



The Developing of Performance Assessment to Calculate Scope and Volume of Cube and Block Competence in The Mathematic Learning of Junior High School

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Abstract

Assessment of performance tests is part of the implementation curriculum of 2013 that can not be implemented by many teachers because there are obstacles such as the absence of standard instruments so that teachers feel difficulty. This research is a study to develop performance assessment test on mathematics learning to calculate scope and volume of cube and block for junior high school in 2013 curriculum that is valid, reliable, practical. Method of this research used research development with adapted from Djemari Mardapi (2016 : 132) to 9 – steps of development. The validity of the instrument contents is tested by 3 experts in the field, the score given by the expert is tested using V Index, and reliability with interarter using the coefficient of Ebel procedure. Data Analysis on field used construct validity with Exploratory Factor Analysis (EFA) and reliability used alpha cronbach. The result showed that instrument of validation test from 10 object assessment test performance through expert judgment produced coefficient of validation that has score of coefficient $> 0,3$ and reliability of 0,88. Data analysis on field test from could see on KMO that showed score of KMO 0,689 that has meaning was the number of instrument test analyzed more deep. The analysis performance test assessment produced 3 factore are product, process, and accommodates task. The result used reliability test of Alpha Cronbach also got coefficient 0,706. Test of practicality, from 3 mathematics teacher respondents stated practical with score 46,67 which means practical use. This research is expected to develop standardized tests to measure the assessment of performance tests on mathematics learning of junior high school to calculate scope and volume of cubes and block.

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INTRODUCTION

Assessment is one of component that very important to measure in the attainment of learning goal. Assessment is one of important aspect to understand and to express the attitude and students behavior (Azwar, 2013: 87). The government still applying assessment not only in the writing test but also the authentic assessment that measure based on process and the result, they are knowledge aspect, attitude and skill that can developing the curriculum. According to Permendikbud number 104 year 2014 said that the curriculum of 2013 ust use the authentic assessment.

The authentic assessment is an assessment that measure of the real performance of student by own students. The performance assessment is activity and result activity that obtained by students during learning (Abidin, 2012: 169). One of them is competence assessment skill that done by observe directly the performance assessment of students. Stiggins (Masrukan, 2014: 32) said that test of performance assessment is a test that teachers ask the students to do special activities under the control of teachers. Then, students will observe their performance and make judgement about quality their result that their showed. The performance assessment is one of technique of assessment during the process of collecting the data to make decision about an individu using systematic observation (Utomo & Ardiyarta, 2013: 3). Performance assessment test could be advance student was learning (Subali, 2011: 132).

Then from the result of interview with teacher of math in SMP AL FUSHA Kedungwuni showed that almost 60 % teachers still using cognitive assessment as the only source assessment toward the students. Despite the teacher realize the important of authentic

assessment especially in the implementation of curriculum 2013. But also, teacher do assessment using relevant test. Assessment done without clear hint and assumed that they done the assessment.

The research by Yudha, Masrukan, & Djuniadi (2014: 62) said that one of the obstacle found in the performance assessment is the teacher not understand yet about performance assessment very well. It happen because they not understand yet about the validity and reliability a test very well. Meanwhile, the performance assessment of test is so complex and so many students in the classroom (Fauzi, 2015: 194). This argue same with (Harjono, 2012: 121) said that the learning activity must done by teacher with developing instruments of learning that they will use in the class. So te learning activity will be maksimum.

The explanation of difficulties that found by teacher give reason to developing the performance assessment that can do with simple and efficient. The developing of performance assessment need to calculate the suitability with curriculum, justice, generality, standart, and reliability (Muslich, 2009: 98 - 99).

Based on the result of observation and interview with teacher of math in the SMP Al Fusha Kedungwuni, Pekalongan. This time, the assessment on math lesson only on cognitive aspect, while on psikomotoric aspect (skill) did not do the assessment. Because the orientation of suspension in the performance of assessment not clear enough so, it make difficult to use (Triana, 2006: 2). The components that difficulties to be observe by teachers and they often can make only test question to measure the cognitive aspect. While to assess the psikomotoric aspect the ability of teacher still minimum.

