triangle is equilateral. So it can be said: "A triangle is called equilateral if and only if all three sides are equal" (Fu et al., 2021; Lupyan, 2017). Given the need for elements that are not defined, then, of course, not all relations can be defined. So, there must also be an undefined relationship.

One of the weaknesses of Euclid's geometry is that tries to define all elements in geometry up to points and lines (Putri & Feriyanto, 2020; Yazidah, 2017). If we consider the first definition of Euclid's geometry: "a point is that which has no part", it is necessary to define what is meant by a part. In his or her second definition: "a line is a length without width", it is necessary to define what is meant by length (da Silva & Santos, 2019; Pereira et al., 2021). What is meant by width? So, it appears that there must be basic understanding to avoid misunderstandings of the concept in the minds of students. In connection with the above, the author tries to provide the basics of a flat plane of triangles and circles that begins with understanding the concept and its terms, then proceeds with a discussion of examples and non-examples, the relationship of a concept to other concepts, and the implications of a concept. So, the Mathematics Content Standards for 8^{th}-grade middle school, which are topics in geometry learning, namely the Pythagorean Theorem and Circles, considering that these three subjects are a fundamental part of geometry (Morino, 2021).

Curriculum, learning process, and assessment are three dimensions of the many

dimensions that are very important in education (Caniglia et al., 2018; Vidergor, 2018). These three dimensions are interrelated with one another. The curriculum is an elaboration of educational goals that form the basis of a learning program (Cahapay, 2020; Wang et al., 2021). The learning process is an effort made by the teacher to achieve the goals outlined in the curriculum. Furthermore, assessment is one of the activities carried out to measure and assess the level of curriculum achievement and the success or failure of the learning process. Therefore, in addition to a suitable curriculum, a correct learning process needs a planned assessment system. On the other hand, assessment in mathematics is expected to reveal students' abilities in terms of understanding the concepts, procedures, communication, reasoning, and problem-solving. In keeping with this, the current curriculum, the 2013 curriculum, calls for student-centered or process-oriented learning. Furthermore, in this age of disruption, Indonesian education faces hurdles. There is inequity or instability in the traditional education system as it transitions to a technology-based education system in the era of disruption (Horvath, 2016; Li et al., 2022). The current educational system has not been able to completely assist teachers and students. Students' readiness and needs, material applicability, and the process of learning evaluation must all be considered while developing curriculum education in the modern era.

In 21st-century skills, alternative assessment in instruction is needed (Ilany & Shmueli, 2021). Based on this, it is necessary to have an alternative assessment that is not only in the form of a written test (Kingston & Broaddus, 2017; Shahbari & Abu-Alhija, 2018), especially on geometry material. In general, teachers in schools tend to use tests more than non-tests. This is possible since the test kits are simple to prepare and use, and those tested are only confined to the cognitive part based on the learning outcomes gained by students after completing their classroom learning experiences. The test technique requires less preparation than the non-test technique. The written test, which is commonly used as an assessment tool, has several weaknesses, but does not generally apply to essay tests (Fitriani & Yarmayani, 2018), including: (1) each item used in a test has a single answer; (2) the test only focuses on the final score and does not focus on how students get answers; (3) the test is not able to reveal how students think; and (4) generally, the test is not able to measure all aspects of learning.

Recently, there has been a tendency for people to start thinking that assessments made on students should be able to provide comprehensive information about students (Suskie, 2018). If a student is said to be successful in learning, then that success must be measured

by measuring instruments that are by the learning objectives or competencies that must be achieved. In other words, the information obtained from the assessment must be comprehensive and be carried out at appropriate times during and after students' studies. This means that measurements must be carried out throughout the learning process that students undergo. For this reason, it is necessary to apply an assessment that can assess students for various things. Assessment is carried out during the learning process and also on learning outcomes. In the 2013 curriculum, assessment is measured in the cognitive, affective, and psychomotor domains (Sabri et al., 2019). Assessment in the cognitive domain in mathematics learning requires teachers to carry out various types of assessment because the demands of the 2013 curriculum for mathematics require students to have the following abilities: conceptual understanding, reasoning and communication, and problem-solving (Hassan et al., 2018; Widiyatmoko & Shimizu, 2018).

