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Treffinger Learning Model Assisted by PPT Media is it Affects Student Learning Outcomes?

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Abstract. The purpose of this study was to determine the effect of treffinger learning model assisted by PPT media on the learning outcomes of students in class XI MIPA SMA Negeri 1 Wundulako. This type of research is quantitative research using quasi experimental method with post-test design only design. The sample of this study amounted to 26 students of class XI MIPA 2 as an experimental class taught using the treffinger learning model assisted by PPT media and 26 students of class XI MIPA 1 as a control class taught using conventional models. Article 24 of Permendikbud No 17/2017 stipulates that the number of students in one study group is at least 20 and at most 28. Based on the results showed that the experimental class obtained an average post-test value of 72.40 while the control class obtained an average post-test value of 62.20. The normality test results obtained the significance value of the experimental class post-test 0.141 and the control class post-test 0.200 showed results > 0.05. The homogeneity test of the experimental group and the control group from the post-test results, the significance value > 0.05. Furthermore, the hypothesis test obtained a significance value of 0.002 <0.05, then H0 was rejected and H1 was accepted. So it can be concluded that there is an effect of Treffinger learning model assisted by PPT media on the learning outcomes of students in class XI MIPA SMA Negeri 1 Wundulako.

Keywords: Treffinger, Power Point (PPT), Learning Outcomes.

1 Introduction

The development of education that is synergistic and relevant to the times is a concern for implementers and users of education, education in Indonesia always has a breakthrough to achieve quality education [1]. The quality of education is built based on the objectives of national education. In national education, students are members of society who seek to develop their potential through the learning process available at certain paths, levels and types of education [2]. Education in Indonesia has always undergone a metamorphosis by changing the face of education to achieve educational goals [3].

Education in Indonesia still needs to improve quality to ensure the mental and cognitive processes of students [4]. The factors that influence education can be seen from its internal factors, including the implementers and directors of education, as well as schools that have advanced in the field of education. Furthermore, from external factors, namely society as a user of education, society as an icon and also the purpose of education itself [5]. The quality of education has always attracted attention because it is a portrait of the progress of thinking with knowledge and skills. The problem faced today is that it is still necessary to improve the process of knowledge and skills of students through various learning innovations in schools [6].

The learning process in schools has not been oriented towards increasing students' creativity because there are still many educators who use conventional learning models [7]. The learning process tends to be teacher-centred or it can be seen that the teacher is more dominant in learning [8]. In addition, whether we realise it or not, the learning process in schools tends to be framed by intense competition between students. The representation of learners in the learning process needs attention because it will affect the mental process and the spirit of learning of learners [9]. However, some interesting facts are that the learning process in schools is always constrained to pursue the minimum completeness criteria (KKM) without seeing the conditions and development of students' knowledge and skills, this happens because students have not been able to be consistently enthusiastic in receiving the knowledge taught by the teacher [3], the solution offered is to present a relatively new learning model for students to help students achieve a consistent process of enthusiasm in the learning process. Bloom

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presented three taxonomies called learning domains, namely the cognitive domain, affective domain, and psychomotor domain. The cognitive domain is related to the results in the form of knowledge, abilities, and intellectual skills. The cognitive domain includes the categories of knowledge, comprehension, application, analysis, evaluation, and creation. One of the learning models offered is the Treffinger learning model. The Treffinger learning model is a learning model that attracts the attention of students and is able to increase literacy and learning independence [10]. Treffinger model is a learning strategy developed from a creative learning model that is mentally building and prioritises the process. Creative problem solving is designed to assist problem solving by using creativity to achieve learning objectives. The Treffinger learning model is able to improve students' creative thinking skills. The Treffinger learning model is a model that involves the affective (attitude) and cognitive (knowledge) domains. The treffinger model consists of three stages: basic tools, practice with procces, and working with real problems. The most dominant characteristic of the treffinger learning model is the effort to integrate the cognitive and affective dimensions of learners to find the directions that will be taken to solve problems. Learners are given the freedom to be active in solving their own problems in the desired way. The Treffinger model is a set of ways and procedures for learning activities whose procedures include orientation, self- and group-understanding, development of creative thinking and attitude skills, encouragement of creative ideas, and development of real and complex problem-solving skills.

