Performance assessment of geometry mathematical representation ability viewed from student interest

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Abstract. This research aimed to test whether learning with cooperative Jigsaw material geometry with performance assessment achieve mastery learning, test whether the ability of the mathematical representation of students with cooperative learning model Jigsaw material geometry with the assessment of performance is better than the ability of the representation of the students on the model of Discovery Learning, a description of the ability of the mathematical representation students on cooperative learning model Jigsaw with the assessment of student interest. This study is a mixed methods research. The subjects were students of class VIII-A one of junior high school in Kaliwungu, Kendal, Central Java. The data collection method using tests, questionnaires and interviews. The results show that: mathematical representation abilities of students who receive Jigsaw cooperative learning on geometry material with performance assessment fulfill the completeness of learning, mathematical representation abilities of students on geometry material in Jigsaw cooperative learning with performance assessments better than mathematical representation abilities of students on Discovery Learning, and descriptions of mathematical representation abilities students in the Jigsaw cooperative learning with performance assessments in terms of students interest learning that students with high learning interest are able to fulfill indicators of mathematical representation ability is very well, students with learning interest are able to fulfill indicators of mathematical representation ability well and students with low learning interest are less able to fulfill the indicators of mathematical representation ability.

1. Introduction
The mathematical representation is one way to solve mathematical problems. Is the important problem? Representation of mathematical problems as a strategy is an evidence-based practice in the schools learning. Implementation [1]. Especially for visual representations, there are 13 students (40.63%) in the experimental group correctly answered the mathematical problem, whereas only seven students (21.88%) correctly answered the problem [2], but visual and symbolic representation suggests students to build relational understanding [3]. The one important thing of representation is translation process. The translation process was done in four stages: unpacking the source, preliminary coordination, constructing the targets, and determining equivalence. The translation process of verbal to graph representations required more than one translation process. This process through the intermediary of some other representations like symbolic, schematic, equations, numerical. In general, students do the same activity except at preliminary coordination activity [4].

Everyone can choose the type of representation in accordance with their ability in interpret the problem. The ability of the mathematical representation eighth grade students one of junior high school
in Kaliwungu, Kendal, Central Java still not optimal. Based on interviews with one of the teachers of mathematics students are still unable to develop the power of representation held in solving problems faced. In this case the role of the teacher is very important in the ability to create a mathematical representation that learners who have good mathematical representation capability, so that to obtain a satisfactory learning outcome and learning objectives can be achieved with good. Besides the affects the ability of representation is interest in learning.

Interest is very big influence on the ability representation, as if the lessons learned material is not in accordance with the interests of students, then students will not learn well because these subjects do not interest him. Effective Factors Increasing the Student’s mathematics abilities especially mathematical representation is student’s interest [5]. Lesson material that interests students will be more easily understood and more easily learned by the students. If high student interest students will also be more active in the learning process.

In addition to student interest in learning to encourage students to be more active is the assessment using performance assessment (PA). Performance assessment is a procedure of assignment to the students in order to gather information about the extent to which the student had recently learned [6]. Beside that performance assessment can reflect student learning attitude, understanding of subject and difficulties of lesson [7]. According to management, there a need to examine the influence of dynamic reaction to individual performance and management decisions with respect to overall project performance [8]. Implementation in learning, the developed performance assessment has fulfilled the feasibility criteria to be applied in the senior high school [9].

Performance assessment driven instruction improved students’ problem-solving abilities and increased student confidence in doing mathematics because they felt more competent in working mathematical problems. Students’ attitudes toward mathematics were generally positive. It is recommended that Ghana Education Service should organise in-service training for mathematics teachers on the use of PA-driven instructions and mathematics teachers should also integrate performance assessment-based tasks in their students’ exercises [10]. While performance assessment is well aligned to project-based learning (PjBL), teachers find it challenging to design and implement PA that is faithful to the authentic context of their projects and viewed externally as rigorous. In contrast to standardizing PA tasks—thereby diminishing authenticity—that developed and used a “shell” to guide teachers in planning, implementing, and engaging in rigorous dialogues that evaluate and elevate PA practice across four PjBL schools. Drawing from analysis of artefacts and audio-recorded professional development sessions, we highlight how the effort to standardize PA practice while maintaining fidelity to authentic context provided rich opportunities for teacher learning and fostered higher levels of teacher responsibility for assessment [11].

Based on the above problems, the purpose of this study was to examine whether learning with cooperative Jigsaw material geometry with performance assessment achieve mastery learning, test whether the ability of the mathematical representation of students with cooperative learning model Jigsaw material geometry with the assessment of the performance is better than the ability of the representation of students on Discovery learning models, the description of the mathematical representation abilities of students in cooperative learning model Jigsaw with the assessment of performance in terms of student interest.

2. Methods
This study used mixed methods kind of concurrent embedded design. The division method in this research is quantitative method as the primary method and qualitative method as a secondary method. Quantitative research methods used to determine whether the ability of the mathematical representation of students using cooperative learning with performances assessment Jigsaw achieve mastery learning and whether the ability of the mathematical representation of students using cooperative learning is better than learning Jigsaw Discovery Learning.

While qualitative methods are used to determine how the description of Jigsaw cooperative learning with performance assessment in terms of student interest. Quantitative research design used in this study
is Posttest-Only Control Design. Sampling with random cluster sampling technique and obtained a class VIII-A as an experimental class acquire Jigsaw cooperative learning with performance assessment and VIII-D as a learning gain control classes Discovery Learning.

