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Relationship Between Prior Knowledge and Internet Self-Efficacy on the Success of Learning Mathematics by Using E-Learning

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***Abstract*. The development of technology, especially in the field of information technology, has greatly influenced the development of the world in all fields, including education. The teaching and learning process, which initially focused solely on teachers, has now developed into focusing on students. One of the impacts caused by technological developments in the field of education is the emergence of a new learning system called e-learning. E-learning is a learning strategy where all teaching and learning activities are carried out through the internet. There are two things that we examined in this study. First, we look for a relationship between preliminary knowledge (ability to use learning media) and self-efficacy (level of confidence) when using the internet to the success of e-learning learning methods. Second, we look for relationships between student strategies to search for information online with self-efficacy when using the internet. The subjects measured in this study were mathematics. Based on the research conducted, two conclusions were obtained. First, students' ability to use the internet and initial knowledge have an influence of 79.3% on student learning achievement. Second, there is a strong correlation between self-efficacy and the strategy of students searching for information online.**

Keywords: Prior Knowledge, Internet, self-efficacy, e-learning

I. INTRODUCTION

The development of technology, especially in the field of information technology greatly influences the development of the world in all fields including education. The teaching and learning process, which initially focused solely on teachers, has now developed into focusing on students. The rush of information about science on the internet has a positive and negative impact for students, for this reason, teachers need to play an active role in preventing negative influences so that teachers no longer act as centers of science but rather act as science mediators when students learn.

In 2014 **Error! Reference source not found.**, revealed that innovative applications of the development of technological tools have created new forms of learning E-learning. E-learning is a learning strategy that applies the development of information technology, where the learning process is fully carried out through the internet. This learning strategy has been used for quite a long time and there have been many studies analyzing its effects on student learning success. Among the research conducted by **Error! Reference source not found.** which revealed that there is a positive influence on the use of e-learning on student motivation and learning achievement at the SD Negeri Annual Yogyakarta. **Error! Reference source not found.** concluded that (1) e-learning learning models provide better mathematical learning outcomes than conventional learning models on cube and beam material, (2) in e-learning learning models mathematics learning outcomes with learning motivation high is better than low learning motivation, (3) on high, medium, and low learning motivation, mathematics learning outcomes with e-learning learning models are better than conventional learning models. **Error! Reference source not found.** explains that 80.04% of students' problem-solving abilities are influenced by the design of e-learning learning models. **Error! Reference source not found.** explained that (1) understanding the mathematical concepts of students who get e-learning learning the web-centric course model is better than students whose learning use power point, (2) learning independence of students who get e-learning web-centric course models better than students who learn to use power point media.

Research on e-learning is carried out from various segments and problems, for example from the comparison of learning methods, motivation, problem-solving skills, and design of learning models as done by the researchers above. Another interesting segment to study in e-learning is the initial knowledge of students, whereas we know that initial knowledge is the knowledge that is brought and attached to students and will affect the learning outcomes. As we know in e-learning, special skills need to be mastered by students, namely skills using learning media.

Apart from the initial knowledge of other factors that are thought to have a relationship to the success of learning with e-learning is the internet self-efficacy of students. Self-efficacy according to **Error! Reference source not found.** is a person's self-confidence to do things right, whereas according to **Error! Reference source not found.** self-efficacy is a person's confidence in his ability to overcome a problem. In e-learning internet self-efficacy is an important part of one's learning success, therefore it can be said that initial knowledge and internet self-efficacy are important factors in the success of learning e-learning. The results of the interaction of the environment outside, adjustment and ability based on experience and education are factors that influence one's self-efficacy**Error! Reference source not found.**. Based on the explanation above, there are two questions in this study, namely,

1. Is there a relationship and influence between initial abilities, internet self-efficacy with the success of learning mathematics?

2. Is there a relationship between the strategy of students looking for something online with internet self-efficacy?

II. LITERATURE REVIEW

A. Preliminary Knowledge

According to Hailikari **Error! Reference source not found.**, Initial knowledge is a combination of knowledge and skills, wherein the learning process functions as (1) label categories that affect new information to be added to existing structural knowledge, (2) the context of assimilation where new material will be interrelated, so it will be easier to construct knowledge through the elaboration process, and (3) the activation of initial knowledge can increase knowledge access during the learning process. So it can be stated that initial knowledge is the knowledge that is built by students before the learning process.

In their research, **Error! Reference source not found.** argues that the initial knowledge possessed by students about the material to be studied can be different from the teacher's conception (misconception). This misconception will have an impact on learning situations and can be a barrier for students to achieve learning success. Even if this misconception is very much different, it will lead to differences in understanding of the material provided by the teacher. To overcome this, the initial knowledge test is very necessary before the teacher gives knowledge to students. **Error! Reference source not found.** explains the role of initial knowledge in entrepreneurship, in his research **Error! Reference source not found.** concluded that initial knowledge had a significant impact on a person's ability to read business opportunities.