A quality learning process is a learning process that occurs when students can achieve the expected learning objectives. The utilisation of learning media in learning activities is one of the ways to improve this aspect of quality learning [11]. Using and choosing the right learning media can provide benefits in improving students' learning outcomes and is useful as a means of attracting students' attention when receiving material presented by the teacher. Schools with limited facilities and infrastructure need to pay attention to relevant learning media, one of the solutions offered is Microsoft power point (PPT). Power point media is a software created and developed by the Microsoft company which is one of the multimedia-based programmes. In the computer this programme is usually grouped in the Microsoft office programme. This programme is specifically designed to deliver presentations with various menu features that can make it an attractive communication medium.

The learning media used in this study is PPT media, where this media can affect the learning outcomes of students, both in the realm of knowledge, skills and attitudes [12]. To be more interesting and interactive, the making of Microsoft Power Point learning media can be equipped with the use of the Slide Master feature as a solution to attract students' learning enthusiasm. Based on the results of interviews with educators (teachers) and some students at SMAN 1 Wundulako, it is known that chemistry learning uses conventional learning models in general by using learning media in the form of chemistry print books as a reference source for learning in class. Based on some facts and chronology of learning that occurs, researchers are interested in conducting research with the title "Treffinger Learning Model Assisted by Ppt Media Does it Affect Student Learning Outcomes?"

2 Research Methods

The type of research used in this study is quantitative research. Quantitative research is one type of research whose specifications are systematic, planned and clearly structured from the beginning to the making of the research design. quantitative research is a research method based on the philosophy of positivism used to research on certain populations or samples, data collection using research instruments, quantitative / statistical data analysis. This research was conducted in the even semester of the 2022/2023 academic year.

The research was conducted at SMA Negeri 1 Wundulako which is located in Wundulako sub-district, Kolaka Regency, Southeast Sulawesi Province. SMAN 1 Wundulako is an education unit with high school level in Wundulako sub-district, Kolaka district, Southeast Sulawesi. In carrying out its activities, SMA Negeri 1 Wundulako is under the auspices of the Ministry of Education and Culture. The school is located at Jalan Guro number 5 Lamekongga. The population used in this study were all students of class XI MIPA SMA Negeri 1 Wundulako class 2022/2023 consisting of four classes. Sampling is done by purposive sampling technique, which is taking two classes with certain considerations, the intended consideration is to choose a class with relatively the same ability of students. The samples in this study were XI MIPA 2 class as the experimental class and XI MIPA 1 class as the control class.

The independent variable in this study is the treffinger learning model assisted by PPT media while the dependent variable in this study is the cognitive learning outcomes of students in solubility and product of solubility material. The research design used in this study was post-test design only. In this study there were two groups to be studied, the first group was the experimental class as a class that received treatment taught using the treffinger learning model, the second group was the control class as a class that did not receive treatment taught using a direct learning model (conventional). The research design can be seen in Table 1.

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Table 1. Research Design

Class	Treatment	Posttest
A_1	**X**	O
A_2		O

Desc: A_1 = Experimental class (using treffinger learning model)
A_2 = control class (using conventional learning model)
X = Treatment (PPT media)
O = *Post-test*

Data collection is a systematic and standardised procedure for obtaining the necessary data. To obtain the desired data, a data collection technique is needed in a study. This step is very important because the data to be collected will later be used in testing the hypothesis. Data collection techniques must be adjusted to the data needed. The test instruments include the final test (post-test), non-test instruments including documentation, in this study the data collection technique used an essay question test to measure the knowledge or learning outcomes of students after being given treatment. This test instrument will be used during the posttest.

