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THE EFFECT OF E-LEARNING PROBLEM LEARNING MODEL FOR LEARNING INDEPENDENCE AND CRITICAL THINKING ABILITY

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ABSTRACT

The purpose of this study was to analyze the effect of e-learning quipper school-assisted problem solving learning models on the independence of learning and critical thinking skills of students. This research was carried out in Saraswati 1 Junior High School (SLUB) Denpasar, in class VII students with an affordable population of 254 students. While the number of samples in the study was 46 students consisting of class VIIA (experimental class) of 43 students and class VIIE (control class) of 43 students. The research method used was quasi-experiment with the research hypothesis testing technique used was MANOVA. Test data analysis requirements used are normality test and homogeneity test. The test results show that all data groups are normally distributed and homogeneous. Hypothesis testing results show there is a positive influence on problem solving learning models on learning independence and students' critical thinking skills. Based on the results of this study, it is sought that the teacher applies a problem solving learning model in the form of e-learning quipper school to improve student learning independence and critical thinking skills.

KEYWORDS: Problem Solving Model, E-Leraning Quipper School, Learning Independence, Critical Thinking Ability.

1. INTRODUCTION

Preface

In education, of course there are subjects that become the main and fundamental subjects that must be mastered, one of which is mathematics. The purpose of mathematics in school is that students have the ability to: understand mathematical concepts, explain inter-conceptual relationships and apply concepts or algorithms flexibly, accurately, efficiently, and precisely in problem solving; doing mathematical manipulation in making generalizations; compile evidence, or explain mathematical ideas and statements; solving problems that include the ability to understand problems, design mathematical models, solve models, and interpret the solutions obtained; communicating ideas with symbols, tables, diagrams, or other media to clarify the situation or problem and have an attitude of appreciating the usefulness of mathematics in life, namely curiosity, attention, and interest in learning mathematics; tenacity and confidence in problem solving; and use reasoning on the nature and patterns of critical thinking; (Wardhani, 2008: 8). Based on these objectives, one of the abilities that must be possessed is the ability to think critically mathematically to solve the problems it faces in everyday life. So the concept of critical thinking should be seen as a mental activity that requires discipline and consistency in evaluating each argument, as well as prepositions related to the problem to be solved. Because of its importance, critical thinking is generally regarded as the main goal of learning (Ristontowi, 2011). However, most students consider mathematics to be a difficult and difficult and even scary subject. This is coupled with the appearance of the mathematics teacher who seems unfriendly to the student and the learning model chosen by the teacher is not appropriate. Learning is carried out is still a teacher center so that the ability of students and student independence does not develop. In general, teachers still apply conventional learning methods such as lecturing, taking notes, and giving assignments without being discussed again so that the motivation and independence of student learning is still low. Students still rely on information or subject matter from the teacher without trying to read the book first. In addition, the results of daily math tests obtained by students are still mostly below the minimum value of completeness.

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In an effort to overcome these problems, the right learning solution is needed. One solution is through the application of different learning models in accordance with the subject matter and endeavored that the model is able to provide stimulus to students to be active in learning activities. So that student independence will also be better in the sense that students will learn material through books in addition to information from the teacher and students can access information anywhere and anytime by utilizing existing technology. And the ability to think critically will also increase because students get a lot of information and they can discuss it in class or outside the classroom. This is because one of the external factors that influence learning is the learning model. The learning model that is considered appropriate is the problem solving learning model assisted by e-learning quipper school. This learning model trains students to be able to identify a problem and provide an appropriate solution and can communicate verbally. The problem solving learning model uses five steps (phases) of learning, namely: (1) Read and think, (2) Explore and plan, (3) Select a strategy, (4) Find and answer, and (5) Reflect and extend. From these steps students have a position as seekers of knowledge, in the sense that they are actively involved in solving problems encountered. By getting students used to using systematic steps, it is hoped that students can overcome difficulties in learning mathematics. So by implementing the learning process based on the syntax above, it can be seen that through learning students can be trained to use the concepts they master to solve the given mathematical problems (Sudiarta, 2005).

Through problem solving, students are expected to have formal mathematical knowledge, both conceptual and procedural, and students are expected to have competence to solve problems and as goals can be interpreted students are given the opportunity to use various techniques in solving problems. While solving problems as an approach can mean learning begins with problems, then students are given the opportunity to discover and construct mathematical concepts.

Based on the description of the problems mentioned above, we need a study that examines "the influence of the learning model of problem solving assisted by e-learning quipper school on the independence of learning and critical thinking skills of students."

2. METHOD

This study was a quasi-experimental study with the study design used was the Post Test Only Control Group Design. This research was carried out in Saraswati 1 Junior High School (SLUB) Denpasar. Affordable population in this study were 254 grade students. While the research sample was taken as many as 86 students who were divided into 2 (two) classes, namely the experimental class (VIIA) as many as 43 students and the control class (VIIE) as many as 43 students. This research is a quantitative research with quasy experiment research method. While the hypothesis testing technique is 2x2 factorial MANOVA. The research design is a post test only control design. The research design is stated in Figure 1.

