Effectiveness of implementing differentiated learning in class viii science subjects at Gonzaga Tomohon Catholic Middle School

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Abstract

Research has been conducted which aims to determine the effectiveness of implementing differentiated learning on student learning outcomes in the material pressure of solids in class viii Gonzaga Catholic Middle School, Tomohon. The research approach used is a quantitative approach. The research method used in this research is quantitative research with a quasi-experimental type with a posttest only control design. The results of the research show that there is a real positive influence by implementing differentiated learning on students' science learning outcomes. The learning outcomes of students on solid pressure materials who study using the differentiated learning model are more effective compared to the learning outcomes of students who study without using the differentiated learning model.

Keywords: effectiveness, differentiated learning, student learning outcomes

Introduction

Freedom to learn is a program or policy from the Ministry of Education and Culture, Research, Technology through the implementation of an independent curriculum which aims to create pleasant learning conditions and provide high quality education for teachers and students. Merdeka Belajar can be understood as the application of a curriculum that prioritizes pleasant situations in the learning process, as well as increasing creative and innovative thinking of teachers.

According to Ki Hajar Dewantara, every individual is different and unique. Ki Hajar Dewantara reminded teachers that children's education actually looks at the nature of the child and connects it with the nature of the times. The varying nature of children's personalities results in differences in students' learning methods, differences in absorption capacity and various other differences. Teachers must be observant in seeing the diversity of these characteristics and cannot force certain ways of learning according to theories that they believe are good for students. Students also have the right to receive learning according to their way of learning to achieve learning goals in their own way.

Differentiated learning is learning that accommodates students' learning needs. Teachers facilitate students according to their needs, because each student has different characteristics, so they cannot be given the same treatment. In implementing differentiated learning, teachers need to think about reasonable actions that will be taken later, because differentiated learning does not mean learning by providing different treatment or actions for each student, or learning that differentiates between smart and less intelligent students.

Many teachers cannot yet imagine how this differentiated learning approach will work because they have carried out a one-way learning process centered only on the teacher for many years. By using a differentiation strategy and providing activities that are tailored to students' needs based on students' readiness, interests and learning styles, it is hoped that students' needs will be met, students will be able to learn according to their respective abilities.

To make this happen, teachers are directed to implement differentiated learning, namely learning that is adapted to the students' character, needs, interests and learning styles. This differentiation learning model is not a new learning model. This learning model requires awareness and also serious hard work in analyzing information data obtained from students in class, then the data is used as material in making decisions in providing learning to students that will be adjusted to their abilities and used in changing something that needs to be changed is also to provide things that are more necessary for each student. Differentiated learning is a series of commonsense decisions made by teachers that are oriented to student needs. This means that decisions taken in differentiated learning must be rooted in meeting students' learning needs and how teachers respond to these learning needs.

Differentiated learning (Differentiated instruction) is not a program, method, or strategy. It is a way of thinking, a philosophy of how to respond to student differences. According to Heacox (in Candra Ditasona 2017: 45) differentiated learning specifically responds to students' continuous learning progress, what they already know and what they have learned. Based on student characteristics, Tomlinson (in Candra Ditasona 2017: 45) suggests that differentiation learning can be done in three ways, namely: (1)

readiness to learn, namely if the assignment given by the teacher is in accordance with the students' skills and understanding, (2) interest, namely if the assignment that given by the teacher is able to encourage or trigger curiosity or desire in students so that they have enthusiasm for learning, (3) learning profile, namely if the assignment given by the teacher is able to give students the opportunity to work in the way they like. The application of differentiated learning makes students feel cared for, more appreciated and challenged to learn. Content that is appropriate to learning readiness, an interesting process, and a challenging product will increase student learning motivation. A teacher's expertise in building a positive classroom atmosphere is very necessary. In this way, the Pancasila student profile will be easier to realize.

The application of differentiated learning will make students feel cared for, more appreciated, and challenged to learn. Content that is appropriate to learning readiness, interesting processes, and challenging products will increase students' learning motivation. A teacher's expertise in building a positive classroom atmosphere is very necessary. In this way, the Pancasila student profile will be easier to realize. Based on the description above, this research aims to determine the effectiveness of implementing differentiated learning on student learning outcomes in the material pressure of solids in class viii Gonzaga Catholic Middle School, Tomohon.

Method

The research approach used is a quantitative approach. The research method used in this research is quantitative research with a quasi-experimental type (Quasi Experimental Research) with a posttest only control design. The population in this study were class VIII students at Gonzaga Tomohon Catholic Middle School for the 2023/2024 academic year. The samples in the study were selected from 2 classes randomly. Class VIII C is an experimental class that studies with a differentiated learning model and class VIII D is a control class that studies without a differentiated learning model on solid pressure material. The instrument used in this research is learning outcomes test questions in the form of multiple choices. The validity used is content validity, namely asking the expert team's opinion about whether the test created is suitable for use. The data in this research was collected by giving a test after the learning activities took place (post-test). The statistical test used in hypothesis testing is the difference test between two means after the prerequisite tests (normality test and homogeneity test) are fulfilled.