Descriptive analysis is used to describe the characteristics of the research variable scores in the form of the average score (mean), and standard deviation (standard deviation) of the post-test of the two classes, namely classes that use conventional learning and classes that use the Treffinger learning model assisted by PPT media. The prerequisite test used in this study used IBM SPSS 24.0 normality and homogeneity tests through normality and homogeneity tests. Hypothesis testing in this study used hypothesis testing which was carried out with the help of Software Product and Service Solution (SPSS). The hypothesis test used in this stage must be in accordance with the statistical assumptions (normality test and homogeneity test) that have been carried out.

3. Results and Discussion

3.1 Research Results

This study aims to determine the effect of learning by using the treffinger learning model assisted by PPT media on the learning outcomes of students in class XI MIPA SMA Negeri 1 Wundulako. The method used is quasi experiment using two samples of class XI MIPA. Research data obtained from the results of the post-test given by students in the form of a description test which includes solubility and product of solubility. The implementation of treffinger learning at the initial stage is given treatment then the final stage is given a test to determine the learning outcomes of students.

a. Analysis of Post-Test Results of Experimental Classes and Control Classes

Before researchers process data to draw conclusions, first calculate the average (mean), median, standard deviation, maximum, and minimum learning outcomes of students, the acquisition of learning outcomes is presented in table 2.

Table 2. Descriptive analysis of post-test learning outcomes

Indicators	Results	
	Control	Experiment
Mean	62.20	72.40
Median	60.86	73.91
Standard deviasi	10.63	12.29
Maximum	80.43	91.30
Minimum	36.96	41.30

Based on Table 2, the post-test results conducted after using the Treffinger learning model assisted by PPT media in the experimental class obtained the highest learning outcome score of 91.30 and the lowest was 41.30, while the average score was 72.40, the median was 73.91, and the standard deviation was 12.29. The results of the post-test conducted after using the conventional learning model in the control group obtained the highest learning outcome of 80.43 and the lowest of 36.96, while the average score was 62.20, the median was 60.86, and the standard deviation was 10.63. The following is the frequency of cognitive domain scores obtained by both classes can be seen in table 3.

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Table 3. Frequency of experimental and control class cognitive domain scores

Range of values	Experimental class		Range of values	Control class	
	Frequency (f)	Percentage (%)		Frequency (f)	Percentage (%)
41-49	2	7.70%	36-43	1	3.85%
50-58	1	3.85%	44-51	4	15.4%
59-67	4	15.4%	52-59	4	15.4%
68-76	12	46.2 %	60-67	7	26.9%
77-85	3	11.5%	68-75	6	23.1%
86-94	4	15.4%	76-83	4	15.4%
	26	100		26	100

Description: f = Number of learners
% = Number of learners who gained quality per number of learners

Based on table 3 shows the difference in the frequency of cognitive domain scores in the experimental class and control class. Each range of values shows the frequency of students who get various scores. The lowest value in frequency shows the experimental class as many as 2 students and the control class as many as 1 student. The highest value in frequency shows the experimental class as many as 4 students and the control class as many as 4 students. The percentage of students' completeness in the experimental and control classes is shown in Figure 1.

