

Guided Discovery Learning and its Effects on Students' Self-regulated Learning

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Abstract: This study focuses on how to solve the problems of students' self-regulated learning. The purpose of this study is to compare students' self-regulated learning between students taught by guide discovery learning and students taught by traditional approaches. The research method used is a quasi-experimental. The variables in this study consist of independent variables namely guided discovery learning and the dependent variable is self-regulated learning. The quasi-experimental design used in this study is post-test-only design with none equivalent. The research subjects were fifty 3rd semester pre-service mathematics teacher from two full classers. Self-regulative learning questionnaire this research has been prepared by Pintrich and Degroot. The items were set based on Likert scale and five choices ranging from completely disagree (1) to completely agree (5). Based on the research data it was found that there was no significant differences in students' self-regulated learning between students who are taught with guided discovery learning and students, who are taught traditionally. Self-regulated learning is one form of affective aspects. Various studies show that there is a tendency that affective aspects are rather difficult to change within time constraints.

1 INTRODUCTION

Traditional learning model is the one of learning models that is commonly found in classroom activities. This model begins with the explanation of a concept or subject matter by the teacher, then the teacher explained the procedures necessary for solving a problem or task, and continued with the student's practice procedures have been explained by teachers with additional issues (Chapko and Buchko, 2004). In this study, teachers play an active role in classroom activities on the other hand passive students receive lessons (Aziz and Hossain, 2010). The learning activities are often referred to as one-way learning, where the teacher is only the conveyer of information. Learning is dominated by teacher without being accompanied by student responses and feedback. Sometimes the material delivered is only based on learning notes and books. Learning activities are also lack of practical activities, teacher handwriting as a determinant of material clarity because of its quality, insufficient interaction with students in the classroom, more emphasis on existing theories without real practice and situations, learning by memorizing but not

understanding, and results oriented (Damodharan and Rengarajan, 2007).

Traditional learning makes students only as listeners and not as learners. As a result, students are not used to being independent in learning. Students only receive lessons delivered by the teacher. Time limitations in class make students unable to maximize their potential. On the other hand, students are required to be able to manage themselves in learning. The better students in managing time will be the better the quality of learning and its potential. Students who have been independent in learning are students who are actively involved in maximizing their opportunities and abilities to learn (Darr and Fisher, no date). This can be understood because regulated-learning is an active and constructive process for students in designing their learning goals and then try to monitor, sustain and monitor their awareness, motivation, and behavior that are guided and limited to their goals and highlight the context in the environment (Pintrich, 2000).

Regulated-learning is an indication of how and why students choose to use a particular strategy or response (Zimmerman, 1990). The regulated-learning is a process that helps students organize

their thoughts, behaviors, and emotions for the purpose of success in their learning experiences (Zumbrunn, Tadlock and Roberts, 2011). Learning independence that has been maximized by students can be used by students in facing life in society. Students who are rich in experience and can stand alone will easily adjust to the inside social life. Life in the future demands independence, not just individual independence, but the independence of the community up to the independence of the nation. An independent nation can be seen as an advanced nation because it is not too dependent on the state or other parties.

If traditional learning always to be used as the main means in delivering subject matter, then students' potential cannot grow. Students will always depend on the teacher without knowing what to do to improve their quality. Therefore, curriculum reform requires teachers to use multi-strategy and multimedia in delivering subject matter. One alternative learning model that can be used is guided discovery learning. The advantages of guided discovery learning strategies allow this learning approach to be used as a tool to solve problems that occur. The use of computers in learning is also important because the integration of computers is a requirement of the curriculum and is expected to improve the quality of student learning. Therefore, this research is important to do to solve problems because the success of students in learning is the hope that each student wants to achieve.

2 METHODS

The research method used is a quasi-experimental. The main difference of this study with true experimental research lies in placing individuals into groups. In experimental studies, individuals were chosen randomly to minimize bias. If individual selection is perceived as impossible or impractical, quasi-experimental research is the right choice. Because the quasi-experimental design does not provide full control, it is very important for researchers to pay attention to factors that affect internal and external validity in interpret the results of his research (Suratno, Ardiana and Tonra, 2018).

The variables in this study consist of independent variables namely guided discovery learning and the dependent variable is self-regulated learning. The quasi-experimental design used in this study is Post-test-Only Design with None Equivalent Groups as shown below.

