The Applying of Hypothetical Learning Trajectory (HLT) on Comparison Material Using Nisab Zakat Theory toward The Student's Learning outcomes

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Abstract

The problems in learning mathematics, especially comparative material, have not combined with religious theory in the learning process. The merging of Knowledge, especially mathematics with the knowledge of religion is very important, because in addition to getting mathematics, the student will directly learn about the knowledge of religion. The comparative learning using the Nisab Zakat theory will encourage to bring out reasoning abilities and students think creatively, and innovative in solving the problem. The aims of the research is to find out how the influence of applying of HLT toward the student's reasoning on the third semester of Education of elementary teacher department in STKIP Muhammadiyah Bangka Belitung. The research method of this research is quasi-experimental design. Data collection techniques are tests with hypothesis testing using t-test statistical formula. The average value of pretest before HLT applied in learning is 64.7 with a minimum value of 49, and a maximum value of 75.8. While the value on the post-test after being applied to HLT obtained an average value of 86.4 with the minimum value of 67 and the maximum value of 100. Then with this it can be concluded that there is a positive effect of the application of HLT (Hypothetical Learning Trajectory) comparison material using the Nisab zakat theory on results Student learning mathematics comparison material.

Keywords: Mathematics, Nisab Zakat, Reasoning, Comparison.

INTRODUCTION

The Comparison is one of the basic Knowledge for learning mathematics, science, and is useful in the real world as well as various life situations (Utari, Putri, & Hartono, 2015). The Questions in daily life make it easier for students to use literacy skills and answer questions, can challenge mathematical thinking patterns (Putra, Zulkardi, & Hartono, 2016). So it is very good if the mathematics learning material is combined with the daily problems. (Sumarto, Galen, Zulkardi, & Darmawijoyo, 2013) The Students are still having difficulty in solving comparison problem questions, especially in solving the problem of comparing reversals, The student difficulties in finding patterns of questions and explaining reasons using the method in solving questions while comparison material is always included about the Final National Examination (Sholohin, & Paris, 2017; Febrian, Hartoyo, & Suratman, 2016).

The Comparative material can be interpreted with the concept of religion which is closely related to the daily and the zakat theory, the combining of the knowledge of religion in mathematics learning is very important, between them there are points that complement and strengthen, even Islam becomes the source of knowledge (Hidayatulloh, 2016). Understanding of Islamic values needs to be instilled in students (Salafudin: 2015). It is expected that students can identify comparative problems of value and understand the ratio in comparison of values. Whereas in the theory of zakat fitrah a person is obliged to pay zakat fitrah for 2.5 kilograms
of rice, so that both concepts can be combined into learning. In learning, students are required to always be involved in the learning process, so that it will provide a stimulus to students that learning the material is very important. Students will better understand the concept of comparison if they are involved in learning activities (Safarehda, 2014). This involvement is in accordance with the concept of the Hypotetical Learning Trajectory (HLT) where the learning path is designed in order for the student can be directly involved in the learning process. Hypothetical Learning Trajectory (HLT) is the learning flow consisting of learning objectives, learning activities, and learning process hypotheses to predict how students' thoughts and understanding will develop in the context of learning activities (Simon, 1995, Mendrofa, 2017).

Based on previous research, several studies have been carried out in the use of the Hypothetical Learning Trajectory (HLT) method (Ayunika et al., 2011; Charitas, Prahmana, & Kusumah, 2016; Elizondo & Hernández-solís, 2016; Fuadih, 2017; Ilma & Putri, 2012; Johar, 2016; Megawati, Siahaan, & Andrian, 2014; Nurdin, 2011; Ramadhanti, 2015; Risnansanti, 2012; Septiono & Darminto, 2014; Wijaya, 2015) and several mathematical researches that discussed the comparison material (Agustina & Amin, 2013; Argarini, Budiyono, & Sujadi, 2014; Fitriana, Yusuf, & Susanti, 2016; Misrianti, Sugiatno, & Hamdani, 2014; Pertiwi, 2017; Rahayu, Retno, & Saputro, 2015; Rudiono, Dafik, & Wahyunogrumin, 2015; Susilo & Khabibah, 2013; Trianingsih & Hidayah, 2014; Utari, 2017; Wibowo, Rif'at, & Hamdani, 2015) and the charitable organization of zakat have been reduced in several previous researches (Asnaini, 2015; Hadi., 2016; Jamhur, 2014; Munif, 2012; Nuruddin, 2014; Ridwan, 2014; Yusefri, 2017) and also measurements of the result of previous researches (Asmawati & Wuryanto, 2014; Hasanah, 2016; Kristin & Rahayu, 2016; Kusmaryono, 2015; Maulidiahwarti, Sumarmi, & Amiruddin, 2016; Pratiwi & Santosa, 2013; Rhamandica, Wonorahardjo, & Arief, 2016). However, no prior research has been applied to apply the Hypothetical Learning Trajectory (HLT) method to the comparison materials that use the theory of Nisab Zakat on the results of learning. Thus, this research objective is to find out the effect of the Hypothetical Learning Trajectory (HLT) method on the comparison material using the Nisab Zakat theory on learning outcomes.

