

Analysis of Authentic Assessment on Mathematics Learning

Desrina Fauziah^{1,a)}, Mardiyana^{2,b)}, Dewi Retno Sari S^{3,c)}

^{1,2,3}*Department of Magister Mathematics Education, Faculty of Teacher Training and Education
Universitas Sebelas Maret Surakarta, Surakarta, Indonesia*

^{a)} fauziahdesrina@gmail.com

^{b)} mardiyana@staff.uns.ac.id

^{c)} dewiretnoss@staff.uns.ac.id

Abstract. Assessment is an integral part in the learning process. Assessment process and the results should be thoroughly, so that all aspects of the ability of learners can be measured. Authentic assessment is in response to criticism that the assessment made educators are mostly paper and pencil test purely cognitive. However, an understanding of the authentic word is very complex and sometimes lead to some different opinions. This study aimed to describe the planning of authentic assessment, describe the implementation of authentic assessment, and describe barriers experienced teachers in authentic assessment in mathematics for students of class VIII. This research is a qualitative research, with data collection through the teacher's document review, interviews, and questionnaires. Data were analyzed using descriptive analysis. The results showed that the plan and implementation of authentic assessment are in the good categories, but the teacher still gets some obstacles in the implementation. The obstacles are in the selection of evaluation techniques and the preparation of authentic assessment instruments in some materials of mathematics learning.

Keywords: *Authentic Assessment, Mathematics Learning*

INTRODUCTION

One of efforts to improve the quality of education in Indonesia comes from the government who conducting perfection in every aspect of education. Aspect of education that has developed continuously in order to improve the quality of education is the curriculum of national education. The change of curriculum has occurred since Curriculum 1947, Curriculum of Lesson Plans Decomposes on 1952, Curriculum of Education's plan 1964, Curriculum 1968, Curriculum 1975, Curriculum 1984 (curriculum improvement of 1975), Curriculum of 1994, curriculum of 2004, curriculum 2006, and curriculum 2013. Curriculum 2013 is the improvement, modification and development of the previous curriculum. The change of curriculum 2006 into Curriculum 2013 was an attempt by the government to achieve optimal quality of education. Curriculum 2013 expected to enhance curriculum 2006 especially in the formation of attitudes and good behavior of students. The change of curriculum also has implication in the change of assessment. Moreover, according of Wibowo dan Wutsqa, learning in school is application of curriculum in achieving educational goals. Whether these goals achieved or not, it is necessary to assessment [1].

The literature review reveals that teachers often view the process of teaching, learning, and assessing as separate tasks. They view that first curriculum is taught, learnt, and assessed. Assessment is an integral part of the learning process. Consistent with the assumption by Hyde, assessment is needed as a unified whole curriculum and learning together [2]. According to Daryanto, assessment is a series of activities to acquire, analyzed, and interpret the data about the process and learning outcomes of students who carried out systematically and continuously. It can be meaningful information in decision-making [3]. Assessment that conducted by the teacher in teaching and

learning process are collecting facts and documents of students' learning to make improvements in learning program. Assessment also can provide feedback for educators to enhance the planning and learning process.

Furthermore Frey dan Schmitt stated that authentic assessment used to measure ability in tasks that represent real-world problems [4]. Authentic assessment considers teaching, learning, and assessment as an ongoing, intertwined and all happening at the same time (Puckett & Black), and that they strongly influence each other [5]. An understanding of the authentic word is very complex and sometimes lead to some different opinions. Researchers have different opinions about the authenticity [6]. Curriculum 2013 through the Permendikbud No. 104 stated that authentic assessment is an assessment that requires the student to show attitude and to use the knowledge and skills gained from learning to do tasks in real situations.

The assessment will be authentic if it resembles and realistic activities in real-world situations [7]. According to Herrington and Herrington, assessments shall be authentic when meets the criteria of (1) The contexts, an assessment requires connectivity and transfer to the world outside the classroom; (2) students which include problem solving skills and higher order thinking is producing knowledge instead of reproducing knowledge. Require students to effectively use the knowledge acquired to establish performance achievement or product, and to increase the depth of knowledge [8]; (3) The task of stimulating a variety of active response, complexes, unstructured requiring decision-making, consists of several steps, and a series of tasks. Requires assessment so it can be integrated with activity; (4) the indicators that support learning and achieving validity and reliability with precise criteria to produce a varied [9].