Assessment as an integral part of learning should not be done for a moment, but must be on a

regular, continuous and comprehensive basis covering all components of the learning process and outcomes of students. The researcher intends to apply the assessment of the performance test on Mathematics in Junior High School. The performance test used as the appraisal tool will be linked to the VIII Class Competence (SK) and Competency Standard (KD), on an even semester's SK Build a Flat Side Room. On the building material of the flat side, the researchers focused only on the material of cube and block. The indicator of the cube and block that researchers will do is calculate scope and volume of cube and block.

Related to the difficulties of teacher in the assess of performance assessment on math learning in the junior high school. The researcher argue that it is need to make plannig and developing the performance of assessment so the researchers interested in conducting research with the title "The Developing of Performance Assessment To Calculate Scope and Volume of Cube and Block Competence In The Mathematic Learning of Junior High School".

METHODS

The method used in this research was research to develop the test. The model of this research adapted by research developing of Mardapi (2016: 132) there are ten (10)steps that must to do. But, in this research, researcher only use nine steps. In this step, the developing of test with the final result was product of test that reliable and valid had reached. The nine steps are (1) Introduction study and determine specification of test, (2) Writing test, (3) Determine the scale, (4) Determine the system of assessment , (5) Analyze the test, (6) Experiment

product and analysis, (7) Assemble the test, (8) Do the measuring, (9) Analyze the final result.

This developing research had done in the SMP Al Fusha Kedungwuni region Pekalongan. The subject of this research was the students of SMP Al Fusha Kedungwuni VIII grade. The sample was 63 students. The result of the data from this research were qualitatif and quantitaf data. The qualitative were transcript of interview, documentation, description of expert correction. The data quantitative were the data of result experiment and test of performance assessment.

This research become important to investigate in the developing process of performance assessment in the mathematic learning to calculate scope and volume of cube and block. The instruments that being develop test had done by validity, reliability, and practically. The expert has given the judgement format of assessment. It is been the source content of validity. For reliability, the researcher used SPSS verse 16.0.

RESULT AND DISCUSSION

The form instrument of performance assessment on the mathematic learning has being develop and then, the content of validity had tested by 3 experts in math. After that, the score had tested by v index. While the content of reliability had tested by interrater and analyzed using Ebel formula. Commentary and advice from the validator used to revise instrument of performance assessment on the math learning in junior high school.

The collecting data from the result of validation of three experts said that the instrument can to use and the form of the data was qualitatif data. It is found by advice of experts. Based on the advice, the researcher got

information that some points need more attention to be base of improvement or revision. They were writing the sentence and the content of the pronouncement must focus on the indicator. The revisoion also got improvement, it was improve the grammar, arrange the sentence and the general form of instrument.

The test of performance assessment that developed consist of 10 instruments. The validity instrument had coefficient score > 0.3. It mean that the instrument of performance had a high validity. The result above also give the conclusion. The conclusion is the test of performance assessment on the mathematic learning can use to practice.

The agreement degree between three validator could explained using interrater coefficient and analyzed using Ebel formula. If the score of result reliability got coefficient score ≥ 0.6 , so the test of performance assessment could reputed and experts has a consistency in the giving assessment (Sujarwanto & Rusilowati, 2015 : 20). Based on the calculated of interrerrater that analyzed using Ebel formula, the researcher got the amount of reliability 0.88. From this score, could conclude the performance of assessment on the mathematic learning reliable and ready to practice.

Research from Sukardi, Ismail, & Suryanti (2014 : 404) that tested of instrument reliability with compare the result of assessment vocational skill by two experts. Vocasional on the children instrument. The result showed that the score of coefficient correlation was 0,888 on first cycle and 0,652 on second cycle. So could conclude that the instrument reliable to use.

Then the researcher do a field test to examine the construc validity used exploratory factor Analisis (EFA). If the data fill the requirement of keiser-meyer-olkin measure of sampling adequacy (KMO MSA) >0.5 and on

chi-square score significant <0,05 then the data suitable and can do the test validity. Based on the field test, the researcher got the score of KMO 0.689 and significant 0.000. The result of test could seen in the Table 1.