3. Results and Discussion
Jigsaw cooperative learning with performance assessment was conducted over two sessions. Before learning students are asked to complete a questionnaire beforehand. This questionnaire aims to find out how the student interest towards mathematics. At the first meeting of the materials discusses are the elements and nets cube beam and the second meeting of the material covered is the surface area and volume of a cube beam. Learning to use the media worksheets, performances assessment sheets and props. Students work on worksheets. After the learning process is completed, we then conducted tests to determine the ability of student mathematical representation. Tests given in the description which amounts to about 6 items. The next activity after the completion of the test was the interview, the interview conducted after the calculation of interest questionnaire each student’s learning and after a mathematical representation abilities test result.

3.1. Mathematical representation ability completeness cooperative learning jigsaw with performance assessment
Based on the results obtained by the ability of the mathematical representation that the test results mathematical representation capability experimental class VIII-A with the highest value of 93, the lowest score of 65 and the proportion of completeness 90.625%. While the class representation abilities test results VIII-D control highest value obtained was 85 and the lowest value is 61, and the proportion of completeness 50%. Furthermore, the data from the test results that have been obtained representation capability is analyzed through several tests, including the prerequisite test, then test the hypothesis 1 (mastery learning).

Before the test mastery learning normality test first to find out whether the data derived from the test scores are normally distributed population. The normality test used the Kolmogorov-Smirnov test with SPSS 16.0. Based on the calculation results obtained by value normality test $\text{sig} = 0.451$ the experimental class and $\text{sig} = 0.830$ the control class. That is the final test result data representation of students mathematical abilities in normal distribution.

Classical completeness test was performed using the test right proportions. Based on the calculation of the proportion of the right party obtained $z_{\text{count}} = 2.041$ with $z_{\text{table}} = 1.64$. So $z_{\text{count}} > z_{\text{table}}$, that is the result of a mathematical abilities test students on the material side of the room got up flat with Jigsaw learning model performance assessment achieve mastery learning. Suggestions for assessment forms and required evidence (e.g., lesson plan, lesson observation and test including correction sheets) for the assessment of the professional activities The contribution of this study is an identified and formulated set of roles, professional activities and performance levels that can serve as an assessment rubric for performance-based teacher education. The next step is to implement the rubric and associated assessment forms in an electronic portfolio-system aimed at assessing and guiding student teachers’ professional development [11]. These activities can be developed towards peer assessment in learning [12].

3.2. Comparison of mathematical representation capabilities
The average difference test is done by using the right side. Based on the calculation of the average difference test t-test is obtained $t=4.324$ with $t_{1-a}=1.998$. So $t > t_{1-a}$, it means that the average posttest mathematical representation ability in the class using Jigsaw cooperative learning performance assessment more than the average posttest mathematical representation ability of students in the class using Discovery Learning.

Proportion test conducted using the test right. Test aims to determine the proportion that the proportion of students who completed study on the class using cooperative learning model Jigsaw assessment of the performance more than the proportion of students who completed study in a class that
uses a model of Discovery Learning. Based on the calculation of the proportion of different test right parties obtained \( z_{\text{count}} = 3.56 \) with \( z_{\text{table}} = 1.64 \). So \( z_{\text{count}} > z_{\text{table}} \). This means that the proportion of students who have learning in class using the Jigsaw cooperative learning performance assessment more than the proportion of students who completed study in a class that uses a model of Discovery Learning. To ensure assessment fairness in class contexts, students should be able to display their competence under different conditions which work best to their advantage [13].

3.3. Description of mathematical representation capabilities in terms of interests in learning in jigsaw cooperative learning performance assessment

Indicators of the ability of representation that will be analyzed include (1) makes the image geometry to clarify issues and facilitate their resolution, (2) make the equation or mathematical models and other representations given, (3) write down the steps to resolve the problem with the words and (4) develop a story line with a representation presented. Based on the results the percentage of students with moderate learning more interest than students with high learning interest. It shows that the majority of students classified as having moderate learning interest, especially motivation that interest described someone wants something, so the interest in learning is needed.

Based on the results obtained information that students with high learning interest capable of meeting the indicator makes the image geometry to clarify the issue and facilitate its completion very well. On indicators make the equation or mathematical model of other representations are given, one subject in either category and a subject with a category quite well. On the indicator has the story according to another representation presented subjects with a high interest in learning able to meet the story very well. Then the write indicator measures the mathematical problem solving with the words high interest in learning the subject categories capable of meeting very well. Mathematical exhibition gave the students an opportunity to apply hands-on activities utilizing also arts and handicrafts, this clearly predicted higher interest [14].

Subject on learning interest groups were able to meet the four indicators capability with good mathematical representation. Often students in the learning interest groups are doing little mistakes, like not describe what is being asked and the number 6 wrong in counting. According Sriyatun, Masrukan and Wardono [15] students in mathematics learning interest groups moderate category have good literacy skills of mathematical criteria for representation component.

Students with an interest in learning is low, the indicator makes the image geometry to clarify the problem and facilitate resolution. Subjects with low learning interest groups able to make drawings and write the complete and correct size. On indicators make the equation or mathematical model of other representations given subject on a low learning interest groups often write what is known directly in the form of symbols. While the indicator has the story according to another representation presented, subjects on a low learning interest group able to write about the story properly, but the subject in low learning interest groups do not describe what is being asked.

4. Conclusion

Base on the results the percentage of students with moderate learning more interest than students with high learning interest. It shows that majority of students classified as having moderate learning interest. Description of the mathematical representation ability of students in cooperative learning model jigsaw with the assessment of performance in terms of student interest are the results show that students with high learning interest capable of meeting the indicators of the ability of the mathematical representation very well, for students with an interest in learning is being able to meet the indicators of the ability of the mathematical representation well. And students with low learning interest less able to meet the indicators of the ability of the mathematical representation.

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