EFFECT OF USE OF DERIVATIVE SNAKE TEACHING AIDS ON MATHEMATICS LEARNING OUTCOMES

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Abstract: This study aims to determine the effect of student learning outcomes using snake props derived from derivative material functions in class XI of SMA 1 Meranti. The study sample was determined randomly and there were 4 classes available so the study population consisted of 2 classes, each of which consisted of 34 students and XI Science-1 experimental class and class XI Science-2 control class. The test instruments in this study consisted of 5 questions essay tests. From the data analysis the average and standard deviation in the experimental class were obtained to pretest 46,471 and 10,282, while for posttest 74,00 and 10,708. For the average value and standard deviation of the control class to pretest 43,059 and 10,790 and posttest data 66,471 and 10,329. From the data analysis using the t-test at the level of α = 0.05, obtained t_{count} = 2.951 for t_{table} = 1.668 it turns out t_{table} < $t_{1-\alpha}$, then H_o is rejected and H_a is accepted. Thus the conclusion is that there is an influence of student learning outcomes using snake props derived from derivative material functions in class XI of SMA 1 Meranti.

Keyword : Props, Derivative Snake, Function Derivative

Abstrak: *Penelitian ini bertujuan untuk mengetahui pengaruh hasil belajar siswa menggunakan alat peraga ular turunan pada materi turunan fungsi dikelas XI SMA Negeri 1 Meranti. Pengambilan sampel penelitian ditentukan secara acak dan tersedia 4 kelas maka yang menjadi populasi penelitian terdiri dari 2 kelas yang masing-masing berjumlah 34 siswa dan XI. IPA-1 kelas eksperimen dan kelas XI. IPA-2 kelas kontrol. Instrumen tes dalam penelitian ini terdiri dari tes essay sebanyak 5 soal. Dari analisis data diperoleh rata-rata dan simpangan baku pada kelas eksperimen untuk pretes 46,471 dan 10,282, sedangkan untuk postes 74,00 dan 10,708. Untuk nilai rata-rata dan simpangan baku kelas kontrol untuk pretes 43,059 dan 10,790 serta data postes 66,471 dan 10,329. Dari analisis data dengan menggunakan uji-t pada taraf α = 0,05 diperoleh t_{hitung} = 2,951 untuk t_{tabel} = 1,668 ternyata t_{tabel} < $t_{1-\alpha}$, maka H_o ditolak dan H_a diterima. Dengan demikian diperoleh simpulan bahwa ada pengaruh hasil belajar siswa menggunakan alat peraga ular turunan pada materi turunan fungsi dikelas XI SMA Negeri 1 Meranti.*

Kata Kunci : *Alat Peraga, Ular Turunan, Turunan Fungsi*

Introduction

Education today is increasingly advanced and modern. As a teacher, we can take advantage of these developments in learning. However, not all teachers make use of it because there are teachers who still use the strategies and learning methods that refer to the past. As a result, teachers become lazy to innovate. Even though learning innovation is very necessary. It will not be possible for the learning system from year to year just like that to not experience renewal. If so, education will be far behind the development of the times. The influence is not only in education, but also many aspects such as politics, economy, social, technology, and others.

According to Trianto (2010: 4), it is argued that the right effort to prepare quality Human Resources (HR) and the only container that is considered to function as a tool to build high-quality human resources is education. Therefore, teachers should be able to create a conducive atmosphere so that learning becomes more effective and enjoyable. According to Kanginan (in Paini, 2010: 80) mathematics is the parent of all branches of science. According to Suheri's statement (2013: 124-125) which states that: Mastery of mathematics will contribute to the achievement of educational goals in general, namely through the formation of human beings who are able to think logically, systematically and accurately and are objective and open in facing various problems " However, most students give up when faced with math problems that are considered difficult and cannot, even though from the difficult questions they will be able to understand and understand. Besides that, students who consider mathematics to be fun and master the lesson are seen as smart students. To overcome this problem the author begins to use the group discussion model in learning while playing props that are used to open students' thinking patterns and can solve problems in mathematics learning. Various improvements have been made both by changing the atmosphere of learning outside the classroom, using new learning resources, increasing practice questions and homework, but in fact students' mathematical learning outcomes show numbers that are not much different from before. Teachers have difficulty determining learning methods due to