The affective domain is concerned with the ability to change one's views and values. Students' attention to lessons, discipline, learning motivation, respect for teachers and classmates, study habits, and social interactions are all examples of affective learning outcomes. Meanwhile, the psychomotor domain encompasses movement behavior as well as individual skills and abilities to act. Psychomotor learning outcomes refer to pupils' capacities or capabilities to act once they have had certain learning experiences. The psychomotor domain includes motor exercises that aid in the development of students' object manipulation abilities. The teacher's role in the development of this psychomotor domain is critical, and he or she is expected to be able to fulfill it.

Assessment is divided into authentic assessment and alternative assessment (Ferita, 2017; Widyastuti et al., 2021). Authentic assessment measures students' actual abilities that cover broad aspects such as students' daily lives. Conducting an authentic assessment requires authentic tasks that must be completed by students. Included in the authentic assessment are performance assessment, portfolio, and student self-assessment. Furthermore, an alternative assessment is an assessment that is different from the usual. Alternative forms of assessment include performance appraisals, observation and questioning activities, presentations and discussions, projects and investigations, portfolios and journals, interviews and conferences, and self-assessments. Alternative assessments encourage students to master not only basic skills (Ghani et al., 2017), but also an alternative assessment is classified as an authentic assessment or not determined by the management of the implementation of the alternative assessment. For example, in assessing the performance of a student, which is just the result

of cheating by his friend, of course, it is not at all part of an authentic assessment. Likewise, the activity of asking a student is just to show that I am diligent in asking questions, and so on.

Authentic assessment has been the subject of several past research, all of which are connected and important and support this research (Arifin, 2018; Fauziah et al., 2018; Sabri et al., 2019; Syaifuddin, 2020). Therefore, in this study, it is necessary to develop an assessment tool in the form of an authentic assessment tool with specifications for performance appraisal, self-assessment, and portfolio assessment.

RESEARCH METHOD

This is development research, to develop an authentic assessment tool for geometry material based on the 4-D model. Researchers use this model because the authentic assessment developed is a device in the learning system. This model is a learning development approach system that is implemented through 4 stages, namely: Introduction (Define), Planning (Design), Development, and Dissemination (Anisa, 2018; Azizah et al., 2021; Hasbi et al., 2019; Ilmiwan et al., 2019; Taruh & Mursalin, 2018). This research was conducted at a public junior high school 2 in Gowa Regency, South Sulawesi, with a subject consisting of 40 students in 8^{th}-grade. The research subjects were chosen based on the research objectives, as well as suggestions, feedback from the teacher, and the fact that the 8^{th}-grade of public junior high school had studied the Pythagorean Theorem material. In this study, authentic assessment tools in geometry learning consist of (1) student learning outcomes test instruments as a reference for performance assessment on the subject of the Pythagorean Theorem and Circles; (2) Student self-assessment instruments; (3) Portfolio assessment instruments in the form of best work and student diaries; (4) Performance appraisal guidelines; (5) Guidelines for self-assessment; (6) Portfolio assessment guidelines; (7) The instrument of authenticity assessment tool feasibility test; (8) Teacher's response questionnaire; (9) Student response questionnaire; and (10) Validation sheet.

Furthermore, authentic assessment tools are used as instruments in this study. This study used Nieveen's theory about the criteria of rich product quality (valid, practice, and effective) (Prayogi et al., 2018; Zeggelaar et al., 2020). The data analysis was carried out quantitatively and qualitatively. Validity and reliability (valid), objectivity and practicality (practical), and effectiveness are the main criteria for developing an authentic assessment tool in this study.