NR	X	O ₁
NR		O ₂

Notes:

- NR = Nonrandom (Not Random)
- X = Guided Discovery Learning
- O₁ = O₂ = Self-Regulated Learning

The dashed line between two sample classes, namely the experimental class and the control class indicates that the two classes are not formed by randomly placing individuals or research subjects into sample classes. The research subjects were fifty 3rd semester pre-service mathematics teacher from two full classers. Students who are subject to the experimental class are taught with guided discovery learning while students who are used as the research subject in the control class are taught conventionally. At the end of the learning activities, students in both sample classes were given a questionnaire (O₁ = O₂), which is to be used to measure their self-regulated learning. Self-regulation learning questionnaire this research has been prepared by Pintrich and Degroot. The items were set based on Likert scale and five choices ranging from completely disagree (1) to completely agree (5). Inverse scores were used in some questions. The scale is composed of 22 items whose reliability for cognitive and metacognitive sub-scales were determined by Pintrich and Degroot as 0.83 and 0.74; respectively (Pintrich, 2000).

3 RESULTS

Description of students' self-regulated learning can be seen based on the average and standard deviation. There were two groups of treatment. Description of students' self-regulated learning is on the Table 1.

Table 1: Description of Students' Self-Regulated Learning.

Treatment	Mean	Std. Deviation	N
GDL	67,192	5,044	26
Conventional	67,917	4,452	24

Both of guided discovery learning (GDL) and conventional classes were 50 students. The average of students' self-regulated learning in GDL class was 67,192 with a standard deviation of 5,044. In other hand, the average students' self-regulated learning in conventional classroom were 67,917 with a standard deviation of 4,452. Students' self-regulated learning to have a range of values between 0 - 110 so students' self-regulated learning in the GDL and conventional class be able to be classified in the good criteria.

Normality test of the data based on learning approach showed that both the GDL and conventional classes have $p\text{-value} > 0.05$ by Shapiro- Wilk test, and conventional class has $p\text{-value} > 0.05$. Test of homogeneity of variance showed that GDL and conventional class have a $p\text{-value} > 0.05$. Therefore, it can be concluded that test based on learning approach that data of students' self-regulated learning came from normal distributed population and abilities of students' in self-regulated were homogeneity based learning approach.

Statistical tests of effects of method of learning and students' self-regulated learning used the Independent Sample Test. The output of test is on Table 2.

Table 2. T-Test for Equality of Means

t	df	Sig. (2-tailed)
-0,537	48	0,594
-0,539	47,911	0,592

Table 2 showed factor of learning approach that has a $p\text{-value} > 0.05$. It means learning approaches that factor has no effect on the ability of students' self-regulated learning.

4 DISCUSSION

The research instrument is used to describe how students in design, monitor, evaluate, and reflect all of their activities that have been prepared. Some of the statements in the instrument include: When I study for a test, I try to put together the information on from class and from the book; When I do homework, I try to remember what the teacher is said in class so I can answer the questions correctly; It is hard for me to decide what the main ideas are in what I read; When I study I put my ideas into my own words; and I always try to understand what the teacher is saying even if it doesn't make sense. The five statements are part of the questionnaire designed by Pintrich and Degroot.

The results of the study show that there is no effect of the learning model on students' self-regulated learning. Some researchers state that it is rather difficult to change affective domain of learning in a short time. Learning activities need enough time to change student habits, especially in terms of students' self-regulated learning. On the other hand, previous studies have shown that guided discovery learning has contributed to an increase in various mathematical abilities of students. One research concluded that self-regulated learning of students who earn mathematics learning by using learning guided discovery better than students who are learning mathematics conventional (Noer, 2010). Guided discovery learning also showed results better than conventional learning in terms of improving mathematical communication skills, mathematical problem solving abilities, mathematical dispositions of students (Karlumah, 2010). Combining guided discovery learning with models or other strategies also showed good results. This can be shown by the high level of mathematical thinking ability and the independence of students who learn using the guided discovery approach with the Jigsaw cooperative type setting better than the high level mathematical thinking abilities of students who learn using guided discovery approaches (Sugandi, 2010).

5 CONCLUSION

Guided discovery learning is a constructivist learning design model that combines the principles of learning with the discovery and radical constructivism with the principles of constructivism learning design theory. Constructivism is a postmodern theory of knowledge that has the potential to change educational theory (Fleury,

1998). In addition, constructivism is not just a learning theory but also a theory of knowledge (Confrey, 1998). In addition, there were significant differences in the behavior of students who were taught with guided discovery learning strategies compared to the behavior of students who were taught without using guided discovery strategies (Akanmu and Fajemidagba, 2012).

Self-regulated learning is one form of affective aspects. Various studies show that there is a tendency that affective aspects are rather difficult to change within time constraints. This can also be seen from the results of this study which concluded that there was no difference between students taught guided discovery learning and students taught with conventional learning.

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