Group	Treatment	Evaluation
Eksperiment	X	Y_1
		Y_2
Control	-	Y_1
		Y_2

Figure 1

Information:
X = Treatment in the form of the influence of problem solving models with E-learning Quipper School
Y_1 = post-test critical thinking skills
Y_2 = post-test student learning independence

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Data collection methods used include the provision of critical thinking skills tests and questionnaire methods. The test is given to determine the level of students' ability to solve the questions after being given treatment. While the questionnaire method is used to find out the interests and independence of student learning after being treated. The questionnaire method is also used to determine student responses to learning that has taken place. In addition, questionnaires are used to improve e-learning learning. The questionnaire was developed in a closed form format using a Likert scale 1-4 which was analyzed descriptively through a mean score with a maximum score of 4 followed by a statistical analysis parametrically with a t-test to determine whether there were differences between the two groups.

3. RESULT AND DISCUSSION

Descriptive Statistical Analysis

Table 01. Summary of Descriptive Analysis

	A1Y1	A1Y2	A2Y1	A2Y2
Rata-rata	12.79	76.12	10.33	74.16
Median	13	74	10	73
Modus	13	78	10	71
Std. Deviasi	2.29	10.13	2.48	9.72
BanyakKelas	6	7	6	7
Rentangan	13	39	11	32
NilaiMaks.	20	99	18	92
Nilai Min.	7	60	7	60
Total	87.08	443.25	74.81	418.88

Information:

A1Y1 = Ability to think critically class VII students in SMP (SLUB) Saraswati 1 Denpasar, which follows learning with a model e-learning quipper school assisted problem solving learning.

A1Y2 = Independence of students studying class VII in SMP (SLUB) Saraswati 1 Denpasar, which follows learning with a model e-learning quipper school assisted problem solving learning.

A2Y1 = Ability to think critically class VII students in SMP (SLUB) Saraswati 1 Denpasar, which follows conventional learning.

A2Y2 = Independence of learning of class VII students in SMP (SLUB) Saraswati 1 Denpasar, which follows conventional learning.

Based on Table 01, it appears that the average mathematics learning outcomes for all data groups are high, except for the A2Y1 data group which is classified as medium.

Testing Requirements for Data Analysis

Testing data analysis requirements consist of a normality test and a homogeneity test. Calculation of testing requirements for data analysis using the SPSS 17.00 program. Normality test is performed to determine whether the data distribution is normal or not.

Testing hypothesis:

H0: data is normally distributed

H1: data distribution is not normal

Test Criteria:

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If p> 0.05, the data is normally distributed
If p ≤ 0.05, the data is not normally distributed

Table 02 Recapitulation of Sample Normality Test Results

NO	Group Sample	Lots of Sample	Significant Number	Conclusion
1	A1B1	43	0,181	Normal
2	A1B2	43	0,200	Normal
3	A2B1	43	0,560	Normal
4	A2B2	43	0,200	Normal

Information :
A1Y1 = Ability to think critically class VII students in SMP (SLUB) Saraswati 1 Denpasar, which follows learning with a model e-learning quipper school assisted problem solving learning.
A1Y2 = Independence of students studying class VII in SMP (SLUB) Saraswati 1 Denpasar, which follows learning with a model e-learning quipper school assisted problem solving learning.
A2Y1 = Ability to think critically class VII students in SMP (SLUB) Saraswati 1 Denpasar, which follows conventional learning.
A2Y2 = Independence of learning of class VII students in SMP (SLUB) Saraswati 1 Denpasar, which follows conventional learning.
Homogeneity test is performed to determine whether the data diversity is homogeneous or not.
Testing hypothesis:
H0: homogeneous data diversity
H1: diversity of data is not homogeneous
Test Criteria:
If p> 0.05 then homogeneous data diversity
If p ≤ 0.05, the diversity of data is not homogeneous

Table 03. Analysis Results of Levene's Test

	F	df1	df2	Sig
Critical Thinking	0,04	1	84	0,951
Self Regulated	0,90	1	84	0,765

Based on table 3, you can see the value of sig. or p> 0.05 so it can be concluded that all data groups have homogeneous diversity.

Hypothesis testing
Testing the research hypothesis with the help of the SPSS 25.00 program the following results are obtained:

Table 04. Summary of Analysis Results of Critical Thinking Learning and Student Learning Independence with Manova

Effect	Statistic	F	Sig.
Learning Model	Pillai's Trace	16,727	0,000
	Wilk's Lambda	16,727	0,000
	Hotelling's Trace	16,727	0,000
	Roy's Largest Root	16,727	0,000

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Based on table 04, the value of F = 16,727 is obtained with sig. = 0,000 or $p \leq 0.05$ This means that the null hypothesis (Ho) is rejected and the alternative hypothesis (Ha) is accepted. These results also show that the critical thinking skills and learning independence of students who follow the learning model of problem solving assisted by e-learning quipper school in class VII Junior High School (SLUB) Saraswati 1 Denpasar are better than groups of students who follow learning with conventional learning models.