FINDING AND DISCUSSION

This study aims to obtain an authentic assessment tool that is valid, reliable, objective, practical, and effective. For this reason, a systematic development process was adopted using the 4-D development model by Thiagarajan with certain modifications. The results obtained at each stage of development in connection with the process of developing an authentic assessment tool will be described as follows.

1. Define Stage

The results of the preliminary analysis showed that, based on the results of monitoring and observation, there were several complaints made by teachers and students about the existing assessment system. So far, the form of the assessment test given makes students worried and anxious because the assessment only focuses on the correctness of the answers obtained by students. In addition, the assessment given by the teacher so far is still mostly subjective. Only the teacher's feelings are used to pass judgment. Alternatively, in this scenario, some teachers provide the highest ratings to pupils who are close to them. Seeing this phenomenon, of course, authentic assessment is a must. For this reason, authentic assessment needs to be applied because authentic assessment does not focus on students' right or wrong answers, but rather on how students understand concepts in geometry learning and how students' explanations reach conclusions.

Furthermore, the researcher assesses the background knowledge, the language employed, and the level of cognitive development of the students in the student analysis. The results of the study show that the 8^{th} grade students of SMPN 2 Barombong have studied geometry at the elementary school level as a prerequisite for studying geometry at the junior high school level. However, the teacher still needs to review the material with the students again. The language used by students is Indonesian, both in daily life and in the learning process.

2. Design Stage

Based on the 4-D development model by Thiagarajan, the second step is the design or design that is carried out, among others, designing problem solving, defining problems, and building alternative parts of the selected problem-solving. The results of the development at this stage are in the form of an initial design which includes several things, namely: (1) the results of the draft guidelines for the use and development of authentic assessment tools, (2) the results of the initial designs of authentic assessment tools, and (3) the results of the

design of instruments that will be used to obtain the data needed in the development process. Figure 1 depicts the design of developing an authentic assessment device.

