



The effect of guided inquiry learning models assisted by simple practicum tools with the experimental method on the creative thinking abilities

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Abstract

The objective of this study was to analyze the effect of guided inquiry learning models assisted by simple practicum tools with the experimental method on the creative thinking abilities of junior high school students. This type of research is a quasi-experimental research design with Equivalent Pretest-Posttest Design. This research was conducted in Lab school Junior High School, Tadulako University, with a population of all eighth-grade students of Lab school Junior High School consisting of 3 classes. The sample of this study was class VIIIB as an experimental class, using random sampling. The research instrument was essay tests and observation sheets. Test data analysis was performed by one-party t-test statistical techniques to test differences in the average score of students' creative thinking ability with a significant level of $\alpha = 0.05$. Therefore the t_{counted} has been obtained, which is 1.02, and the t_{table} is 2.02. This means that the value of t_{counted} is outside the receiving area of H_0 , so it can be concluded that there is an influence of guided inquiry models assisted by simple, practical tools with experimental methods on students' creative thinking abilities.

Keywords: Creative Thinking Skills, Guided Inquiry, Simple Practicum Tools.

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INTRODUCTION

Physics is one of the subjects in the science family. Research on physics learning shows many factors that make learning interesting and influence high student learning achievement. One of them is the active involvement of students in the learning process, students are involved in observing, operating tools and practicing using concrete objects (Supriyono, 2003). Thus in the implementation of physics in students' learning is not only to memorize but also to learn actively or experience directly through various scientific activities.

But the reality found in the field, many teachers apply conventional learning in their

learning using only textbooks in schools. Students are only fixated on answering questions in the textbook, therefore that the creativity of students is not optimal. As happened in one of the State Junior High Schools in Palu City. The use of conventional learning also has an impact on students' interaction with the teacher as well as with other students. As a result, the ability of students' creative thinking is less developed.

The results of observation also showed that the teacher still rarely did experiments because laboratory tools were incomplete so that the role of students in learning was not yet optimal, which had an impact on

students' creativity. Creativity is very important, but schools are still not able to develop it optimally. In this case, teachers have not given freedom for their students to express themselves creatively in the practicum activities (Aryani, 2008).

Thinking skills that can be developed in physics are creative thinking and critical thinking skills. According to Torrance (Filsaisme, 2008), creative thinking skills are not just thinking skills to memorize material and relay information that is already known. Creative thinking skills are thinking skills that go through several processes to find solutions to a problem. So that someone creative will always respond to a problem that is around him, look for various sources to solve the problem, connect multiple sources that have been obtained, make several alternative solutions to the problem, conduct testing of alternative solutions, create a solution and communicate solutions to existing problems.

Creativity as a theoretical approach is seen as a multi-component process, which involves not only cognitive aspects and abilities but also affective, motivational, and other characteristics through social and cultural interactions (, Maria; Dimos, Athanasios; Kampylis, 2012). This process leads to the emergence of several new understandings, ideas, practical solutions, or products that are meaningful to individuals. Creative thinking skills developed in learning according to include aspects of fluency (ability to think smoothly), flexibility (flexible thinking ability), originality (original thinking ability), and elaboration (ability to think in detail).

Creative thinking skills can be developed through learning in school. According to (Santrock, 2011) there are 5 steps in the creative process, namely (a) preparation, which provides interesting problems for students and stimulates student curiosity; (b) incubation, which gives students time to think about the problem and helps students to make unusual connections in their thinking; (c) insight, i.e. when all the

pieces of the puzzle appear to be related and compatible; (d) evaluation, i.e. students determine which ideas have value and are new; and (e) elaboration, i.e., students elaborate on their concepts, usually this stage requires more time.

The experiment provides an opportunity for students to prove the theory, discover theories, or eliminate theories (Setyoningrum, 2013). The effectiveness of practicum is not only charged by the teacher, but the most important is from the students. How a student behaves during the implementation of the practicum, the attitude towards the tools and materials available, and the attitude towards the time allotted.

