

The Influence of Information and Communication Technology Access to The Mathematics Learning Achievement and Mathematical Anxiety of Elementary School Students

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Abstract--- This research was conducted to determine information and communication technology for the learning achievement of mathematics and mathematical anxiety of elementary school students in Tasikmalaya. The greater the intensity of the child in accessing ICT both because of the freedom of the family and the easier it is to get ICT devices will affect the cognitive abilities of children. This study focuses on studying children's mathematical learning achievement because in mathematics the cognitive aspects of children are widely developed including procedural numeracy and logical thinking skills. In addition, it will also examine the affective aspects of ICT access to students' mathematical anxiety. The results showed that the intensity of elementary students in accessing ICT devices was very high and not followed by students' learning achievement and math anxiety.

Keywords: information and communication technology, achievement of mathematics, mathematical anxiety

I. INTRODUCTION

The world community is now inseparable from information and communication technology (ICT). Technology has now evolved to become increasingly developed and practical. In the past, people if they wanted to get information about news needed a long time, that is, at first the news was typed with a manual type, then printed or sent by post. This certainly takes a long time. Furthermore, developing computers that make typing easier and supported by internet networks, messages can be sent quickly via email. The development of technology then spread to cellphones. Technology has entered the small device. Getting information and communication in the form of text, sound, images, and videos can be easily obtained through cellphones.

Technology can help in the teaching and learning process, as revealed by Kimmins (1995), Kimmins and Bouldin, (1996): Technology can serve at least four roles in teaching and learning of mathematics. Specifically, technology can aid in (1) mathematical concept and skill development, (2) mathematical problem solving, (3) mathematical reasoning, and (4) mathematical communication. Technology is very important in teaching and learning mathematics, because it influences students in improving mathematics learning (NCTM, 2000).

Information and communication technology (ICT), or in English known as Information technology (IT) is a general term that describes any technology that helps humans to make, change, store, communicate and / or disseminate information. IT brings together high-speed computing and communication for data, voice and video. Examples of information and communication technology are not only personal computers, but also telephones, TVs, electronic household appliances, and modern handheld devices (such as cellphones).

Information and communication technology according to Darmawan (2012: 17) defines that: "Information and communication technology is the result of human engineering on the process of delivering information from the sender to the recipient so that it is faster, wider distribution, longer storage". According to Sutarman (2009: 17), the purpose of information and communication technology is: "1. To solve problems, 2. To open creativity, and 3. To increase effectiveness and efficiency in doing work".

Information and communication technology referred to in this study are all equipment used to obtain information in the form of sound, text, images, or videos through television, radio, computers, and cellphones used by elementary students.

Various studies have been conducted to determine the positive and negative effects of using ICT devices. Based on the Wajszczyk (2014) study on students, ICTs need to be well introduced so that students do not know ICT is just entertainment but also has many benefits. Teachers also need to be equipped with adequate ICT knowledge. So for the case in Indonesia, the extent to which the use of ICT in elementary school students needs to be studied, is it just for entertainment? Game online? Social media? Watching video channels?

Student cognitive development is expected to develop in learning at school. Cognitive aspects of children, especially mastery of mathematics material, are the main focus because these subjects are given to students at all levels of education. Students can get math knowledge in school through ICT or at home through games or learning available on mobile. The cognitive aspect here is learning achievement.

The word achievement comes from Dutch language which is achievement. In Kamus Besar Bahasa Indonesia (1989: 700), learning achievement is the mastery of knowledge or skills developed by subjects, usually indicated by the value of the test or the number given by the teacher. According to Buchori (1983: 94) defining learning achievement is a learning outcome that is achieved or demonstrated by students as a result of learning both numbers or letters as well as actions that reflect the learning outcomes achieved in each particular period. Numbers or learning outcomes that show learning outcomes.

In addition to ICTs that can support children's cognitive development in mathematical material according to Sheffield and Hunt (2006), mathematical anxiety also has a direct influence on the ability to complete student assignments.

Interest in mathematics anxiety was initiated by observation of mathematics teachers in the early 1950s. In 1957, Dreger and Aiken introduced mathematics anxiety as a new term to

describe the attitudes of students with mathematical difficulties. They define it as "the presence of a syndrome of emotional reactions to arithmetic and mathematics" (Baloglu & Zelhart, 2007). Mathematical anxiety can also be described and defined as anxiety when finding mathematical problems (Sheffield & Hunt, 2007). In addition, Ashcraft (2002) defines it as feeling depressed and fearful when faced with mathematical abilities. This study will examine how the relationship between ICT access made by students to their mathematics learning achievements. The intensity of ICT access is thought to also influence student mathematics anxiety.

II. METHOD

This study uses quantitative correlation research methods. This method is based on the philosophy of positivism, used to examine certain populations or samples with sampling techniques which are generally carried out randomly, data collection uses a quantitative / statistical data analysis research instrument with the aim of testing the established hypothesis (Sugiyono, 2008: 14).