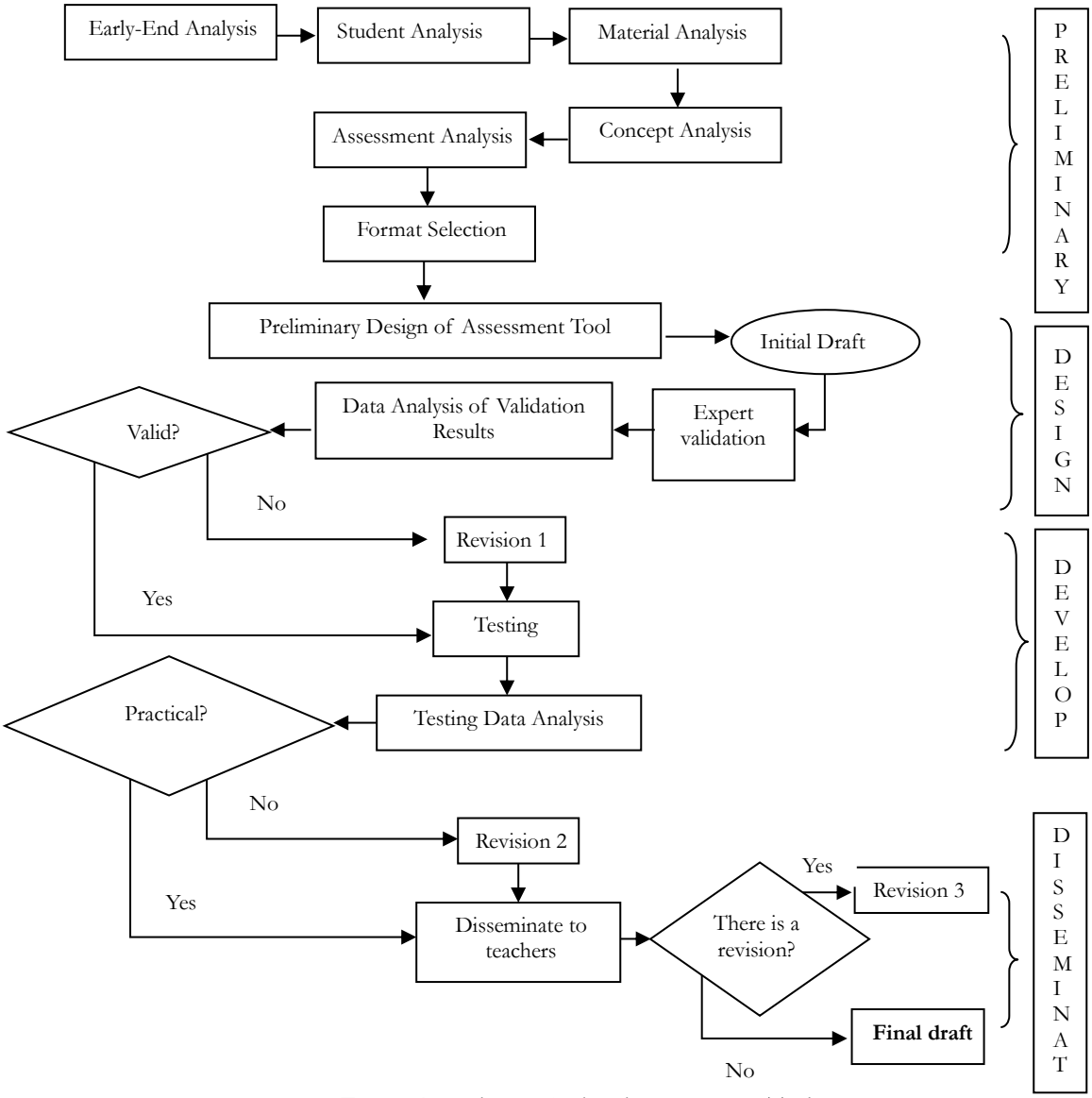

Figure 1. Design an Authentic Assessment Tool

3. Development Stage

At this stage, a prototype-1 authentic assessment tool has been produced consisting of instruments (validity, reliability, objectivity, practicality, and effectiveness). These results at this stage are followed up by carrying out activities to test the validity of the resulting prototype. The results of this development stage will be presented as follows:

a. The results of the validity of the performance assessment tool

The results of the assessment/validation of students' performance tests for the development of an authentic assessment tool on the subject of the Pythagorean

Theorem. The results of the analysis can be explained in Table 1 as follows:

Table 1. Validation Results of Student Performance Tests for Developing Authentic Assessment Tools on The Subject of The Pythagorean Theorem

		Validator I	
		Irrelevant Score (1-2)	**Relevant** Score (3-4)
Validator II	**Irrelevant** Score (1-2)	0 item	0 item
	Relevant Score (3-4)	0 item	16 item

Based on Gregory's content validity formula, content validity $= \frac{16}{(0+0+0+16)} = \frac{16}{16} = 1$. This shows that the level of validity is 1 or V = 100% which means the assessment results from the two validators have "strong relevance". The results of the measurement or intervention carried out by the two validators are valid.

The results of the assessment/validation of the performance test for developing an authentic student assessment tool on the subject of the circle. The results of the analysis can be explained in Table 2 as follows:

Table 2. The Results of The Validation of Student Performance Tests for The Development of An Authentic Assessment Tool for The Main Circle

		Validator I	
		Irrelevant Score (1-2)	**Relevant** Score (3-4)
Validator II	**Irrelevant** Score (1-2)	0 item	0 item
	Relevant Score (3-4)	0 item	22 item

Based on Gregory's content validity formula: content validity $= \frac{22}{(0+0+0+22)} = \frac{22}{22} = 1$. This shows that the level of validity is 1 or V = 100% which means the assessment results from the two validators have "strong relevance". The results of the measurement or intervention carried out by the two validators are valid.