The implementation of authentic assessment as Assessment Standards Curriculum 2013 that is expected to positively impact the future of education in Indonesia, in fact get different perceptions and criticism in its development. Maruasas states that authentic assessment of teacher are not fully understood. According to Margaret, Based on a survey conducted by a lecturer State University of Semarang (Unnes) was found many teachers who have difficulty to understand the method of evaluation in Curriculum 2013. Ani Rusilowati, Professor of the Faculty of Mathematics and Science (MIPA) Unnes who conducted a survey of 20 of the 23 teachers of secondary school (SMP) of 21 Semarang, stating that as many as 66 percent (15 of 23 teachers) difficulties in understanding the models of learning and 79 percent (18 out of 23 teachers) have trouble making assessment instruments. Correspondingly based on research results Rusindrayanti and Santoso is known that teachers are still have a lot of difficulties in the assessment [10].

Mathematics is a fundamental science in the development of science and technology which inseparable from human life. Through the authentic assessment in mathematics, expected to provide opportunities for students to get a real experience and meaningful to themselves, as well as demonstrate a high order thinking. The expectation as expressed by the Mendikbud that, they will be more creative, innovative and more productive so that later they can be successful in facing various problems and challenges of the era. Considering the emphasis in the curriculum of 2013 is an authentic assessment then the implementation needs to be a concern. Many issues about the authentic assessment, especially in mathematics, needs to be studied more in depth for improving the implementation of authentic assessment in efforts to achieve the national education goals.

RESEARCH METHODOLOGY

This research is a qualitative research. The qualitative research produces descriptive data with natural background and uses several of methods. Subject of the study is teachers of junior high school grade VIII in the Surakarta. The object of this study is the plan, implementation and obstacles experienced in the VIII grade teacher's authentic assessment according to curriculum 2013. The data collection techniques are used the document reviews of teacher are interviews and questionnaires. Data were analyzed using descriptive analysis.

Documentation techniques was to review documents made in Mathematics Teacher of grade VIII junior high school namely syllabus, lesson plans, assessment instruments of knowledge and skill assessment instruments. The sheets of document review are used to collect information about the suitability of syllabus, lesson plans, assessment instrument of knowledge and skills assessment instrument with the specific principles of authentic assessment that contained in Permendikbud No. 104 2014 [11]. The results of the study then calculated the level of propensity to Table 1.

Table 1. Criteria of Categories

No.	Score	Category
1	$X \geq \bar{X} + 1Std_x$	Very good
2	$\bar{X} + 1Std_x > X \geq \bar{X}$	Good
3	$\bar{X} > X \geq \bar{X} - 1Std_x$	Bad
4	$X \leq \bar{X} - 1Std_x$	Very Bad

Data collection techniques with questionnaire intended to record students' perception on the implementation of the assessment that carried out by teachers. Similarly, the data obtained through the sheets of document review, score obtained from the questionnaire sheet that also show the calculation level of propensity to table 1. The alternative answers can be selected by the students in the questionnaire, which has the range of scores from 1 to 4. The technique to collect the data is interview, in form of semi-structured interviews. Semi-structured interviews used to find problems to be more open, so that parties interviewed can issue opinions and ideas. Interviews guidelines in this study, contain the description of the research outline in the form of a list of questions. Interviews conducted in mathematics teachers regarding how are teachers' assessment from the plan, implementation and obstacles faced. Data collected by interviews and then reduced, the data relevant to the implementation of authentic assessment and that used as supporting data or explanatory.

RESULTS AND DISCUSSION

Planning and implementation of authentic assessment by the teacher refer to the specific principles of authentic assessment made by Permendikbud No. 104 2014 about concerning the Assessment of Learning Achievement by Teachers in Primary and Secondary Education. The specific principles are (1) the materials of assessment developed from curriculum; (2) cross-charge of or subjects; (3) the ability relate to the students; (4) student performance; (5) student motivation; (6) activities and the learning experiences of students; (7) gives independence of students to construct a response; (8) emphasizes the integration of attitudes, knowledge, and skills; (9) develop divergent thinking skills; (10) becomes an integral part of learning; (11) requires immediately feedback and continuously; (12) emphasizes that reflect real-world contexts; (13) associated with the world of work; (14) using data obtained directly from the real world; and (15) using a variety of methods and instruments. Results of authentic assessment planning data, can be seen by the teacher in Table 2.