4. DISCUSSION

The results of this study indicate that there is a better positive effect of the problem solving learning model assisted by e-learning quipper school in class VII Junior High School (SLUB) Saraswati 1 Denpasar on students' critical thinking skills and learning independence than those taught with conventional learning.

Through the e-learning quipper school assisted problem solving learning model students are actively involved in learning. Students are given the freedom to explore information based on the solution to the problems sought by them. So that the subject matter is better understood by students because they are actively involved in learning and students' interest in learning increases. According to Muhson (2005) that "the application of problem solving models in mathematics learning can increase student interest in learning. The indications are that learning becomes fun, able to increase the active role of students and student independence. "

The ability to solve mathematical problems is a mathematical ability that is very important because it occupies as a general and primary goal in learning mathematics. The help of e-learning in the problem solving learning model related to student independence can also help cover up the weaknesses of the problem solving learning model, which is related to time constraints in delivering the material. E-learning learning shows that e-learning can enable students to take control of their own learning activities in addition to providing convenience for students who have learning difficulties. With the hope of e-learning learning becomes more effective and efficient. This is in line with research conducted by Nugraheni (2017) which states: based on the hypothesis testing statistically obtained results that there is no significant difference between independence and interest in learning in the experimental group and the control group. However, based on descriptive analysis, the average results of independence and student interest in the experimental group were higher than the control group.

This implies that students must become independent students and be able to encourage mathematics programs in creating students who have independence in learning. Students build a deep understanding in learning mathematics when they can control their learning, by determining learning goals, monitoring their progress, assessing and reflecting on their thought processes, confident in their abilities, and persevering in facing difficulties. With the hope that this media can expand learning opportunities, more independent, increase teacher and student interaction, more efficient and effective. And based on the results of hypothesis testing further reinforces that the problem solving learning model assisted by e-learning quipper school is able to provide a significant effect on learning independence.

The use of quipper school assisted problem solving models assisted in independence can be measured based on observations during the learning process and when monitoring student activities in accessing, sending assignments online, how often students are active in discussions, how often students access their Quipper School, and how often to download material that is available. Teachers can download student learning outcomes in Excel format, and can be used for various follow-ups, for example, used as motivation for students or used as a plus for students to increase their motivation to learn.

This implies that students must become independent students and be able to encourage mathematics programs in creating students who have independence in learning. Students build a deep understanding in learning mathematics when they can control their learning, by determining learning goals, monitoring their progress, assessing and reflecting on their thought processes, confident in their abilities, and persevering in facing difficulties. With the hope that this media can expand learning opportunities, be more independent, improve teacher and student interaction, be more efficient and effective. And based on the results of hypothesis testing further reinforces that the problem solving learning model assisted by e-learning quipper school is able to provide a significant effect on learning independence.

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While the problem solving learning model on critical thinking skills aims to motivate students so as to encourage students to know and master the skills presented by the teacher in the learning process. In the implementation of the problem solving learning model is a series of learning activities that emphasize the problem solving process faced scientifically. Students actively think, communicate, search and process data, and finally conclude. Then learning activities are directed at solving problems. In learning the teacher includes the help of e-learning quipper school which is useful and gives students the opportunity to be able to learn anywhere and discuss easily, so students can master the material well. And indirectly students' thinking ability will emerge to think of problem solving that has been given, so that students are more easily enthusiastic in participating in learning. In line with research conducted by Hidjrawan (2016) which suggests that effective problem solving learning models are used to be able to improve critical thinking skills and student learning outcomes. As well as good responses given by students to the problem solving learning model.

In mathematics learning that uses conventional learning models emphasizes the function of educators as providers of information. Educators strictly regulate the learning process both in terms of topics, quality, and strategy. Here educators emphasize their task as a model. The goal will be maximally achieved if educators are able to demonstrate knowledge and skills appropriately so that students can emulate them. While students only passively listen to educators' explanations without being actively involved in learning. This is not in line with the conception of mathematics learning that students must understand by exploring their abilities.

Based on this understanding it is clear that learning using the problem solving learning model assisted by e-learning quipper school is better applied to students than conventional learning, because by using the problem solving learning model assisted by e-learning quipper school students can explore their own abilities. And the results of the first hypothesis test reinforce that innovative learning models, such as problem solving learning assisted by e-learning quipper school are able to have a significant influence on critical thinking skills.

5. CLOSING

From the results of data processing, the following conclusions can be drawn:
(1) There is a better influence on the ability to think critically between students who take the problem solving learning model with e-learning Quipper School and students who take conventional learning.
(2) There is a better effect on learning independence between students who take the problem solving learning model with e-learning Quipper School and students who take conventional learning.
(3) There is a better simultaneous effect between critical thinking skills and learning independence between students who take the problem solving learning model with the Quipper School e-learning and students who take conventional learning.

Based on this conclusion, it is better for teachers to keep trying to pay attention to the use of various learning models, especially the use of problem solving models, which are proven to partially improve students' thinking abilities. Likewise it is necessary to increase the independence of student learning, so students can be more responsible for the success of their learning.

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