The results of the assessment/validation of performance appraisal guidelines on the subject of the Pythagorean Theorem and Circles. The results of the analysis can be explained as follows (can be seen in Table 3):

Table 3. Results of The Validation of Performance Appraisal Guidelines on The Subject of The Pythagorean Theorem and Circle

		Validator I	
		Irrelevant Score (1-2)	**Relevant** Score (3-4)
Validator II	**Irrelevant** Score (1-2)	0 item	0 item
	Relevant Score (3-4)	0 item	4 item

Based on Gregory's content validity formula: content validity $= \frac{4}{(0+0+0+4)} = \frac{4}{4} = 1$. This shows that the level of validity is 1 or V = 100% which means the assessment results from the two validators have "strong relevance". The results of the measurement or intervention carried out by the two validators are valid.

The results of the assessment/validation of student self-assessment guidelines for the development of authentic assessment tools on the subject of the Pythagorean Theorem and Circles. The results of the analysis in Table 4 below are as follows:

Table 4. The Results of The Validation of Students' Self-Assessment in Developing an Authentic Assessment Tool On The Subject of The Pythagorean Theorem And Circles.

		Validator I	
		Irrelevant Score (1-2)	**Relevant** Score (3-4)
Validator II	**Irrelevant** Score (1-2)	0 item	0 item
	Relevant Score (3-4)	0 item	4 item

Based on Gregory's content validity formula: content validity $= \frac{4}{(0+0+0+4)} = \frac{4}{4} = 1$. This shows that the level of validity is 1 or V = 100% which means the assessment results from the two validators have "strong relevance". The results of the measurement or intervention carried out by the two validators are valid.

The results of the assessment/validation of the "best work" portfolio assessment guideline for the development of an authentic assessment tool on the subject of the Pythagorean Theorem and Circles. The results of the analysis can be explained as follows:

Table 5. Validation Results of The "Best Work" Portfolio Assessment Guidelines for Developing Authentic Assessment Tools on The Subject of The Pythagorean Theorem And Circles

		Validator I	
		Irrelevant Score (1-2)	**Relevant** Score (3-4)
Validator II	**Irrelevant** Score (1-2)	0 item	0 item
	Relevant Score (3-4)	0 item	5 item

Based on Gregory's content validity formula: content validity $= \frac{5}{(0+0+0+5)} = \frac{5}{5} = 1$. This shows that the level of validity is 1 or V = 100% which means the assessment results from the two validators have "strong relevance". The results of the measurement or intervention carried out by the two validators are valid.

The results of the assessment/validation of the portfolio assessment guide "diary" of the development of an authentic assessment tool on the subject of the Pythagorean Theorem and Circles. The results of the analysis in Table 6 are as follows:

Table 6. Validation Results of Portfolio Assessment Guidelines "Diaries" of Developing Authentic Assessment Tools on The Subject of The Pythagorean Theorem and Circles

		Validator I	
		Irrelevant Score (1-2)	**Relevant** Score (3-4)
Validator II	**Irrelevant** Score (1-2)	0 item	0 item
	Relevant Score (3-4)	0 item	5 item

Based on Gregory's content validity formula: content validity $= \frac{5}{(0+0+0+5)} = \frac{5}{5} = 1$. This shows that the level of validity is 1 or V = 100% which means the assessment results from the two validators have "strong relevance". The results of the measurement or intervention carried out by the two validators are valid.

In addition to content validity, to show the functioning of the questions in measuring the abilities that should be measured, item validity tests were also carried out based on the results of the test trials. Testing the validity of this item is done using SPSS software with Bivariate Pearson analysis. The results obtained will be presented in each of the following performance tests. The validity test of the Pythagorean Theorem subject performance test obtained a correlation value of more than 0.355. It can be concluded that the items on the Pythagorean Theorem subject performance test are significantly correlated with the total score or can also be declared as "valid".

The validity test of the circle subject matter performance test is greater than 0.355. It can be concluded that the items on the circle subject matter performance test have a significant correlation with the total score or can also be declared as "valid".

b. Performance Assessment Tool Reliability Test Results

The internal consistency test of the subject of the Pythagorean Theorem obtained a degree of reliability of 0.61. This shows that the degree of reliability of 0.61 is in the interval $0,60 < R \leq 0,80$. In other words, the level of internal consistency of the performance test is "high". The internal consistency test of the circle subject obtained a degree of reliability of 0.64. This shows that the degree of reliability of 0.64 is in the interval $0,60 < R \leq 0,80$. In other words, the level of internal consistency of the performance test is "high".