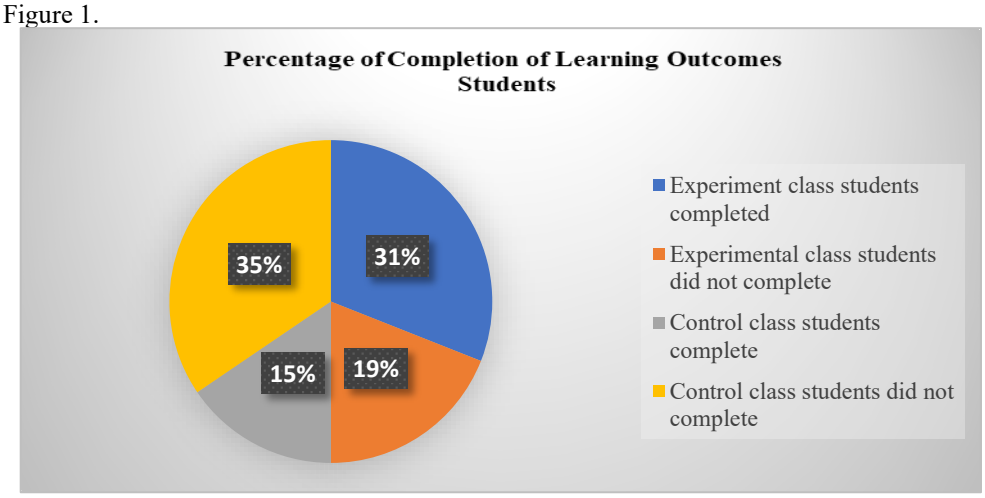

Figure 1. Percentage of completeness of student learning outcomes in the cognitive domain of experimental and control classes.

Based on Figure 1, it shows that the percentage of completeness of the experimental class is greater than the control class. In the experimental class, the percentage of completeness was 62%, while the control class obtained a percentage of completeness of 31%.

b. Normality Test

This normality test aims to determine whether a variable has normally distributed data or not. Data that has a normal distribution is one of the requirements for a parametric test. In this study, to test the normality of sample data, it was calculated using the SPSS (Statistical Product and Service Solutions) for Windows programme with one Kolmogorov-Smirnov test with a significance level of 0.05. If the Sig. or significance value> 0.05 then the data is normally distributed. The results of the normality test calculation are presented in table 4.

Table 4 Normality test of experimental-control class group data

Normality Test				
Object	Class	Kolmogorov-Smirnov[a]		
		Statistic	df	Sig.
Learner learning outcomes	Experimental class post-test	.149	26	.141
	Control class post-test	.102	26	.200*

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Based on table 4, it shows that the sig kolmogorov-smirnov value> 0.05. so the conclusion of this distribution is that it states normal, because the data obtained shows normal, the data can be continued to the next stage, namely by using a homogeneous test.

c. Homogeneity Test

The homogeneity test was carried out to obtain the assumption that the research samples came from the same or homogeneous conditions. The sample is declared homogeneous if the significance value> 0.05. Sample testing uses the Lavenes test with the help of SPSS 24.0. The results of the homogeneity test calculation are presented in Table 5.

Table 5 Test of homogeneity of experimental-control class group data

Homogeneity test				
	Levene Statistic	df1	df2	Sig.
Based on Mean	.029	1	50	.866
Based on Median	.025	1	50	.875
Based on the Median and with adjusted df	.025	1	46.397	.875
Based on trimmed mean	.019	1	50	.891

Based on Table 5, it shows that for the experimental group and control group from the post-test results, the significance value of the Levene test> 0.05. so the conclusion of this distribution is that the data is declared equal or homogeneous, because the data obtained meets the requirements, the data can be continued to the next stage, namely hypothesis testing.

d. Hypothesis Test

Hypothesis testing is used to prove the truth of the hypothesis proposed. Hypothesis testing in this study used the t test or the test of the average difference between experimental data and control data. The data used is the value of cognitive learning outcomes (post-test) between the experimental class and the control class. After testing the prerequisite analysis, namely normality and homogeneity tests, it is known that the two sample classes are normally distributed and homogeneous. Furthermore, the research hypothesis testing was carried out using the t test to determine the effect of using the treffinger learning model assisted by PPT media on the learning outcomes of class XI MIPA SMA Negeri 1 Wundulako.

Based on the results of the calculation, the results of hypothesis testing with the t test post-test of the experimental class and control class can be seen in table 6.

Table 6. Hypothesis testing results with independent sample test post-test of experimental and control classes

t-Test						
		F	Sig.	T	Df	Sig. (2-tailed)
Learner learning outcomes	Equal variances assumed	.029	.866	3.200	50	.002

Based on the calculations in table 6 using SPSS 24.0, the significance value (2-tailed) is 0.002 <0.05, so H0 is rejected and H1 is accepted, which means that there is an average difference in student learning outcomes between using the treffinger learning model assisted by PPT media with conventional learning methods.