Implementation of a Physics practicum in schools today still faces many obstacles (Anwar, 2014). Problems faced by teachers in organizing practicum include the lack of equipment and practicum materials and the lack of knowledge and skills of teachers in managing practicum activities.

Also, research conducted by (Sundoro, 2013), shows that the teachers' obstacles in doing laboratory activities namely lack available laboratory equipment and the lack of understanding of physics about the importance of innovation in learning to develop creative thinking habits in students that can be grown in practicum.

Science learning using guided inquiry models will be carried out through practicum methods. According to Kartodirekso (Anwar, 2014), practicum as a means of learning physics concepts and students' thinking abilities in developing science concepts can be developed through practicum activities. Practical activities can also provide student learning skills, just like scientists. The concept of a science lesson should indeed use the concept of inquiry, not by memorizing formulas, laws, and postulates. Implementation of a Physics practicum in the field today apparently still faces many obstacles. Overcoming the problem of lack of equipment and practical materials in the laboratory, a simple practicum tool can be used.

Based on the description above, the existence of a laboratory with a set of tools becomes a necessity that must be met by the school. But the existence of laboratories in schools in rural areas is sometimes minimal with makeshift weapons or even do not have laboratory space. This condition needs the presence of strategic and innovative solutions due to the lack of practicum equipment.

An innovative effort that can be made to outsmart the availability of practicum tools by this research is to make simple, practical tools. Tools that are easily made using materials obtained from the surrounding environment and can also be made by ourselves. This simple practicum tool is expected to make it easier to understand concepts. The material is easier to live by using tools and improve skills in using simple practicum tools and can stimulate the creativity of teachers to develop their abilities in making practical tools. The objective of this study is to determine the effect of guided inquiry learning models assisted by simple practicum tools with experimental methods on the creative thinking abilities of junior high school students.

METHOD

Trial learning models are limited, the type of research used is a quasi-experimental research design using the "Equivalent Pretest - Posttest Design." The research design, according to (Suharsaputra, 2012), can be seen in Table 1.

Table 1 Research design

Group	Pretest	Treatment	Posttest
A	0	X	0
B	0	-	0

Information :

A : Experimental Group

B : Control Group

X : guided inquiry learning model

The population in this study were all students of class VIII Lab school UNTAD

Junior High School Palu consisting of 3 classes. Subjects in the study consisted of 2 classes, namely class VIII B as an experimental class with a number of students 23 and class VIII C as a control class with a number of students 22. Determination of the sample in this study is using a random sampling method, and the sampling technique is based on consideration. The reason for choosing the sample with consideration is because both classes have an average value of physics learning outcomes that are considered homogeneous based on the opinion of the physics subject teacher.

The instruments used in this study were: 1) learning devices; 2) tests of creative thinking skills; and 3) teacher and student observation sheets. Data collected from this study were further processed using statistical techniques. Data analysis techniques were using prerequisites and hypothesis testing.

RESULTS AND DISCUSSION

The results of the study show the data in table 2.

Table 2 Post-test Score Descriptions Creative Thinking Ability for Experiment Class and Control Class

Description	Post-test	
	Experiment	Control
Sampel (n)	23	22
Minimum score	8	7
Maximum score	23	21
Average score	15.91	13.27
Standard deviation	3.39	4.46

Based on the research results obtained, the percentage of achievement indicators can be seen in Figure 1.