The results of the analysis to test the reliability coefficient of Alpha Cronbach on the performance test of the subject of the Pythagorean Theorem with an Alpha value of 0.782 were obtained. It can be concluded that the items on the performance test of the Pythagorean Theorem are "reliable". Meanwhile, the Alpha Cronbach reliability coefficient test on the Circle Principal Performance Test obtained an Alpha value of 0.759. So, it can be concluded that the items on the performance test are "reliable".

c. Authentic Assessment Tool Objectivity Test Results

In the analysis of the objectivity test, the authentic assessment tool rubric is carried out on each performance test result. The results of the analysis will be presented as follows. The objectivity test of the rubric of the student performance assessment tool on the subject of the Pythagorean Theorem and Circle gets the value of $r_{xy} = 0,99$. Thus, the criteria determined at the interval of $0,79 \leq r_{xy} < 0,99$ have a "very high" level of objectivity. Next, test the objectivity of the rubric of the student's self-assessment tool on the subject of the Pythagorean theorem and circles get the value of $r_{xy} = 0,95$ (Pythagorean theorem) and the value of $r_{xy} = 0,96$ (Circle). Thus, the criteria determined at the interval of $0,79 \leq r_{xy} < 0,99$ have a "very high" level of objectivity.

Test the objectivity of the rubric of the student portfolio assessment tool on the subject of the Pythagorean theorem and circles get the value of $r_{xy} = 0.97$ (Pythagoras theorem) and the value of $r_{xy} = 0.95$ (Circle). Thus, the criteria determined at the interval of $0.79 < r_{xy}$ 0.99 have a "very high" level of objectivity.

d. Authentic assessment tool practicality test results

The results of the practicality test of authentic assessment tools are carried out by analyzing: (1) the data from the observation sheet on the feasibility of the application of the authentic assessment tool obtained through validation by two experts, and (2) the data from the observation sheet on the implementation of the authentic assessment tool obtained through observations by the observer. make observations of teachers who carry out authentic assessments.

The results of the feasibility assessment of the application of an authentic assessment tool show that this performance appraisal tool has a feasibility value (LK) of 4.3. It can be concluded that the performance appraisal tool is "appropriate" to be applied because it is in the interval of $3.5 \leq L_K < 4.5$. It can be concluded that the self-assessment tool is "feasible" to be applied because it is in the interval $3.5 \leq L_K < 4.5$. Meanwhile, this portfolio assessment tool has a feasibility value (LK) of 4. It can be concluded that the self-assessment tool is "appropriate" to be applied because it is in the interval $3.5 \leq L_K < 4.5$.

The results of the observation of the implementation of the authentic assessment tool. The results show that the implementation of this authentic assessment tool has an implementation value (T) of 4.64 on the subject of the Pythagorean theorem and (T) of 4.57 on the subject of circles. It can be concluded that the application of an authentic assessment tool is "completely implemented" because it is at an interval of $4.5 \leq T$.

e. Results of Item Analysis

The results of the level of difficulty of the test items on the performance test items on the subject of the Pythagorean theorem. It was found that 4 items out of 10 items were in the 0.71-1 interval, including the "easy" category. While the other 6 items are in the interval of 0.31 – 0.70, including the "medium" category. The results of the level of difficulty of the test items on the performance test items on the subject of the circle. It was found that 1 item out of 8 items was in the interval 0.71 - 1 "easy" category. While the other 7 items are in the interval of 0.31 – 0.70 in the "medium" category.