The study population included 29 elementary schools in Tawang, Tasikmalaya. The population for about 3,101 students in 5th and 6th grades. By random sampling of the questionnaires distributed, there were 93 students. The instrument of this study used information and communication technology questionnaires, anxiety questionnaires, and mathematical tests. Questions about the dependent variable of information and communication technology regarding the activeness of elementary students in accessing information and communication technology. Mathematics learning achievement in the form of acquisition of mathematics test scores given and anxiety questionnaires adopted from Freedman (2014).

III. RESULT AND DISCUSSION

Data obtained from the results of the study were then carried out analysis of the analysis prerequisite test in the form of a normality test. Normality test shows the results of ICT access variables, mathematics learning achievement, and math anxiety have abnormal distribution. Furthermore, the analysis of the results of the research data was tested using the Kendall non parametric test.

Table 1. Correlation Test for ICT access to the Mathematics Achievement

			ICT access	Math Achievement
Kendall's tau_b	ICT access	Correlation Coefficient	1.000	.114
		Sig. (2-tailed)	.	.150
		N	93	93
	Math Achievement	Correlation Coefficient	.114	1.000
		Sig. (2-tailed)	.150	.
		N	93	93

Table 1 shows the results of the relationship of ICT access to the achievement of mathematical abilities showing a value of 0.114. This means that the relationship between the two variables is very low. ICT access there is no significant relationship with the math skills of fifth and sixth grade students in elementary school.

When compared with the results of the descriptive analysis, the answers to ICT access questionnaires showed that 25.8% of children did

not have their own mobile phones, 66.67% had no television in the rooms, 45.16% of children liked to play games, 75.27% children did not play free time, playing time less than 2 hours 80.65%, 82.79 children like television shows, 61.29% children love television shows / soap operas, 74.19% children sleep more than 8 pm, almost 45% children agree if you are not allowed to use cellphones and watch television. The math achievement data is as follows:

Table 2 Data Description for Mathematical Achievement

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Math Achievement	93	0	11	532	5.72	2.473
Valid N (listwise)	93					

Table 2 above shows the average value is 5.72. The maximum score for the math test is 20. This shows that the mathematics ability of elementary school students is still low, with a minimum value of 0 and a maximum value of 11. The low relationship between ICT access and students' mathematical abilities can be attributed to the child's high access to mobile games and

television to seeing film / soap shows and math achievements shows a low value. ICT access to students shows that there is no connection with the material as according to Sutarman (2009: 17) cannot solve problems, open creativity, and cannot support effectiveness and efficiency in learning mathematics resulting in low student math tests.

Table 3 Correlation Test for ICT Access to The Mathematical Anxiety

			ICT access	Math Anxiety
Kendall's tau_b	ICT access	Correlation Coefficient	1.000	.151
		Sig. (2-tailed)	.	.055
		N	93	93
	Math Anxiety	Correlation Coefficient	.151	1.000
		Sig. (2-tailed)	.055	.
		N	93	93

Table 3 shows the results of the relationship of ICT access to the achievement of mathematical abilities showing a value of 0.114. This means that the relationship between the two variables is very

low. ICT access there is no significant relationship with the math skills of fifth and sixth grade students in elementary school. Nearly more than 50% of students do not have meaningful math anxiety. The

level of ICT access made by students has been discussed previously, it is less able to develop mathematical abilities by showing the results of low math tests. As the results of the Novikasari study (2016) show the results of higher mathematics learning achievement, the higher mathematics anxiety is possessed so that it can stimulate

problems. These results are in line with this study of ICT access that does not support the improvement of students' mathematical abilities resulting in low mathematics anxiety. Next will be seen the relationship between mathematics achievement and math anxiety of elementary students.

Table 4 Correlation Test between Mathematics Achievement and Mathematical Anxiety

			Math Anxiety	Math Achievement
Kendall's tau_b	Math Anxiety	Correlation Coefficient	1.000	.325**
		Sig. (2-tailed)	.	.000
		N	93	93
Math Achievement	Math	Correlation Coefficient	.325**	1.000
		Sig. (2-tailed)	.000	.
		N	93	93

** . Correlation is significant at the 0.01 level (2-tailed).

Table 4 shows that there is a significant relationship between achievement or the results of tests of mathematical abilities with mathematical anxiety. The higher the mathematics achievement, the higher the mathematics anxiety of elementary school students.

IV. CONCLUSION

This study investigated the relationship between access to ICT in elementary school students towards elementary school mathematics learning achievement and math anxiety. The results showed that there was no significant relationship between ICT access and mathematics learning achievement, there was no significant relationship between ICT access and mathematical anxiety, and there was a significant relationship between mathematics learning achievement and mathematics anxiety of elementary school students in grades 5th and 6th in Tasikmalaya.

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