THE RESEARCH METHODS

The type of research used was quasi-experimental design with the design of the one group pretest-post test design where in a group or class research was given treatment, but before the treatment, the student was given the pretest before that the treatment and also was given the posttest. The learning process with the application of the Hypothetical Learning Trajectory (HLT) in the comparison material using the Nisab Zakat theory, and the final results analyzed are in the form of numbers, and hypothesis testing using statistical formulas.

In this research there are 2 (two) variables, namely the independent variable or variable is "The application of the Hypothetical Learning Trajectory (HLT) in the comparison material using the Nisab Zakat theory. While the dependent variable (dependent variable) or the variable y in this research is "learning outcomes. The design can be described as follows.
Table 1. Experimental Research Design

<table>
<thead>
<tr>
<th>Class</th>
<th>Treatment</th>
<th>Final test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental Class 1</td>
<td>$X_1$</td>
<td>$O_1$</td>
</tr>
<tr>
<td>Experimental Class 2</td>
<td>$X_2$</td>
<td>$O_2$</td>
</tr>
</tbody>
</table>

Description:

$X_1$ = Contextual treatment

$X_2$ = Treatment using the HLT approach

$O_1 = O_2$ = Final test (posttest) experimental class 1 and experimental class 2

Before hypothesis testing is done, the analysis prerequisite test is done first on the students' initial abilities, for the balance test with a 0.05 level of significance. Test the analysis prerequisites of the normality test using the Lillifors test, the homogeneity test. If the test results are normally distributed and come from the same area of variance, then the Statistical Hypothesis is tested using the t-test.

Assumptions for normality tests, namely:

$H_0$: Data is normally distributed

$H_1$: Data is not normally distributed

Test Criteria: if $L_{\text{count}} < L_{\text{table}}$ then $H_0$ is accepted, so that both data are normally distributed.

Assumption for homogeneity test, Namely:

$H_0$: Homogeneity Data

$H_1$: Data is not Homogen.

Test Criteria: if $F_{\text{count}} < F_{\text{table}}$ then $H_0$ accepted, so that both data are homogeneous.

Comparison of hypotheses is carried out based on the right party test hypothesis formula. If $T_{\text{count}} \leq T_{\text{table}}$, then $H_0$ accepted. The hypotheses tested are:

$H_0$: $\mu_1 \leq \mu_2$

$H_1$: $\mu_1 > \mu_2$

$\mu_1$: Learning outcomes with the contextual method

$\mu_2$: Learning outcomes with HLT Method

The sampling technique uses cluster random sampling technique and hypothesis testing using the t-test. (Sugiyono, 2016).

\[
t_{\text{ses}} = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{s_1^2/n_1 + s_2^2/n_2 - 2r \left( \frac{s_1}{\sqrt{n_1}} \sqrt{n_1} \right) \left( \frac{s_2}{\sqrt{n_2}} \sqrt{n_2} \right)}}
\]

THE RESULTS OF THE RESEARCH AND THE DISCUSSION

This research is a quasi-experimental design. The design used in this study is the one group pretest - post test design. In this research before applying the Hypothetical Learning Trajectory (HLT) on comparison material using the Nisab Zakat theory was given at the pretest and after applying the HLT Method, the posttest was performed to see whether there were
differences in learning outcomes before applying HLT and after applying HLT. If there are differences in the value of the pretest and the post test value, it can be said that there is the influence of the Hypothetical Learning Trajectory (HLT) comparison material using the Nisab Zakat theory on student learning outcomes.