The results of the analysis of the discriminatory power of test items on student performance tests on the subject of the Pythagorean Theorem. The percentage of discriminatory power obtained is in the "accept and repair" category or is in the interval

of 0.30 – 0.39. While the other 4 and 5 items are "very good questions" because they are in the interval of 0.40-1. Meanwhile, the distinguishing power of the test items on the student performance test on the subject of the circle. It was found that only item 3 has a percentage of discriminating power of 29.32% in the category of questions with "fixed questions" action. While items 2, 3, 4, and 8 each have different percentages of 39.32%, 29.77%, 32.50%, and 37.27% are in the category of questions with "accept and correct" actions. Furthermore, items 1, 5, and 7 each have a percentage of 40.68%, 39.77%, and 50.91% are in the category of questions with "very good" actions.

4. Disseminate Stage

This dissemination stage was carried out in a limited and simple manner by distributing and socializing with the teachers of SMPN 2 Barombong, Gowa Regency. From the results of the distribution, several suggestions were obtained and used to revise the initial draft into a final draft as the final development of the assessment tool. These suggestions include: (1) The performance test developed should pay attention to the level of students' cognitive development as well as the available time allocation; (2) The rubric developed should be easier to use by the teacher by paying attention to the criteria on each scale.

Figure 2 shows parts of an authentic assessment tool for student performance tests on the Pythagorean Theorem that were created in this study.

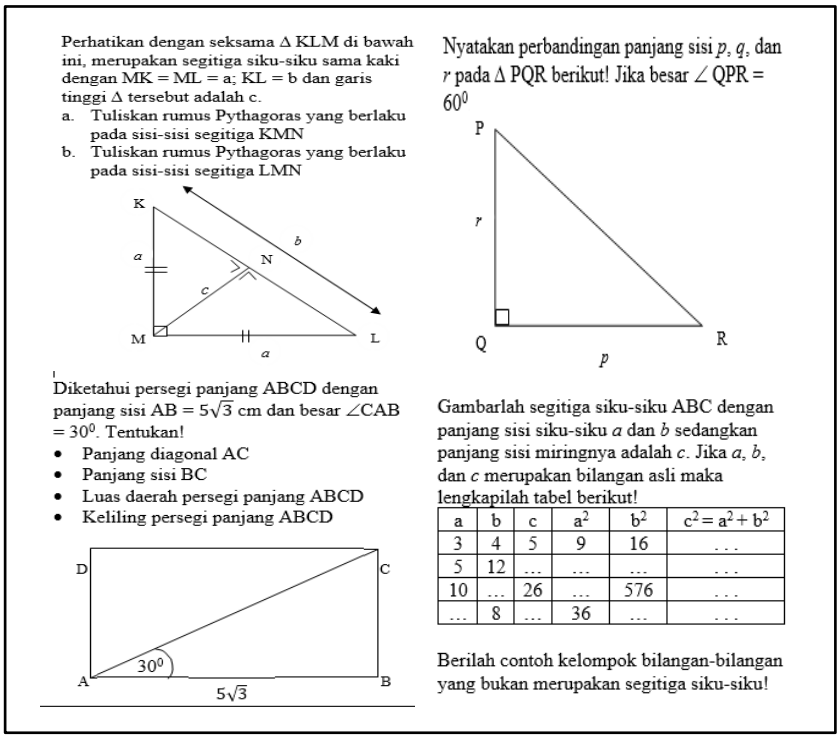

Figure 2. Authentic Assessment Tools for Student Performance Tests on The Pythagorean Theorem

Moreover, the following are pieces of authentic assessment tools for student performance tests on the subject of circles in Figure 3.