Table 1. The Result of Test Advisability of Data Construct Validity

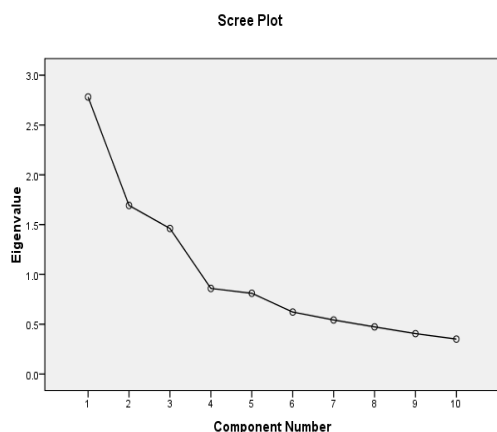
KMO and Bartlett's Test	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.689
Bartlett's Test of Sphericity	Approx. Chi-Square
	128.163
	Df
	45
	Sig.
	0.000

Based on the result of data processing coefficient SPSS Measure of Sampling (MSA) got the score of KMO 0.689, with criteria MSA >0.5. It showed that the result of data field test could to be continue with analysis factor of exploratory. This case proper with theory that delivered by Ghozali (2016: 378) if the score of KMO >0.5 could do analysis factor but if the score KMO <0.5 analysis factor could not analyze.

Data analysis on field could see rotated component matrix all was the number of instrument performance assessment loading factor > 0.3 (Nugroho, Djuniadi, & Rusilowati, 2016: 20). Moreover, Exploratory Factor Analysis (EFA) could using knowledge eigenvalue was formed are factors of variabel (Khilmiyah, Sumarno, & Zuchdi, 2015: 4).

The result output of analysis factor consist of 4 main parts that need more attention. They were: (1) *Total Variance Explained*; (2) *Scree Plot*; (3) *Component Matrix*; (4) *Rotated Component Matrix*. Based on *total variance explained* many factors that formed was 3. Many factor formed by score of eigenvalues that still above 1. The

number of eigenvalues showed the importance of relative each factor. In the calculating the 10 varians that analyzed. Beside of seen the table of *Total Variance Explained*, the number of factor also can be seen *Scree Plot* on picture 1.



Picture 1. *Scree Plot* Factor Analysis Test Performance Assessment

Based on the *Scree Plot* we could see that from factor 1 to 2 and factor 2 to 3 had descend eigenvalues still above number 1. While from factor 4 until end eigenvalues under the number 1. So the amount of factor was 3.

After the 10 of test had extracted become 3 components, the next steps was do the rotation of distribution *component matrix*. There was difference of score correlation variable with each factor before and after do a varimax rotation. The result of rotated *component matrix* could on Table 2

Table 2. The Result of Rotated Component Matrix

Rotated Component Matrix^a

	Component		
	1	2	3
1. Completeness of instrument and material	0.168	0.848	0.094
2. The carefulness student in the beginning practice	0.456	-0.055	0.629
3. The competence of student in the use of instrument activity	0.045	0.230	-0.613
4. The students activity in the doing their work	0.523	0.571	0.124
5. The shape of slices of cube structure	0.740	-0.018	0.092
6. The suitability procedure of practice with the command	0.124	0.234	0.689
7. The determination enumeration and calculation of final result	-0.180	0.836	-0.016
8. The determination of time that they need to work	0.763	-0.094	0.004
9. The determination of formula that they produced	0.591	0.276	0.048
10. The conclusion work result that they got	-0.025	0.215	0.793

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 4 iterations.

Based on table 2 there was one of number that value of factor score loading was <0.5. It mean that this number could not included from 3 formed. You can found the number 3 in the sentence “The competence of student in the use of instrument activity”. For the component that formed in the number one, the researcher called competence of product and included to valid construct with validity score **0,698**, the number test consist of 5, 8, and 9, they were (5)The shape of slices of cube structure, (8) The

determination of time that they need to work and (9) The determination of formula that they produced. Meanwhile in the second factor consist of number 1, 4, and 7 that called process competence and included to valid according to construct with the score of validity **0.752** with the word (1) Completeness of instrument and material, (4) The students activity in the doing their work and (7) The determination enumeration and calculation of final result. In other side, on the third factor consist of number 2, 6 and 10 that called to accomodate work competence and called valid according to construct with the score of validity of construct **0.704** with the word (2) The carefulness student in the beginning practice, (6) The suitability procedure of practice with the command and (10) The conclusion work result that they got.