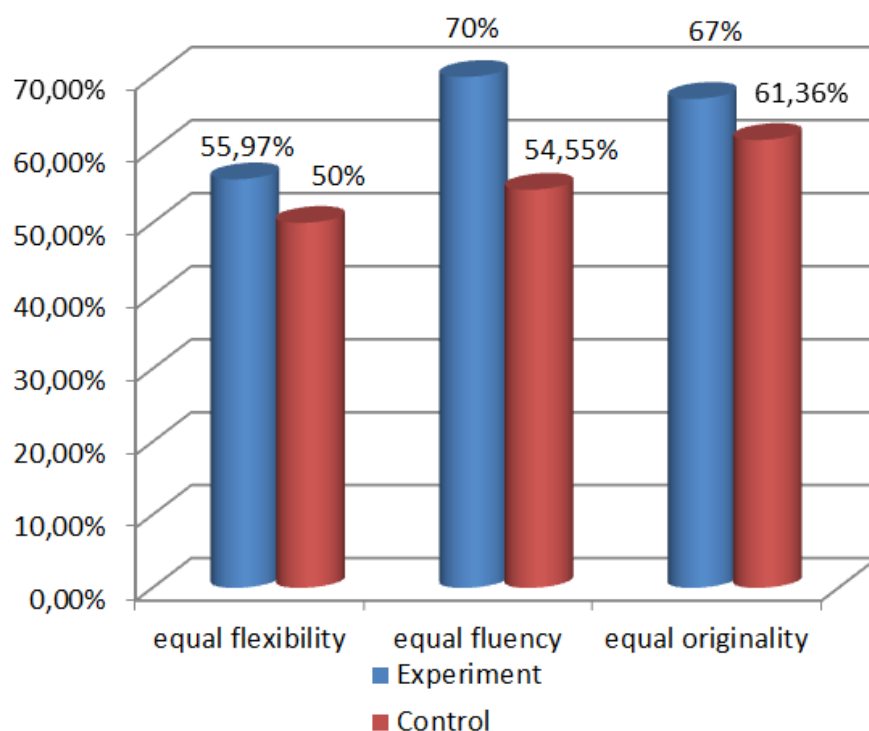


Figure 1 Achievement Diagram Indicators of Students' Creative Thinking Ability in the Experimental and Control Classes

This normality test uses Chi-squared with acceptance criteria $\chi_{\text{Calculate}} < \chi_{\text{table}}$, significance level $\alpha = 0.05$, and degrees of freedom $dk = k - 3$. Data used to test normality include the final test results in creative thinking abilities both in the experimental class and in the control class. The results obtained from the post-test normality testing between the experimental class and the control class can be seen in Table 3.

Table 3 Post-test Normality Test Results Experimental Class and Control Class

Description	Post-test	
	Experimental	Control
Sample	23	22
χ^2_{counted}	-39.96	2.94
χ^2_{table}	7.81	
Information	Normal	

Furthermore, the homogeneity of data testing. This test, using the F test with the criteria if $F_{\text{count}} < F_{\text{table}}$. The

results obtained from the experimental class and the control class, as in Table 4.

Table 4 Post-test Homogeneity Test Results

Description	Final Test	
	Experimental	Control
Sample	23	22
F_{counted}	1.05	1.05
F_{table}	2.02	
Information	Homogenous	

Based on the above criteria, it can be said that the data has the same variance (homogeneous). Thus, these data can be used to be further processed to the level of hypothesis testing. Testing this hypothesis is useful to see differences in the mastery of students' physics concepts between the experimental class and the control class — statistical test results data in Table 5.

Table 5 Significance Tests (One Party) in the Experiment Class and Control Class

Class	$T_{counted}$	t_{table} ($\alpha=0.05$)	Findings
Experimental	2.05	1.68	H_1
Control			Accepted

Based on Table 5, $t_{counted} > t_{table}$ or $2.05 > 1.68$. This means the value of t is outside the reception area of H_0 . Thus H_0 is rejected, and H_1 is accepted. From these data, it can be concluded that the average score of creative thinking abilities among students taught using the guided inquiry learning model assisted by simple, practical tools with experimental methods is greater than the students taught using the guided inquiry learning model demonstration method in class VIII of Lab school Junior High School UNTAD Palu.