In the teaching and learning process, a teacher should not consider students as blank paper which will then be filled with knowledge, **Error! Reference source not found.** stated that the main principle in a learning process is knowing students 'initial knowledge, because students' initial knowledge will determine the good or bad results study in the future. By knowing and understanding the students' initial knowledge, the teacher will more easily determine the pattern of teaching, because through the initial knowledge students have will be the foundation for building new knowledge.

The initial knowledge possessed by students can sometimes be a supporter and can also be a barrier to the subsequent process of knowledge acquisition, Ambrose, et al. Stated that there are 4 (four) initial knowledge factors that can affect learning outcomes, namely inappropriate Prior Knowledge, inactivity Prior Knowledge), inadequate (insufficient prior knowledge), and inaccuracy (inaccurate prior knowledge). The four factors can be overcome by the teacher through the right teaching method as needed, so that if the four factors can be overcome it will improve students' creative thinking skills, as stated by **Error! Reference source not found.** that there is a positive relationship between initial knowledge and thinking ability creative in chemistry lessons. In research in the field of chemistry also **Error! Reference source not found.** concluded that statistical testing showed that there were significant differences between the mean scores of students who had and those who did not have initial chemistry knowledge in semester tests and year 1 final exams. The correlation analysis shows that there is a strong correlation between initial knowledge and learning outcomes, and regression analysis shows that initial knowledge has an influence on learning outcomes.

B. Internet self-efficacy

According to **Error! Reference source not found.** the concept of internet self-efficacy is a form of development of the concept of self-efficacy developed by **Error! Reference source not found.**, a study that strengthens this statement was stated by **Error! Reference source not found.** who suggested that seeking help for mathematics through the internet is commonplace done by students and even more preferred than having to search for mathematical information in the library. The habit of online information searching directly influences one's internet self-efficacy, where openness in accepting experience, challenges, and motivation is an important element that influences one's information self-efficacy **Error! Reference source not found.**.

III. RESEARCH METHODS

A. Relations and Effects of Internet Self Efficacy, Preliminary Knowledge of Mathematics Learning Outcomes

Table 1. *Respondent Profile and Internet Self Efficacy (ISE)*

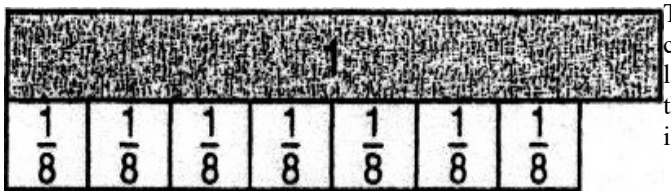
Resp	ISE	Resp	ISE	Resp	ISE	Resp	ISE	Resp	ISE
1	M	11	H	21	M	31	M	41	L
2	L	12	M	22	M	32	L	42	L
3	M	13	L	23	L	33	H	43	M
4	L	14	L	24	M	34	M	44	M
5	M	15	L	25	M	35	M	45	H
6	M	16	H	26	M	36	L	46	L
7	M	17	H	27	L	37	M	47	L
8	M	18	M	28	H	38	M	48	M
9	L	19	M	29	L	39	L	49	L
10	H	20	L	30	H	40	H	50	L

The study was conducted using a sample of 50 people using data derived from the values obtained by the research object. The first step is to measure the ability of the object of research in utilizing the internet by using an internet self-efficacy scale, namely the scale used to determine the ability perceived by students to use the Internet consisting of 13 question items with 5 Likert scale answer choices and test their initial mathematical abilities. The next step is to provide experimental actions in the form of giving Linear Function material in e-learning. After the experimental action is carried out the next step is to test their mathematical abilities.

Data analysis to determine the extent to which the independent variable influence on the dependent variable uses multiple regression analysis which acts as the independent variable $X1$ is the value of early mathematical knowledge, $X2$ is the internet value of self-efficacy and the dependent variable and Y is the math test

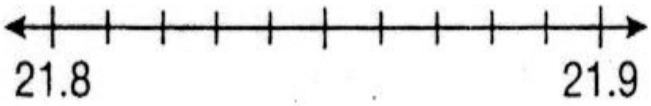
value with **Linear Function** material. Table 1 describes the profile of 50 respondents including the trust in their internet self-efficacy (ISE) which is divided into 3 categories, namely high, medium and low. 50 respondents have different ISEs where the majority of respondents' abilities are in the moderate category (M), which is as many as 22 respondents and low (L) as many as 19 respondents. Furthermore, from 50 respondents, the percentage of their attendance in computer courses was recorded which was then correlated with the ISE level. The correlation coefficient of 0.67 indicates that the relationship between the ISE level and the level of attendance in the computer course is quite positive which means that the higher the level of attendance causes the higher the ISE level.