The analysis of performance assessment on mathematic learning used reliabilitas test alpha cronbach with SPSS software verse 16.0. The result of measurement used alpha cronbach got the score of coefficient reliability's instrument 0.706. The result of analysis on output SPSS verse 16.0. for limited reliability test could seen on Table 3

Table 3. The Result of Analysis Reliability Field Test

Reliability Statistics	
Cronbach's Alpha	N of Items
0,706	9

Table 3 showed that coefficient of reliability according to analysis used SPSS program verse 16.0. reached 0,706. This score appropriate with the theory that mentioned by Naga. Naga said that the coefficient reliability reached 0,50 or more, it is enough toaccept as a good reliability. (Khumaedi, 2012: 13). The research that done by Pradana, Parno, & Handayanto (2017: 58) produced the score of coefficient reliability

alpha cronbach was $r_{ii} = 0.67$ it mean that number of test had high degree of constancy. It appropriated with the research by Alfatah, Waluya, & Sukestiyarno (2013: 40) they produced the score of coefficient reliability with alpha cronbach was 0.618 more than of criteria could called reliable.

The practicability of performance assessment test on mathematic learning to calculate scape and volume of cube and block for junior high school grade VIII also judged to measure the ease of test when used by teacher. It is appropriated with Arifin (2012: 27) tha the practicability is a requirement of standart tests. The practibility mean that it is be a facilitator a test in preparation, use, process, interpret and administration.

The practibility test that developed by 3 teachers of mathematic in SMP Al Fusha Kedungwuni Pekalongan, the assessment aspect in the questionnaire of practibility included objectivity aspect, systematically, construction, grammar, and practicality with the total of pronouncement was eleven. Each aspect has assess given alternative answer score 5 (very good), score 4 (good), score 3 (enough), score 2 (less) and score 1 (poor). The result of developing of performance assessment test showed that the test of performance assessment being developing by them could include very practice to use in the class. It is same with the test of practicability that researched by Kurniati (2013: 167) based on distance scale 1 until 3 obtained the result that 75% from test which done by the teacher toward assessment of instrument learning activity could use in the class. In other side, Dwijayani (2017: 130) put the test the practibility of instrument that measured using observation sheet of activity and the response of teacher toward instrument of learning in the practice category.

Based on the explanation above, the result of developing of performance assessment could be used to measure the ability's skill of students on competence to calculate scope and volume of cube and block in the mathematics learning for VIII grade and the rubric of assessment with the method of assessment that could be understood by every teacher and fulfill the requirement of validity and reliability with practicality. It means that the test was able to be used by teachers.

The results of this study are expected to develop standardized tests to measure the assessment of performance tests on mathematics learning of Junior High School competence to calculate scope and volume of cube and block that can serve as a guide for assessment of performance tests by assessing the valid, reliable, and practical and facilitate teachers in assessment of performance tests especially cube and block of mathematics.

CONCLUSION

The result of this research was produced the performance assessment in the mathematics learning for junior high school on the competence to calculate the scope and volume of cube and block in 2013 curriculum. The performance assessment that developed consists of 4 indicators. The result of the research showed that the assessment of validity test of performance from 10 numbers had produced a coefficient of validity with a score coefficient $>0,3$ and the score of reliability was $0,88$.

The result of analysis of construct validity used *Exploratory Factor Analysis* (EFA) got the *Keiser – Meyer – Olkin Measure* (KMO) $> 0,5$ that was $0,689$, the significance *Bartlett's Test of Sphericity* was $0,000$, meanwhile, the coefficient of *Measure of Sampling* (MSA) from 13 numbers $> 0,5$ it means that the instrument fulfills criteria

testing of factor analysis. *Total Variance Explained* shows that the number of factors formed was 3 factors. It is determined from the score of eigenvalues which is still above number 1. This is supported by the scree plot that was produced on the test. *Component Matrix* shows that the distribution of 10 numbers of instrument on 3 factors that were formed. The result that was obtained on the table *rotated component matrix* shows that 10 numbers of instrument had high loading factor on one of the factors and in the other factor, they had low factor. The score of loading factor that was found for 9 numbers of instrument $> 0,3$. So the number of instrument included to 3 factors that were presented. The coefficient of reliability that the researcher got was $0,706$.

The instrument of practicality assessment was judged based on five indicators, they were subjectivity, systematicity, construction, grammar, and the practicality. The result of the assessment used to all the aspects that had the score of practicality $46,67$ from three of the teachers' respondents. Based on the criteria score that was made by the researcher got the conclusion. The researcher concludes that each respondent assesses the instrument of performance assessment on the mathematics learning in the junior high school was practical to use.

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