Using Valsiner Theory To Enhance Mathematical Representation Ability

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ARTICLE INFO

Article History:
Received Date: 15th April 2017
Received in Revised Form Date: 30th April 2017
Accepted Date: 15th May 2017
Published online Date: 01st August 2017

Key Words:
Mathematical Representation Ability, Valsiner Theory, Konventional Learning.

ABSTRACT

The purpose of this research was to determine the upgrade mathematical representations of college students using learning based theory Valsiner better than the ability of mathematical representations of students who use conventional learning models and know the rest of the indicator to which students have difficulty in solving problems ability mathematical representations after being given learning based Theory Valsiner.

The method used is a quasi-experimental. The population in this study are prospective teachers of mathematics education in universities Siliwangi Tasikmalaya. While the subject of the sample were college students who follow courses in semester V probability theory which consists of an experimental class and the control class in Mathematics Education. Samples were taken at random based on class, grade VB as experimental class amount 34 students, and the class as a class VD control with the amount of 34 students. The technique of collecting data using mathematical representations ability tests. The research instrument set of test questions. Data were analyzed using two different test average.

From processing data analysis and hypothesis testing using real level test a = 1% result increased ability mathematical representations of students by using learning based on theory Valsiner better than the ability of mathematical representations of students who use conventional learning models, and the greatest difficulties experienced by students in solving ability representation mathematics is the visual representation indicator with a percentage of 39.71%.
INTRODUCTION

Higher education is a complicated process because it not only absorbs information but must understand and involves activities and actions to be done to obtain optimal learning outcomes using various evaluation techniques (authentic assessment). Learning outcomes are obtained by combining the capabilities taken from both individual and group task assignments, quizzes and final tests.

Students of mathematics teacher candidate need to master the ability of advanced mathematical thinking in the process of studying in college, among which are the ability of representation, abstraction, representational relationships and abstraction, creativity and mathematical proof. Mathematical skills that are expected in mathematics learning one of them is the ability in representing.

Cai, Lane and Jakabcsin (Suryana, 2012) states that representation is the way one uses to express the answers or mathematical ideas in question. Various representations are often used in communicating maths such as tables, drawings, graphs, mathematical expressions, and writing in their own language, both formal and informal (written text). The problem is a simple algebraic expression but the correct answer of learners from Indonesia is 48% of grade 8 students and the international average is 65%. Indonesian students are still difficulties in the symbolic representation of \( xy + 1 \), in the analysis of learners from Indonesia many who choose the wrong answer that is A, B and C include reading \( xy + 1 \) there is only one operation that is operation added, the next mistake is represented in the form Algebra \( x (y + 1) \), many also choose option B because it does not mean added so the choice becomes multiply \( x \) and \( y \) by 1, selection of option C because learners interpret \( xy \) as sum \( x \) with \( y \).

In the preliminary study on the theories of the opportunities of the college student still difficulties in representing the problem into the correct answer. For example Faris raffle a coin of Rp. 100 balanced three times. Write the notation of the following statement: B is the event that the Image of "Cow's Cow" takes place on the first draw!

Need to be explained The matter in this preliminary study is devoted to being able to uncover indicators of student representation ability. Through the representation, it is hoped that students can put forward answers or mathematical ideas in the form of tables, drawings, graphs, expressions or mathematical notations, writing in their own language both formal and informal.

In the question the student is expected to be able to express answers or mathematical ideas in the form of notation. Students still find it difficult to represent the question in the form of notation even though it has been given the previous example.

To solve it is as follows:

Write first notation of experimental sample space that is as follows:
\[ S = \{GGG, GGH, GHG, HGG, GHH, HGH, HHG, HHH\} \]
With \( G \) = Picture "Karapan Sapi" and \( A \) = Number
Since the coin coins used are balanced, each sample point has the same chance of occurring, ie
B is the event that Picture "Karapan Sapi" occurs in the first draw. Then the event space of B notation is:

\[ B = \{\text{GGG, GGH, GHG, GHH}\} \]

If traced the results of the work of M1 based on the indicators represent in the form of notation, then encountered fundamental errors that should not be done by M1, such as students can not write the notation well and correctly from the first step write down the overall sample space notation to write space space notation B Requested.

Based on the background of problems that have been described, then the formulation of the problem in this study include:

1. Which is better to improve students' mathematical representation ability using learning model based on valsinal theory compared with students' mathematical representation ability using conventional learning?
2. On which indicator students have difficulty in solving problems of mathematical representation ability after given learning based on valsiner theory?

The hypothesis is as follows:

1. The improvement of students 'mathematical representation by using learning based on valsinal theory is better than students' mathematical representation ability using conventional learning model.
2. In the indicator where students have difficulty in solving problems of mathematical representation ability in the opportunity theory course after given learning based on valsiner theory.

METHODS

The research method used by writer in research is experimental method. In this case the researcher will see whether or not the improvement of students' mathematical representation ability in the probability theory course. In this study, researchers tested a learning model based on valsinal theory in experimental class compared with control class using conventional learning model.