3.2 Discussion

Based on data collection and research results obtained at SMA Negeri 1 Wundulako, the following discussion is obtained. This study uses two variables that become the object of research, namely the independent variable Treffinger Learning Model assisted by PPT media and the dependent variable of student learning outcomes. Educators use a post-test to determine the effect of the Treffinger Learning Model on student learning outcomes. Treffinger is one of the few models that addresses creativity issues directly and provides practical suggestions for achieving cohesiveness, involving both cognitive and affective skills at each level of the model. Treffinger demonstrates the interrelationship and interdependence between the two in promoting creative learning. Treffingger is one of the models that appreciates the diversity of thinking that arises during the learning process and working on problems.

Every meeting in the experimental class the teacher provides learning with the help of PPT media (Microsoft power point) aims to make it easier for the teacher to convey the material presented, attract students to stay focused during learning because it is accompanied by attractive images and animations, and students more easily understand the teacher's explanation and can follow the learning model carried out by the teacher. At the end of the meeting, students are given Learner Worksheets (LKPD) and then discuss with their group friends to find out the extent of students' understanding of the material presented. The 4th meeting was conducted post-test in the

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experimental class. The post-test aims to measure the success of students in achieving the competence of solubility and solubility product material after the class is given treatment.

XI MIPA 1 class (control class) used conventional learning model or direct learning. Learning activities in the control class applied conventional learning. At each meeting the teacher explained the solubility and product of solubility using the lecture method. At the end of the meeting students work on the questions given by the teacher. Then the questions were discussed with the teacher and students. The 4th meeting was held a post-test in the control class. The post-test aims to measure the success of students in achieving the competence of solubility and product of solubility material after the class is given treatment. Based on the results of the research Table 2 shows the results of the post-test in the form of a test of the cognitive learning outcomes ability of students taught using the treffinger learning model is higher than students taught using conventional learning models. This is because the control class applies a conventional learning model where the teacher only provides direct learning with the lecture method monotonously in classroom learning activities. The learning process tends to be teacher-centred or it can be seen that the teacher is more dominant in learning. Teachers are more active in delivering subject matter while students only listen so they cannot develop their knowledge. the use of conventional learning models through the lecture method does not necessarily trigger students' curiosity and active involvement in learning [13]. another cause is that students in conventional learning only provide few opportunities for students to be able to express ideas or ideas. So it is still lacking in improving the ability of students' learning outcomes [14].

In the experimental class, the learning model applied was the treffinger learning model. Treffinger learning is a model of developing creativity through the problem solving process. [10] suggests that learning with the Treffinger model has a positive effect on students' cognitive learning outcomes. This is because almost all of the syntax of the Treffinger model more often trains fluent thinking skills than other abilities. Fluency is the ability to come up with many ideas, ways, suggestions, questions, ideas or alternative answers smoothly in a certain time quickly which emphasises the quality of the answer. Research using the treffinger model has been conducted with the research title "The Effect of Treffinger Learning Model on Creative Thinking Ability and Learning Outcomes of Salt Hydrolysis Class XI Science Students of SMA Negeri 5 Banjarmasin in 2016/2017". The results showed that the average value of learning outcomes of experimental class students was higher than the control class, it proved that the treffinger model had an effect on the creative thinking ability of students and the learning outcomes of students in class XI IPA SMAN 5 Banjarmasin. This is also supported by research conducted by Nurul Fatimah with the title "The Use of Treffinger Learning Model to Improve Students' Cognitive Learning Outcomes in Geometric Optics Material Class X MAN Blora 2014/2015 Study Year". This research was conducted using the quasi-experimental method. The results of this study state that the increase in learning outcomes of experimental class students is significantly higher than the learning outcomes of control class students.