Table 2. Results of Data Planning and Authentic Assessment

No.	Indicator	Score
1	The materials of assessment developed from curriculum	4
2	Cross-assessment or subjects achieving scores	2.5
3	Relates to the ability of students	3
4	Based on student performance	2.5
5	Student motivation	3
6	Focuses on activities and the learning experience of students	3
7	Gives independence of students to construct a response	2.5
8	Emphasizes the integration of attitudes, knowledge, and skills	2.5
9	Develop divergent thinking skills	2.5
10	Becomes an integral part of learning	3
11	Requires immediately feedback and continuously	3
12	Emphasizes that reflect real-world contexts	2.5
13	Associated with the world of work	3

14	Using data obtained directly from the real world	2.5
15	Using a variety of methods and instruments	3
	Total Value	42.5
	Conversion of Total Value	2.83
	Category of value	Bad

The indicators of planning and implementation of the first authentic assessment are the materials of assessment developed from curriculum. Achievement of the indicators collected information about the completeness and clarity of the RPP, especially the design of teachers' assessment that developed in accordance with the curriculum. This indicator reached the perfect score is 4. Its mean that, the RPP created by mathematics teacher has been fully and clearly relate to comprehensiveness 4 Core Competences (KI) and the suitability of Basic Competency (KD) by Permendikbud No. 24 2016 Appendix 15, about the Core Competences and Basic Competence Mathematics SMP / MTs. Moreover, the indicators achievement, assessment techniques, assessment instruments and assessment system using Reference Assessment of criteria (PAK).

A second indicator is charge of cross-assessment or subjects achieving scores of 2.5. Most of the instruments assessments made by the teachers still not relate to other subjects. This is consistent with the statement that the teacher still difficult to relate the materials of assessment by other subjects mathematics (Interview, January 2017).

A third indicator achieve score 3. Planning and implementation of assessment by teachers has been relating to the ability of students. Sometimes, there are assessment on some material that are not in accordance by student's ability. This is due to the ability of student diversity.

In contrast to the previous indicators, the fourth indicators about students performance-based assessment is only able to achieve scores of 2.5. Half of the analyzed RPP does not include their performance-based assessment. This is in accordance with the statement of teachers that "the learning of mathematics, not all of the materials can contain a performance-based assessment. There are several content that are difficult to be associated by performance-based assessment of students "(Interview, January 2017).

In the fifth indicators achieve a score 3, which means that the results of the assessment may motivating the students to improve the competence of attitudes, knowledge, and skills. In improving the competence of the students, teachers also emphasize on activities and learning experiences of students. On this indicator achieve a score 3. It can be seen of the assessment instrument created and performed by his mathematics teacher, but there are some materials that are difficult to develop skills assessment instrument such as content angle, Pythagoras, tangent, exponential number, quadratic functions, and so on.

Indicators on granting independence students to construct responses achieve a score 2.5. Implementation of authentic assessment in learning of mathematics is still not able to construct the students' response to the optimum. This is due to in the process of mathematics learning, students tend to confine his thoughts only on formulas and exercises regularly.

The next indicator about the integration of the realm of attitudes, knowledge and skills in the assessment has not yet obtained the maximum score, are 2.5. Obstacles on how to prepare a considered assessment tools realm of attitudes, knowledge and skills in an integrated manner. The draft assessment spiritual and social attitudes are made teachers often show up. However, the perception of students showed different results. According to students, teachers have been appropriate in assessing the spiritual attitude. Students assess that teachers' give more value relates by the spiritual attitude of students in prayer and answered greetings. Here is a table of students' perceptions about the assessment techniques performed mathematics teacher:

Table 3. Student Perceptions About the Teacher Assessment Techniques

No	Indicator	Scores
1	Assessment in accordance with the student ability	3.3
2	There are no subjective element in the assessment results (not are affected religion, race, culture, etc.)	3.3
3	Students are able to see the process and results	3

4	Assessment was done by assessment of knowledge, skills and attitudes	2.8
5	Assessment able to provide motivation in learning	3
6	The scoring performed when the learning process	3
7	Teacher rewards the student activity	3
Total Value		21.4
Konversion of Total Value		3.06
Category of value		Good

The ninth assessment indicators are able to develop divergent thinking skills obtained a score of 2.5. Assessment that teachers in developing students' ability to high order thinking using open ended questions still lacking. This is in accordance with the statement of teachers that the student is still difficult to understand the math concept. Students are still difficulties in solving the problems of the routine, so that teachers find it very difficult to develop assessment instruments that manage capabilities High Order Thinking (HOT).