The pretest is done before doing learning / treatment which aims to measure the extent the students understand the comparison material and the concept of Nisab Zakat. In this research using the Hypothetical Learning Trajectory (HLT) in the comparison material using the Nisab Zakat theory. The question is the pretest as shown in Figure 1 below.


Figure 1. Pretest Question

In answering the problem of some students who are not correct in answering questions. From the observations it was found that most of them have not mastered the concept of comparison, and there are still many who do not know the magnitude of the zakat fitrah. However, most students in working on the pretest problem found that they have used comparison theory to solve problems. Likewise with the answers to the students' pretest in figure 2 below. The students appropriate in determining many members of each family, which corresponds to the problems in the problem. Figure 2 below is the student's answer sheet.

After the pretest, the application of the Hypothetical Learning Trajectory (HLT) was carried out on the comparison material using the Nisab Zakat theory. To design a learning activity, it is necessary to know the picture of student thinking that can participate in learning activities and be able to consider and anticipate student reactions. HLT consists of three main components, namely 1) learning objectives for the student; 2) learning activities and devices / media used in the learning process; and 3) the conjecture of the learning process how to know students' understanding and strategies that arise and develop when learning activities are done in the classroom (Gravemeijer, 2004).

Each Student Activity Sheet (LAM) arranged has determined the learning objectives to be achieved, from the purpose is designed a sheet of learning activities, where each activity requires students to think critically in solving the problem. The results of activities the conjecture or the student's answer is expected in solving the problem.
In the application the researcher divides the research subject into four groups, and allows each group to sit with their respective groups to discuss LAM given. Figure 3 below is LAM Stage 1.

Answers Transcript of group conversations in working on LAM 1 is as follows.

A : How about number 1?
B : number 1, the member of family each member pays Zakat fitrah 2,5 kg. So if 6 member must pay zakat fitrah 15 kg
A : Ooh
B : yes, 6 times 2.5 kg
A : why must pay 2.5 kg
B : because the rule of zakat fitrah must pay 2.5 kg
A : How about the questions table, could I get the information.
B : yes, you could, here many family pay zakat fitrah for 10 people 25 kg. so every person must pay 2.5 kg
A : can I see there?
B : yes mr.
A : if we don’t now the rule must be 2,5kg, by lok the information on the table, can I answer it?
B : yes, you can, because the amount
A : Ooh, I see?
B : yes sir.

Description:
A : lecturer
B : Group 1

Based on the transcript of the conversation above, it can be seen that students have understood the amount of zakat fitrah that must be issued by each person. In addition, in determining the amount of zakat fitrah can be seen in the information about the question by comparing the amount of zakat fitrah 10 people is 25 kg, then each person 2.5 kg.

In the stage 1 of LAM, the students are able to identify comparative value problems using the amount of zakat fitrah and zakat mal Nisab, and students are able to understand the ratio in
the comparison of values. On the issue of LAM 1 using the theory of the amount of zakat alms of fitrah, and some magnitude of the zakat syariah law.

The question requires students to be able to determine the amount of zakat that must be released in a family of 6 people. The findings obtained in answering question number 1, the two groups were correct in determining the final results, but did not use the concept of comparison in answering the questions.

The two groups above answer the questions with two different answers. In the first group they immediately determined the amount of zakat fitrah for each person 2.5 kg compared to 6 people, then the amount of zakat fitrah must be spent is 15 kg. While group 2 answered the question by determining the number of families compared to the amount of zakat fitrah each person.

The next discussion is about the results in stage 2. LAM in stage 2 as seen in figure 4 below.

![Figure 4. LAM stage 2](image)

The total of 4 groups discussed completing the LAM that had been given. The results of the analysis of the learning process and student answers found that they were very enthusiastic in discussing, and they were able to solve the problem correctly. As Figure 5 below is the answer of students in stage 2.

![Figure 5 The answer sheet stage 2](image)
In the answer to Figure 5 above, it was found that all groups answered the questions correctly. They are able to communicate the question's problems in making conclusions and are able to use the concept of comparison in solving problems. From the results of observations during the learning process it was found that all students had understood the magnitude of zakat fitrah that must be issued by each individual. So they easily use their reasoning abilities to solve problems.

After the implementation of the Hypothetical Learning Trajectory (HLT) was completed, all research subjects were given a final test (post-test) which was done individually. In the final test phase it aims to see the extended of students understand the concept of comparison both in solving the problem of missing value and the problem of comparison as well as the extended of students are internal to solve the problem.