In addition, in the experimental class using Microsoft powerpoint media assistance, in the learning process there was interaction between teachers and students, where when the teacher provided material through Microsoft powerpoint media by combining images with appropriate colour and font processing, students were more enthusiastic and interested in paying attention to learning material with powerpoint media slides during the learning process. Learners express themselves when the teacher displays slides about images that are often encountered in everyday life as well as when students work on LKPD students find it easier to understand learning material after the teacher provides treatment using powerpoint media. Using powerpoint media has the advantage of being able to display objects that do not actually exist physically or are termed imagery, has the ability to combine all media elements such as text, video, animation, images, graphics, and sound into an integrated presentation, has the ability to accommodate students according to their learning modalities, especially for those with visual, auditive, kinestic types, then able to develop learning materials, especially reading and listening young. Thus, learning using the treffinger learning model assisted by powerpoint media can improve student learning outcomes.

Based on Table 3 shows the difference in the frequency of cognitive domain values in the experimental class and control class. Each value range shows the frequency of students who get various values. The lowest value in frequency shows the experimental class as many as 2 students and the control class as many as 1 student. The highest value in frequency shows the experimental class as many as 4 students and the control class as many as 4 students. Then the chemistry learning outcomes completeness test was carried out in the experimental and control classes. The completeness test was conducted to determine the effectiveness of PPT-assisted Treffinger learning. Based on Figure 1, the completeness test results in the experimental class reached 62% or 16 out of 26 students had reached the KKM. while in the control class it reached 31% or 8 out of 26 students had reached the KKM. Based on the results of the completeness analysis, the experimental class obtained higher results than the control class. This shows that Treffinger learning assisted by PPT media is effective on learning outcomes in solubility and solubility products. This is in accordance with research conducted by which states that the use of the Treffinger model can improve the understanding of the concept of student learning outcomes.

There are several factors that cause the results of Treffinger learning assisted by PPT media better than conventional learning. In Treffinger learning assisted by PPT media as follows: (1) students are more actively involved in learning (2) students are required to develop their creativity to solve a problem or problem at hand (3) students can cooperate and exchange knowledge (4) learning provides an interesting phenomenon for students (5) students are enthusiastic and focus on the material displayed on the media used (PPT) when following the learning process (6) the use of PPT media in addition to making it easier for a teacher, the presentation is also designed as well as possible so that it can attract students' interest.

Based on the previous data testing has been fulfilled, then the normality test of the data of each experimental group and control group is carried out. In table 4, a normality test is carried out which aims to see whether the data from the two samples are normally distributed or not. Based on Table 4.3, it shows that the sig kolmogorov-smirnov value> 0.05. so that it is normally distributed, which means that the data used is valid or accurate. Because the data obtained shows normal, it means that the data can be continued to the next stage, namely by using the homogeneous test parametric test. The homogeneity test is carried out with the aim of knowing whether the two data have the same variance (homogeneous) or not. Based on table 5 shows that the significance value of the levene test> 0.05 so that the data is homogeneous, which means that the two data have the same variance.

All data testing has been carried out, then proceed with drawing conclusions or hypothesis testing using the t test to find out whether the two learning models used have a significant difference or not, provided that if the significance value is> 0.05, then H0 is accepted and H1 is rejected, namely there is no difference in the average post-test learning outcomes of students in the two groups. If the significance (2-tailed) <0.05 then H0 is rejected and H1 is accepted, that is, there is a difference in the average post-test learning outcomes of students in the two groups. Based on table 6 shows the final results of the hypothesis test, the significance value is 0.002 <0.05, so H0 is rejected and H1 is accepted. So it can be concluded that there is a difference in the learning outcomes of students using the treffinger learning model assisted by PPT media with the learning outcomes of students who use conventional learning models.

4. Conclusion

Based on the results of the research and discussion that has been stated after testing the hypothesis using the t-test, it is concluded that there is an effect on the use of the treffinger learning model assisted by PPT media on the learning outcomes of SMA Negeri 1 Wundulako students compared to conventional learning methods, based on calculations using hypothesis testing using SPSS 24.0 obtained a significance value (2-tailed) of 0.002 <0.05 so that H0 is rejected and H1 is accepted, which means that there is a difference in the use of treffinger learning model assisted by PPT media with conventional learning methods.

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