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A survey on the perception of students against technology in learning mathematics

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Abstract. Discoveries related to information and communication technologies change the viewpoints of humans against the world including the world of education. The role of technology supports many activities, especially learning activities, and it also can support the learning process. Education systems in the globalization era show the transformation which is previously manual and conventional into the system that effectively and efficiently can improve the information technology. Thus, this research aims to identify the perception of students toward technology in learning especially mathematics. This study uses a survey approach, with data collection methods namely questionnaires distributed to 42 students. The results show that 70% of students had enthusiasm and interest in technology especially mathematics learning.

1. Introduction

Mathematics is one of the significant subjects in the school curriculum. Youth must learn the basic principles that are useful and beneficial for their daily lives [1]. For American harnesses, the power of mathematics is one of the ways to participate fully in the future. Across the States in the United States, as data reported by National Assesment of Educational Progress, 2013 showed less than 40% of students proficient in mathematics [2]. Students are still difficult to consider. Mathematics is a difficult subject at the level of elementary to high school [3]. In 2015, Indonesia ranked 62 out of 70 countries with a score of 403 from the OECD average score 493. This indicates the ability of students in Indonesia in resolving problems with the forms like questions of review, giving the reason, communicating, and resolving as well as interpreting various issues are still low. On the other hand, mathematics is a subject which is important in human life. Mathematics plays the role in almost every aspect even in digital technology nowadays [4].

Mathematics learning should be an effort in directing student to construct knowledge through the process [5]. Knowing is not a result but a process that begins from experience, so that students should be given the widest opportunity to build the knowledge they must have [5]. In order to achieve the purpose of mathematics learning, the teacher should create innovations that support the process of mathematics learning. One of the teacher's innovations in learning mathematics can be with learning strategies such as the mathematics learning strategy with scaffolding. This strategy is assistance that given to students to learn and solve problems. It can be applied to props in the form of media or technology [6]. Students can use technology assistance such as the use of LCD or power point



presentations with an attractive display of power points that will further enhance students' interest in learning. And thus technology is very important to support student learning activities [7].

Statements of position in the NCTM related to technology are quite clear, and the means are the important means for learning and teaching mathematics. Seen as a whole part of the learning tools, technology can extend the scope of the subject matter as it can be learned by the students and expand some cases that can be solved by students [8]. Therefore, it can be assumed that technology is essential in education.

In the era of globalization, information and communication technology play an important role in almost every aspect of our lives as humans [9]. National Council of Teachers of Mathematics specifically stated that: technology is an important tool for learning mathematics in the 21st century, and all schools should ensure that all of their students have the access to technology. Effective teachers maximize the potential of technology to develop the student's understanding, stimulate their interests, and enhance their ability in mathematics. When technology is used strategically, it can provide the access of mathematics for all students [10].

One of the important ideas of the NCTM's statements above is that effective teachers are expected to harness the potential of technology to develop the students' understanding, to stimulate the students' interest in learning, and improve math skills of students. One of the important ideas of the NCTM's statement above is that effective teachers are expected to harness the potential of technology to develop the student's understanding, stimulate interest in learning, and improve math skills of a student. First, the technology serves the tools to work on calculating the math. Second, the technology serves the place to train mathematical skill mastery. Last, the technology serves the tools that can be used for developing and understanding the concept.

In the function of technology as a tool to do on math, technology users do not need to know nor understand how technology solves its own mathematical problems encountered. In the other words, the process of examining the results does not have to look in the eyes of the user. In this case, the technologies work only help streamline the problem of resolution time [11].

Technological tools with various benefits are made to help the students in math lessons. Thereby, these can provide ease to the students and support how to learn mathematics [12]. The utilization of technology to learn can be applied in the class that is innovative like the provision for students to access the computers and the internet. Schools can provide a lot of computers and network equipment in their classrooms to be used as the supporting tools for lessons or providing a computer lab as a means to increase the knowledge about technology and information. The purpose of innovation in increasing the availability of computers and the internet is expected to make students familiar with the use of ICT and to facilitate the use of technology in the classroom [13].

ICT is not only computers or Internet but also all kinds of other information and communication media. In this study, ICT focused on the use of computers and Internet in learning. (ICT) in education refers to the use of computer-based communication applied to the daily learning class. In addition, the purpose of ICT in the implementation of the education is to enable students gain a broader knowledge and can access the Internet to develop a global view so that the attainment of effective learning can be implemented [14]. Effective learning in the process of teaching and learning is expected to attract the learners' attention, and learning students' interests can make the students feel happy against the popular activities as well as the presence of attention, and they also show their willingness or enthusiasm [15].

2. Method

2.1. The variable of the research

The variable of the research is a single variable, namely the perception of students in the subject of mathematics consists of: a) delight learning math; b) paying attention in the math lesson; and c) the existence of enthusiasm in learning mathematics.

2.2. The subject of research

The subject of this research is the primary school students of class VI using the technology (computers and internet) in the learning activities, and aged 11 to 12 years with the number of 42 people. The goal is to figure out how the perception using technology in the subject of mathematics learning.