Results and discussion

This research data was taken from two classes, namely class VIII-C and class VIII-D at Gonzaga Tomohon Catholic Middle School, with the number of students in class VIII-C (experimental class) being 29 people and the number of students in class VIII-D (control class) being 29 people. The data taken is data from students' post-test results in science subjects on the subject of pressure in solid substances. In inferential analysis, before testing the hypothesis using the t-test, a homogeneity of variance test and a normality test are first carried out. The data used is post-test data from both classes. Analysis of the post-test data from the two classes was carried out to determine the normality and uniformity of the data as a requirement for hypothesis testing using the t-test for the two classes.

1. Prerequisite test

a. Normality test using lilifors test

The results of the post-test score normality test in the experimental class showed the value of L_{count} = 0.1374 and L_{table} = 0.180. Because $L_{count} < L_{table}$, the experimental class post-test scores are normally distributed. Meanwhile, the post-test score normality test for the control class showed the value of L_{count} = 0.0678 and L_{table} = 0.180. Because $L_{count} < L_{table}$, the post-test scores for the control class are normally distributed (Lilliefors calculation of post-test data, see the attached page).

b. Homogeneity of variance test

The results of the analysis of testing the similarity of two varieties with F-test statistics on post-test data, with S12 = 104.3941 and S22 = 84.2116 give a value of F_{count} = 1.0000085 and F_{table} = 1.882. This shows that $F_{count} < F_{table}$, so there is not enough evidence to reject H_0:σ_1^2=σ_2^2. So, it can be assumed that the variances of the experimental class and control class are homogeneous.

2. Hypothesis testing

To test the hypothesis, the post-test data for both classes will be analyzed using inferential statistics, namely the difference test between two means, provided that both samples have a normal distribution which is tested using the Lilifors test.

Because the normality test for the post-test for both classes has been fulfilled based on the Liliefors test and the variance homogeneity test has also been fulfilled, hypothesis testing using t-test statistics can be continued.

a) H0 : $\mu 1 \leq \mu 2$
b) H1 : $\mu 1 > \mu 2$

with,

$\mu 1$ = Post-test score of students who study using the differentiated learning model.

$\mu 2$ = Post-test score of students who studied without using the differentiated learning model.

c) α=0.05
d) The test statistic used is the t-test
e) Test Criteria: H0 is rejected if $t_{count} > t_{0.05}$
f) t_{count} = 4.368
g) Conclusion: At a significance level of 0.05, t_{count} = 4.368 > t_{α}=2.004, so H0 is rejected. This means that: The learning outcomes of students in learning pressure on solid substances who study using the differentiated learning model are better than the learning outcomes of students who study without using the differentiated learning model.

From the results of research in experimental classes on pressure material on solid substances using a differentiated learning model at Gonzaga Tomohon Catholic Middle School, in general it shows that there is a real positive influence of the use of this treatment on the students' science learning outcomes.

This is shown by the average test results given to both classes, where for the experimental class the final test score was 82.76 while for the control class the final test score was 72.41. This shows that the final test score for the experimental class is higher than the final test score for the control class. Thus, this also shows that teaching material on pressure in solids using a differentiated learning model is more effective than teaching material on pressure in solids without using a differentiated learning model.

At a significance level of 0.05 based on the difference test between two means and the results of the descriptive analysis above, it can be seen that this also applies to the learning outcomes of the experimental class which are better than the control class. So a conclusion can be drawn that: The learning outcomes of students in learning pressure on solid substances who learn by applying the differentiated learning model are more effective compared to the learning outcomes of students who study without applying the differentiated learning model.

Conclusion

From the results of research in experimental classes on solid pressure material using differentiated learning, in general it shows that there is a real positive influence of the use of this treatment on students' science learning outcomes. This is shown by the average test results given to both classes, where for the experimental class the final test score was 82.76 while for the control class the final test score was 72.41. This shows that the final test score for the experimental class is better than the final test score for the control class. Thus, this also shows that teaching material on solid pressure using a differentiated learning model is better than teaching material on solid pressure without using a differentiated learning model. At a significance level of 0.05 based on the difference test between two means and the results of the descriptive analysis above, it can be seen that this also applies to the learning outcomes of the experimental class which are better than the control class. Thus, the learning outcomes of students on solid pressure material who study using the differentiated learning model are more effective compared to the learning outcomes of students who study without using the differentiated learning model.

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