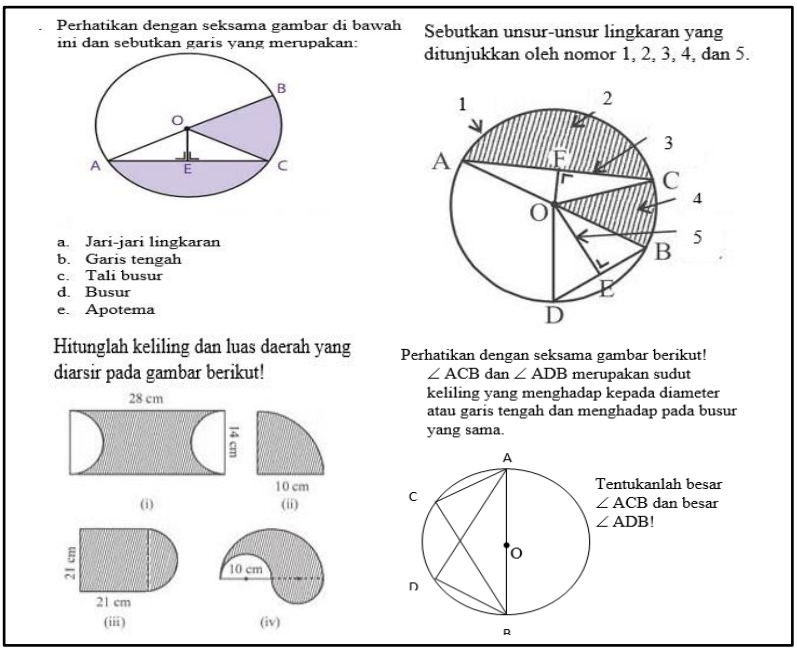

Figure 3. Authentic Assessment Tools for Student Performance Tests on The Circle

5. Discussion

The achievement of research objectives will be stated to what extent the research objectives that have been previously set have been achieved. This achievement is associated with the validity, reliability, objectivity, and practicality of authentic assessment tools. More specifically, these four things will be described in succession below: (1) Validity, based on the results of the validity tests that have been stated previously, it can be concluded that the prototypes of authentic assessment tools (guidelines for the use and development of authentic assessment tools and appropriate instruments) have all met the validity criteria. Although previously, several revisions have been made according to the suggestions given by the validator; (2) Reliability (valid), based on the reliability test results both rationally and empirically, it can be concluded that the authentic assessment tools (guidelines for the use and development of authentic assessment tools and corresponding instruments) have all met the reliability criteria. Although previously, several revisions have been made according to the suggestions given by the validator; (3) Objectivity (practical), based on the results of the objectivity test of the authentic assessment tool rubric, it can be concluded that the rubric that has been developed has been able to objectively assess student performance test results in terms of the "high" level of objectivity of the rubric. Although previously, several

revisions have been made according to the suggestions given by the validator; (4) Practicality (practical), theoretically, based on the results of the expert's assessment of authentic assessment tools, it can be stated that the assessment tools are feasible to be applied, as well as based on the results of practitioners' assessments. Empirically, based on the results of the performance appraisal tool trials conducted, the practicality of authentic appraisal tools can also be fulfilled; and (5) Effective, the dissemination stage shows that the authentic assessment is effectively used, but with the status of "revision device" based on suggestions and input from the results of the deployment of the device. The findings of this study are relevant and are backed up by several earlier studies (Fauziah et al., 2018; Ilmiwan et al., 2019; Sabri et al., 2019; Syaifuddin, 2020; Taruh & Mursalin, 2018).

CONCLUSION AND SUGGESTION

This study aims to obtain an authentic assessment tool that is valid and reliable (valid), objective and practical (practical), and effective through the development process. Based on the results of the analysis and discussion showed that the development of an authentic assessment tool for geometry learning in grade 8th met the criteria of being valid, practical, and effective. Based on expert judgment, a valid instrument fills in the blanks. Based on test dependability, the instrument proved to be consistent in its assessment. Because it is in an extremely practical category, the teachers may easily use the instrument in the classroom and from the results of the dissemination, several suggestions were obtained and used to revise the initial draft into a final draft as the final development of the assessment tool.

Further research suggests that authentic assessment tools for various topics be developed to objectively examine students' abilities in broader subjects. The instrument, on the other hand, can be used by the researcher, and the performance can then be improved. The instrument that has been produced can help teachers evaluate the performance of geometrical material that can be used as a reference in the manufacture of instrument performance in studying mathematics.

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