heterogeneous student abilities. The interest in learning from students is lacking and often seems to not focus on the material when teaching and learning activities take place. Students are often seen talking to their friends when the teacher explains the material in front of the class. Inactive students ask the teacher about the material being taught. Similarly, if the teacher gives questions to students, very few students respond to questions from the teacher. Students tend to feel afraid of being wrong when answering questions from the teacher regarding the material being taught. This media also requires the activeness of students in choosing and finding material concepts, so students who were originally passive will participate in their study groups. Based on the problems that have been described, the authors want to make the latest innovations and the authors are interested in conducting research with the title: "The Influence of Use of Derivatives Snake Teaching Tools on Mathematics Learning Outcomes of Function Derivative Materials in Class XI Students of SMA 1 Meranti".

Method

This study uses a quasi-experimental method. The research sample used consisted of two classes namely the experimental class and the control class, the experimental class was taught using derivative snake props and the control class was taught by the lecture method. Study material for data collection in schools is chosen by the Function Derivative material. Before the teaching and learning process begins, the two groups are given a preliminary test (pretest) which aims to determine the initial abilities of the two groups. And after the teaching and learning process the two groups end up again given a test (posttest) to find out the learning outcomes of the two groups then shown in Table 1 as follows:

Table Two Group Pretest-Design Tests

Group	Initial Test (*pre-test*)	Treatment	final test (*post-test*)
experiment	T_1	X_1	T_2
control	T_1	X_2	T_2

Description:

    T_1: pre-test

    T_2: post-test

    X_1: learning using derivative snake props

    X_2: learning with the lecture method

The research procedure is the stages and actions taken in the research process. The stages of this research are:

1. Preparation stage

    a. Develop a research schedule

    b. Arrange the learning plan program

    c. Prepare a grid in preparing assessment instruments

2. Implementation phase

    a. Determine the sample class of the existing population.

    b. Conduct pre-tests to determine students' ability to solve problems before being treated.

    c. Carry out teaching and learning procedures in both sample classes

        1. Deliver teaching material in accordance with SK and KD.

        2. In the experimental class applied learning using derivative snake props.

        3. In the control class direct learning (lecture method) is applied.

    d. Carry out the final test (post-test) to find out the learning outcomes after treatment

       The instrument used in this study to obtain data is a test instrument in the form of a description test to find out the mathematics learning outcomes of students before and after learning using derivative snake props. Tests are arranged in the form of essays in 5 questions for pretest and 5 questions for posttest.

Result And Discussion

Result

After all the material was delivered to two classes, the same test was carried out to find out the difference in ability between the two classes. Classes taught using derivative snake props (experimental class) with the number of students n = 34 obtained a maximum value of 88 minimum value of 56, average 74, standard deviation s = 10.708 and Variance (s^2) = 114,666 (calculation in the attachment 22). Classes taught without the use of derivative snake props (control class) with the number of students n = 34 obtained a maximum value of 80, a minimum value of 48, an average of 66,471 standard deviation s = 10,329 and Variance (s^2) = 106,681.

The hypothesis in this study is that there is the influence of the use of derivative snake props on the mathematics learning outcomes of students of functional derivative material in class XI students of SMA 1 Meranti. Hypothesis testing is done to determine decision making, whether the null hypothesis (H0) proposed is rejected or accepted. Based on the results of testing the basics of the analysis obtained, namely the mathematics learning outcomes of students who were taught using derivative snake props and mathematics learning outcomes of students who were taught using lecture methods with normal distribution and homogeneous variance, hypothesis testing can be done using t.

The results of hypothesis testing obtained t-count = 2.951. (found in appendix 24). By using a distribution list t, it can be found that the price of t table at the confidence level of 5% with degrees of freedom ($n_1 + n_2 - 2$) is 1.668. Price t_{count} (2.951) > t $_{table}$ (1,668). So it can be concluded that "the average learning outcomes of students using derivative snake props are better than the average student learning outcomes without using derivative snake props".