Further to the tenth indicators, planning and implementation of assessment by teachers are inseparable from learning. So that teachers require immediately feedback and continuously on the results of student assessment. On both of these indicators achieve a score 3. The review of an assessment instruments made teachers to know the suitability assessment with real life, integration, sustainability, performance orientation.

The finding of the study is the planning of authentic assessment in the bad category. The teachers' lesson plan have already clear and detail that appropriate with syllabus and student's text book. Based on Permendikbud No. 103 2013, lesson plan should develop in detail refers to syllabus, student's text book and teacher's book. Implementation of authentic assessment include three aspects of assessment that are attitudes, knowledge, and skills. Permendikbud No. 104 2014 stated that the scope of assessment students' learning outcomes by teacher cover attitudes, knowledge, and skills competence.

Teachers have engaged in planning and implementation of authentic assessment are difficulty in the selection of assessment techniques and the preparation of the instruments on some of the material in mathematics learning. According to Puslitbang Kebudayaan in evaluation assistance of curriculum 2013, the lack of teacher comprehension in assessment process such as: (1) determine attitudes, knowledge, and skills assessment; (2) determine technique and type of assessment in attitudes, knowledge, and skills; (3) created instrument and reporting the results of assessment in attitudes, knowledge, and skills.

CONCLUSION

The research results show that the planning and implementation of authentic assessment in the category bad. Teachers have engaged in authentic assessment are difficulty in the selection of assessment techniques and the preparation of the instruments on some of the material in mathematics learning. Based on these conclusions, the recommendations can be a consideration for the various parties are in the realm of education are:

1. Necessary to perception among practitioners of education, especially in mathematics learning about the how to measure the competence of attitudes, knowledge and skills of students in an integrated manner.
2. Needs to be developed instruments of assessment authentic contextual, integrated, sustainable, and motivate students. The ability to manage the High Order Thinking in learning of mathematics.

REFERENCES

1. Wibowo, R. & Wutsqa, D. U., Evaluasi Pelaksanaan Kurikulum Tingkat Satuan Pendidikan (KTSP) Mata Pelajaran Matematika SMP di Kota Yogyakarta, *Jurnal Riset Pendidikan Matematika*, 1(1), 58-68, (2014)
2. Hyde, D.P., What makes a good secondary assessment? On achieving the aim of assessment, *Journal Education and Practice*, 4(12), 188-197, (2013)
3. Daryanto, *Pendekatan Pembelajaran Saintifik Kurikulum 2013*, Yogyakarta: Gava Media, (2014).
4. Frey, B. B. & Schmitt, V. L., Coming to term with classroom assessment, *Journal of Avanced Academic*, 18(3), 402-423, (2007).

5. Puckett, M.B., & Black, J.K., *Authentic Assessment of the young child: Celebrating developing and learning* (2nd ed). New Jersey: Prentice-Hall, Inc, (2000).
6. Gulikers, Judith T. M, Bastiens, Theo J, Kirschner, Paul A., A Five-Dimensional Framework for Authentic Assessment, *Journal of Educational Technology, Research and Development*, 52, 67-86, (2004).
7. Gulikers, Judith T. M, Bastiens, Theo J, Kirschner, Paul A., Authentic Assessment, student and teacher perceptions: the practical value of the five dimensional framework. *Journal of Vocational Education and Training*, 58(3), 337-357, (2006).
8. Newmann, F.M & Wehalage, G. G., Five standard of authentic instruction, *Educational Leadership*, 50(7), 8-12, (1993).
9. Herrington, J. & Herrington, A., Authentic conditions for authentic assessment: Aligning task and assessment, in critical vision, *Proceedings of the 29th HERDSA Annual Conference*, 10-12 July 2006, 146-151.
10. Rusindrayanti, R., & Santoso, R, Implementasi Pendekatan Saintifik Mata Pelajaran Matematika Kelas VII Tahun Pelajaran 2013/2014 pada Kurikulum 2013 DIY, *Phytagoras: Jurnal Pendidikan Matematika*, 10 (1), 80-94, (2015).
11. Peraturan Menteri Pendidikan dan Kebudayaan No. 104 tahun 2014 tentang Penilaian Hasil Belajar oleh Pendidik pada Pendidikan Dasar dan Pendidikan Menengah, Jakarta: Kemdikbud, (2014).