Furthermore, the price of \( t_{\text{count}} \) is compared with \( t_{\text{table}} \) with the following criteria.

\[
\begin{align*}
  t_{\text{Count}} &> t_{\text{tabel}} \quad \text{so } H_a \text{ is accepted then } H_o \text{ is rejected} \\
  t_{\text{Count}} &\leq t_{\text{tabel}} \quad \text{so } H_a \text{ is accepted then } H_o \text{ is rejected}
\end{align*}
\]

The calculation results as in table 1 below.

<table>
<thead>
<tr>
<th>Table 1. Hypothesis Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>( t_{\text{count}} )</td>
</tr>
<tr>
<td>3,218</td>
</tr>
</tbody>
</table>

Based on the calculation results, it is found that \( t_{\text{count}} \) is 3,218 and \( t_{\text{table}} \) is 2,045. because 3,218>2,045 so \( H_o \) is accepted \( H_o \) is rejected. This means that there is a positive influence on the application of the Hypothetical Learning Trajectory (HLT) on the comparison material using the Nisab Zakat theory on student learning outcomes.

The use of zakat Nisab theory is used as the starting point in Comparison material learning. In addition, the use of zakat theory adds scientific evidence that the knowledge of religion and knowledge cannot be separated, the two sciences can go hand in hand or together. In addition, in completing the activity sheet, the student is very enthusiastic and motivated in discussing problems.

Freudenthal (in Gravemeijer & Van Eerde, 2009) holds that students are given the opportunity to develop and develop their ideas and thoughts when constructing the mathematics. Lecturers can choose appropriate learning activities as the basic for stimulating students to think and act when constructing the mathematics (Prahmana: 2017).

In this research, the researcher made the learning design of Hypothetical Learning Trajectory (HLT), in the comparison material using the Nisab Zakat theory. Gravemeijer & Cobb (2006) state that HLT is the hypothesis (guess) from situational problems that are contextual to formal mathematics in the learning process.

The various researches using HLT's Hypothetical Learning Trajectory have been conducted. Ayunika uses the Hypothetical Learning Trajectory (HLT) for improving student's understanding of the concepts. From the results of her research it can be concluded that with the help of the Hypothetical Learning Trajectory (HLT) can build students' understanding of mathematical concepts, the use of the Hypothetical Learning Trajectory (HLT) learning design
is able to develop better conceptual understanding. Learning is increasingly meaningful for students using HLT. In addition, by using HLT, the series of activities designed to develop students' thinking skills in constructing material. (Ramadhanti, 2015)

The results of this research are also supported by previous research related to apply the Hypothetical Learning Trajectory (HLT) conducted by Wijaya which shows that learning with the Hypothetical Learning Trajectory can encourage prospective teachers to be able to present effective learning for students who experience learning problems in the class and can develop student learning skills (Wijaya, 2015) to have an impact on students' results. Elisabet Ayunika also revealed that, in learning the trajectory hypothesis, learning that has been compiled, corresponds to the learning process in the classroom and supports students in expanding their understanding of concepts (Ayunika et al., 2011). In this research, the Hypothetical Learning Trajectory (HLT) method with the zakat theory was used to improve student learning outcomes in the comparison material, in obtaining the results that there was the positive influence on applying the Hypothetical Learning Trajectory (HLT) using the Nisab Zakat theory to student learning outcomes.

CONCLUSION AND SUGGESTION

From the results of the research found that in working on the activity sheet, the students are very challenged in doing it. They are very interested in working on the problem of comparison using the Nisab Zakat theory, and the HLT used is the latest innovation in the learning. From the results of statistical calculations obtained data that learning by combining religious theory with mathematical theory, especially the comparison material using the theory of Nisab zakat has a positive effect on the student learning outcomes.

Based on the conclusions of the research results, the researcher gives several suggestions that students should be expected to always update new things in accordance with mathematical material. The lecturer should combine the learning of mathematics in the material of comparison with the Nisab Zakat theory, and hopefully there will be further research on mathematical theory that is combined with the religion theory.

REFERENCE


Gravemeijer, K. (2004). Local Instructional Theories as Means of Support for Teachers in Reform Mathematics Education. Mathematical Thinking and Learning, 6(2), 105-128.