Based on the post-test data hypothesis, it can be concluded that there are differences in the ability to think creatively between the class being taught and the guided inquiry learning model assisted by simple, practical tools using experimental methods and demonstration methods. In the experimental class, using the experimental method assisted with simple, practical tools, the percentage of results is higher than the control class using the demonstration method. This happens because the experimental method students are dealing directly with practical tools so that students are more optimally expressing their creativity in conducting experiments. With the experimental method, students can design their experiments that will be conducted but still based on the drawings that have been provided in the Student Worksheet. Whereas in the control class with the demonstration method, students design experiments in accordance with the steps specified together with the teacher and do not come into direct contact with the practicum only limited to observing and

then writing the results obtained on the Student Discussion Sheet. So in the control class, students are limited in developing their creativity. This is because the learning process is not given the freedom to various variables and the amount of data during the experiment, discuss and look for articles in accordance with the material that has been determined. Student creativity does not emerge and develop because, in the learning process, students are given no freedom.

Guided inquiry learning has five stages, namely presenting questions or problems, making hypotheses, designing experiments, collecting and analyzing data, and making conclusions. At the stage of presenting questions or problems, researchers present problems in the form of pictures and videos relating to the material properties of light in life and explain the relationship with the material to be studied. This stage is also where students are given Student Worksheets for the experimental class and Student Discussion Sheets for the control class. Then students are divided into homogeneous groups.

Based on the test of students' creative thinking abilities by taking 3 indicators out of 6 items, namely thinking flexibly 3 questions, thinking smoothly 2 questions, and originality 1 question, the result shows that smooth thinking has the highest percentage of indicators at 70% in the experimental class and originality has the highest percentage of indicators at 61.36% in the control class. This means that the experimental method can improve students' ability to answer questions correctly and not be the same as other students' answers. Factors that influence this are the freedom of students to express their curiosity as well as differences in the character and ability of students in testing the truth of a concept so that many unique and different responses emerge from one

student to another. While the lowest percentage of indicators is flexible thinking, in the experimental class, 55.97% and in the control class 50%, this means that the ability of students to develop answers is still low, it is because students are more focused on the discovery of a new idea that is different from the others so that students are not able to develop ways that already existed before. However, the percentage shows that the experimental method can develop student creativity in answering questions.

This is in line with previous research conducted by (Seranica, Purwoko, & Hakim, 2018) shows that the inquiry learning model can increase the creativity of thinking skills and scientific attitudes in biology students. Inquiry-based learning is one of the learning methods that can provide active and authentic knowledge.

This research is in line with research conducted by (Sandika, Bayu & Fitrihidajati, 2008) that the influence of guided inquiry models is significant on students' critical thinking skills. The guided inquiry model provides opportunities for students to find their knowledge and play an active role in learning in order to understand concepts well and to develop critical thinking. Through guided inquiry learning, students are allowed to know and be actively involved in discovering concepts from existing phenomena in the environment with the guidance of the teacher.

Guided inquiry can encourage students' scientific thinking habits, and students are more open to new ideas in groups or practice critical thinking skills because, in learning, the teacher conducts questions and answers and guides students to formulate relevant facts. Inquiry can encourage students to think scientifically, and students are more open to new ideas in groups or classes, with the hope that students think

of the process not only as of the result (Nur'Azizah, Hani & Kurnia Jayadinata, Asep & Gusrayani, 2016). Guided inquiry can build knowledge. Students will gain through the process of discovery in class so that answers to problems raised are found directly by students more clearly (Nuswowati, Haryanti & Sudarmin, 2016).

Based on these findings, it can be concluded that the guided inquiry learning model has the advantages of conventional learning models in terms of growing critical thinking skills. In guided inquiry learning assisted by simple, practical tools, students will be directly involved in learning, always trained to solve problems that are not fixed only on textbooks. Other findings from this study are that there is an increase in students' creative thinking abilities through guided inquiry learning models assisted by simple, practical tools. This improvement is because during the learning process using simple practical tools makes students more interested in being able to face and do experimental steps themselves so that they can develop their thoughts and can find solutions to their own problems so that students more easily remember their lessons and then discuss with a group of friends.

CONCLUSION

Based on the results and analysis of research data, it can be concluded that there is an influence of guided inquiry models assisted by simple practical tools with experimental methods on students' creative thinking abilities of Lab school Junior High School UNTAD.

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