This research was conducted at Siliwangi University on mathematics education student class of 2015-2016. The population in this study are all students who follow the theories of opportunity theory in the mathematics education program of Siliwangi University Semester V. The sample selection is done by using simple random sampling technique according to the class. The sample of the study was taken randomly from the class in the sixth semester of students who followed the probability theory courses selected one class at random as the sample class and one more class as the control class.

In this study there are two variables, namely the independent variable and the dependent variable. Independent variables in the research that is learning based on valsiner theory and conventional learning while the dependent variable of students' mathematical representation.

The research design is as follows:

\[
\begin{array}{ccc}
A & O & X1 & O \\
A & O & X2 & O \\
\end{array}
\]

Information:

A = Grouping of samples randomly by class
X1 = The treated group (using learning based on valsinal theory)
X2 = The treated group uses conventional learning
O = Pretest (before treatment) and Postest (after treatment)
RESULTS AND DISCUSSION
Quantitative data as the initial score is obtained from the test results in the experimental class and control class i.e pretest and postes kemelesam reperesentasi mathematics mahanaswa.

Improvement in experiment class
Data of pretest and postes result of experiment class is presented in Diagram below:

From the postes of the experimental class class obtained an average score of 18.53. The normal average gain obtained in the largest experimental class is 0.72 with the largest normal gain value of 0.95 and the smallest normal gain value of 0.33. The mode obtained from the normal data gain experimental class of 0.757 while for the median of 0.757.

It is seen that the highest frequency is in the 5th grade with the number of 10 students while the low frequency is in the 3rd grade with 1 student.

List of Normal Static Size Gain, Ability Representation Mathematics student experiment class as follows:

<table>
<thead>
<tr>
<th>Statistical Data Size</th>
<th>Experiment Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lots of data (n)</td>
<td>34</td>
</tr>
<tr>
<td>The largest data (sb)</td>
<td>0,95</td>
</tr>
<tr>
<td>The smallest data (sk)</td>
<td>0,33</td>
</tr>
<tr>
<td>Range (r)</td>
<td>0,62</td>
</tr>
<tr>
<td>Median (Me)</td>
<td>0,757</td>
</tr>
<tr>
<td>Mode (Mo)</td>
<td>0,757</td>
</tr>
<tr>
<td>Average (x̄)</td>
<td>0,72</td>
</tr>
<tr>
<td>Standard Deviation (ds)</td>
<td>0,17</td>
</tr>
</tbody>
</table>

Improved control classes
The result data of pretest and postes control class score is presented in the following
The normal average gain obtained in the control class is 0.55 with the largest normal gain value of 0.76 and the smallest normal gain value of 0.33. The mode obtained from the normal data gain of the control class is 0.57 while for the median of 0.57. Obtained diagram as follows:

List of Normal Static Size Gain, Ability Representation Mathematic student of control class as follows:

<table>
<thead>
<tr>
<th>Statistical Data Size</th>
<th>Control Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lots of data (n)</td>
<td>34</td>
</tr>
<tr>
<td>The largest data (sb)</td>
<td>0.76</td>
</tr>
<tr>
<td>The smallest data (sk)</td>
<td>0.33</td>
</tr>
<tr>
<td>Range (r)</td>
<td>0.43</td>
</tr>
<tr>
<td>Median (Me)</td>
<td>0.55</td>
</tr>
<tr>
<td>Mode (Mo)</td>
<td>0.57</td>
</tr>
<tr>
<td>Average (x)</td>
<td>0.55</td>
</tr>
<tr>
<td>Standard Deviation (ds)</td>
<td>0.11</td>
</tr>
</tbody>
</table>

To see statistically normalized statistical gain data difference in the experiment class and control class more clearly as follows:
The diagram can be explained that the largest gain of the experimental class is 0.95 while the largest gain control class is 0.76. Average gain of experiment class is 0.72 while control class is 0.55. This shows that the improvement of students’ mathematical representation ability whose learning based on valsinal theory is better than the improvement of students’ mathematical representation ability using conventional learning model.

Testing of hypothesis 1 is to know the improvement of student's mathematical representation ability using learning based on valsiner theory with which using conservative learning model.

Based on the calculation obtained values as follows. \( t_{\text{count}} = 4.95 > t_{(0.01 (66))} = 2.39 \) then \( \text{H}_0 \) is rejected and \( \text{H}_1 \) is accepted. This means that the improvement of students' mathematical representation ability whose learning based on valsiner theory is better than improving students' mathematical representation ability using conventional learning.

Hypothesis 2, based on the analysis of the problem then the average percentage of student difficulties in solving the problem on the theory of opportunity theory on each indicator of the ability of mathematical representation can be presented in the following table:

**CONCLUSION**

Based on the results of research and data processing, obtained the following conclusions improvement in the ability of mathematical representation of students who use learning based on valsinal theory is better than improving the ability of mathematical representation of students using conventional learning model. The biggest difficulty experienced by students in solving the problem of mathematical representation is on the indicator Visual representation with percentage 39.71%.

**REFERENCES**