From the results of the data obtained this study describes the mathematics learning outcomes of students who learn to use derivative snake props and use lecture learning methods on derivative material functions in class XI. Science of SMA 1 Meranti. The results of the posttest data analysis showed that the mathematics learning outcomes of students

taught using derivative snake props were better than the mathematics learning outcomes of students who were taught using the lecture method.

Discussion

Based on the results of posttest data analysis, it was concluded that the mathematics learning outcomes of students taught using derivative snake props were better than the mathematics learning outcomes of students who were taught using lecture methods on function derivative material. This study found that the average post-test results of the experimental class were 74 and the control class was 66.447.

Supardi (in Malik, 2009: 46) describes the factors that need to be considered (controlled) before carrying out experiments, namely:

1. Basic mathematics, before the experiment starts students each class group needs to be balanced so as not to occur in one class consisting of smart students, while the other consists of students who are moderate and less intelligent. So that the difference in the final results of the experiment is not caused by treatment but by the conditions of different students.

2. When studying, it needs to be considered when the lesson takes place, the experimental group is not allowed to enter in the morning while the control group enters the afternoon or vice versa.

3. Teacher/Teacher. Educational background, and teaching experience sought to have a balanced degree. Likewise the level of discipline and ability.

Based on the factors above, before this research was carried out some controls have been carried out on these disturbing factors, including:

1. Basic math students, for superior classes are not included in the sample population list. So that in sampling, the two sample classes are representative groups of low class students who can represent the population.

2. Study time for the experimental class and control class is in the morning.

3. The teacher/instructor in both sample classes is the same teacher to guarantee subjectivity.

In the learning process, the media has the function of carrying information from the source (teacher) to the recipient (student). The role of the teacher is to help students receive and process information to achieve learning goals. The use of derivative snake vending media can be used not only in the teaching learning process takes place, but students can also use it when they are free or relaxed. This is because this learning media is more dynamic in its use. Learning media are designed in such a way that students are more easily using the derivative snake media. In accordance with the results of the experiments conducted by the researchers, the learning provided with derivative snake learning media is believed to be superior in improving students' mathematics learning outcomes, especially in mastering the concept of derivative functions.

Conclusion

Based on the posttest data of the experimental class and the control class normal distribution and the two homogeneous variances. Next, hypothesis testing is done, the results of which are $t_{count} > t_{table}$ (2,951 > 1,668). Thus H_0 is rejected and H_a is accepted so that it can be concluded that there are influences of students' mathematics learning outcomes on functional derivative materials using derivative snake props in class XI. Science of SMA 1 Meranti.

References

Arikunto, S. 2011. *Dasar-Dasar Evaluasi Pendidikan*. Jakarta: PT. Bumi Aksara.

Arikunto, S. 2013. *Prosedur Penelitian*. Jakarta: PT. Rineka Cipta.

Daryanto. 2011. *Media Pembelajaran*. Bandung: PT. Sarana Tutorial Nurani Sejahtera.

Mahmudah, S. 2010. *Metode Penelitian UIN Sunan Ampel Surabaya.* *http://digilib.uinsby.ac.id/8738/6/bab%.3pdf* diakses pada 26 Oktober 2017

Paini, 2010. Upaya Meningkatkan Hasil Belajar Matematika Dengan Menerapkan Strategi Genius Learning. *Jurnal mathematics Paedagogic,* I, (1): 77-91

Sapta, A. 2011. Peningkatan Penguasaan Nilai Sudut Trigonometri Dengan Menggunakan Domino Trigonometri. *Jurnal Mathematics Paedagogic,* I (2): 113-124

Slameto. 2013. *Belajar dan Faktor-Faktor Yang Mempengaruhi.* Jakarta: Rineka Cipta.

Sudjana. 2005. *Metoda Statistika.* Bandung: PT. Tarsito.

Suprayetno. 2010. Peningkatan Hasil Belajar Matematika Melalui Model Pembelajaran Dengan Pendekatan Investigasi. *Jurnal Mathematics Paedagogic,* I (1): 53-67

Trianto. 2010. *Mendesain Model Pembelajaran Inovatif-Progresif.* Jakarta: Kencana.