In addition to providing an experiment in the form of an internet browsing ability test, students are also given a test of the initial knowledge test of mathematics by using questions that already exist on the internet **Error! Reference source not found.** such as,



1.Values from 7/8 - 5/8 are ……

A. 1/4 B. 2/4 C. 1/2 D. ¾



2. .Rounding up 21.83 to the nearest tenth is ……

A. 20 B. 21.8 C. 21.9 D. 22

3. The way to write 7/10 in decimal form is ……...

A. 0.07 B. 0.17 C. 0.7 D. 7.10

B. Online Search Strategy and internet self-efficacy

*T*o determine internet self-efficacy, structured interviews were carried out for each student, where students were asked to search for answers to tasks given by researchers through the internet and measured the length of time they searched there were 10 questions given to students to find answers online.

In addition to the measured search time, the assessment carried out by the researcher on students is about (1) confidence in surfing the internet, (2) the ability to stay focused on the target, (3) the ability to search for keywords, (4) the ability to understand how the internet works (5) confidence in managing information, (6) the ability to sort out useful/reliable sources, and (7) satisfaction with the results obtained **Error! Reference source not found.**.

IV. RESULTS AND DISCUSSION

A. Descriptive Statistics

Based on

Table ***2***, the results of descriptive statistics are obtained for each research variable which includes minimum, maximum, average and standard deviations. In **X1** variables obtained an average of 36.5 from the maximum value of 65 that might be obtained which is located in a sufficient category, meaning that students are sufficiently able to use the internet. For the initial mathematical knowledge variable (**X2**) an average of 73.5 was obtained from the total value of 100 that might be obtained. This shows that students' initial knowledge is in a Good category. Whereas for mathematical values with the topic of linear functions, the average value of 64.7 is obtained from the total value of 100 that might be obtained which means it is in the Good Enough category.

Table 2*. Descriptive Statistics*

	N	***Minimum***	***Maximum***	***Mean***	***Std. Deviation***
Internet Self Efficacy ( )	*50*	*28,00*	*42,00*	*36,5000*	*3,28416*
Math Score	*50*	*10,00*	*100,00*	*64,7000*	*23,93465*
Prior Knowledge ( )	*50*	*25,00*	*100,00*	*73,5000*	*23,90991*
Valid (listwise)	*50*				

B. Multiple Regression Analysis

Table 3. presents a summary of the results of multiple regression analysis starting with testing the regression model using the F-test. The F statistic value is 89.804 with a significance of <0.05 indicating that the analysis can be continued to test multiple regression models.

Table 3. ANOVAa

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	22248,481	2	11124,241	89,804	,000[b]
	Residual	5822,019	47	123,873		
	Total	28070,500	49			

a. Dependent Variable: Math Score
b. Predictors: (Constant), Prior Knowledge, Internet Self Efficacy Score

After the F test gives the conclusion that the multiple regression model is significant in testing the interrelationship between variables, the test is continued with a partial test.

presents the results of the t-test to find out the partial effect of each independent variable on the dependent

variable. From the t statistic value obtained 3.956 for **X1** and 9.639 for **X2** with each significance value smaller than 0.05 so that it can be concluded that partially Internet self-efficacy and prior knowledge affect Mathematical Values.

Table 4. T-test

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1(Constant)	-62,149	17,038		-3,648	,001
Internet Self Efficacy Score	2,146	,543	,295	3,956	,000
Prior Knowlegde	,718	,075	,718	9,639	,000

a. Dependent Variable: Math Score

To find out how big the Y variation is determined by X, it can be known through the R square value presented in Table 5

Table 5. R Square

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,890[a]	,793	,784	11,12981

a. Predictors: (Constant), Prior Knowledge, Internet Self Efficacy Score

Based on Table 5, the R square value is 0.793 or the influence of variables **X1** and **X2** on **Y** is 79.3 percent while the rest is influenced by other factors.

C. Relationship of Online Search Strategy and Internet Self Efficacy

Referring to the **Error! Reference source not found.**, all respondents were independently assigned to conduct material searches for Linear Functions and their Application in the economy then measured the level of internet self-efficacy through the ability to strategize in searching the internet. In conducting an online search all students start by writing keywords as they are and then applying a top-down strategy. There are 23 students who open 4 sites directly, while others open sites one by one in the order listed. The ranking system is used to determine students' internet self-efficacy. Spearman's Rank Correlations analysis is used to determine the correlation between variables, and the results obtained that the online search strategy has a strong correlation with the respondent's internet self-efficacy.

V. CONCLUSION

The results of the interview show that respondents who have high ISE and are on average having attended computer courses and have sufficient initial abilities, so that these two factors become supporting elements in the success of respondents in finding something online and have a higher ability to innovate in solving problems, Based on the results and discussion in the previous section it can be concluded that (1) the ability of students to use the internet and initial knowledge has a relationship and significant influence both simultaneously and partially on student achievement with the magnitude of the influence of 79.3 percent, and (2) there is a correlation strong between the strategy of students looking for something online with internet self efficacy.

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