2.3. Instruments and research methods

The instruments used in this research is the question form. This research is a survey, with data capture method is a test in the form of comprising 10 statements by the indicators as follows: a) delight learning math; b) paying attention in the math lesson; and c) existence of enthusiasm in learning mathematics.

3. Result

The result shows that the perception of students toward technology in learning math, as measured by the now comprising 10-statement and given a score of 1 to 4. Overall results of this research obtained maximum value 39 and the minimum value 17, average earned amount 28.86 and standard deviation (SD) 4.72. Based on the question form which has been calculated, the frequency of calculation results is given the question form at any granule as follows:

Most students agree that they get the higher achievements on the subject of mathematics with the help of technology. This percentage represented on points 2 of 86%. This shows that the students are enthusiastic in learning mathematics using technology. Moreover, from the data obtained, it also pointed

Table 1. The results of students' perceptions of technology in mathematics learning.

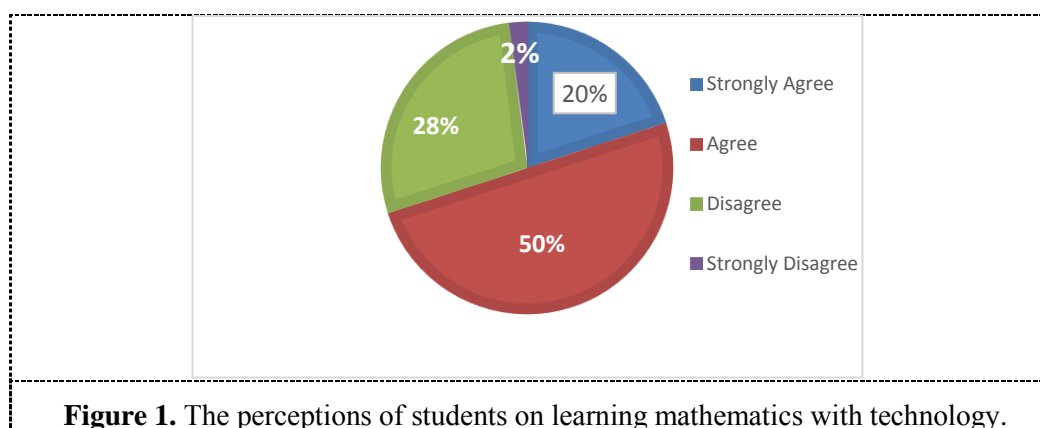
No	Item	Strongly Disagree	Agree	Disagree	Strongly Disagree
1	I am glad to learn math with the help of technology.	24%	64%	12%	0%
2	I would like to increase the achievement on math subjects after studying mathematics with the help of technology.	24%	62%	10%	5%
3	I pay more attention to the subject matter of mathematics during the learning process with the help of technology.	21%	45%	31%	2%
4	I feel more active during the process of learning math with the help of technology.	12%	57%	29%	2%
5	Learning math with the help of technology makes me easier to understand the subject matter.	33%	43%	21%	2%
6	I asked questions that I did not understand when learning mathematics with the help of technology.	26%	67%	5%	2%
7	I am more fond of learning with the help of the technology or media upon learning mathematics.	17%	36%	48%	0%
8	I am more enthusiastic to learn math with the help of technology.	10%	48%	43%	0%
9	I will get a loss if I do not follow the process of learning math with the help of technology.	10%	33%	52%	5%
10	I am eager to follow the process of learning math with the help of technology.	24%	50%	26%	0%

out that students feel more active during the process of learning math with the help of technology with the percentage of 69% in points 4. On the other hands, 9 points with a percentage of 43% indicates that students do not feel a loss if they do not follow mathematics learning activities with the help of technology.

The students that feel delighted in learning math when using technology with percentage of 88% is on 1 point, and it proves that the students are motivated to learn. In addition, most students feel comfortable to learn mathematics by using technology in accordance with points 7 with percentage 53%. Therefore, in this context the students feel comfortable and motivated if the learning process is conducted with the help of technology even though still there are a few students who disagree.

The students give more attention while learning mathematics with the help of technology with percentage 66% in point 3. Additionally, students get better to understand the subject matters of Mathematics with the help of technology with the percentage of 76% on 5 points. It could be inferred that the students paid close attention to the subjects of mathematics because at the time how the student learned was facilitated or assisted with technology. Based on learning with the help of technology, it can be concluded that almost all of the students agreed that with the help of technology, it makes math fun as a lesson so that students have the motivation to learn math with the help of technology.

In point 9, students would ask the things that they do not understand when learning math with the help of technology, and it gets the highest percentage of IE with percentage 93%. It deals with the things about it, and students have high enthusiasm in following the process of learning math with the help of technology. When aggregated, then the number of students who strongly agree with the learning using technology by 20%, and then the students agreed amount to 50%, while students who do not agree by 28%, and students who strongly disagree by 2%. Here is a graph showing the number of subjects who give the responses based on each statement.



4. Discussion

This study found the results that students considered mathematics learning would be more fun if it is conducted with the help of technology even though it was a subject that was generally categorized as a difficult lesson. Students have a positive attitude towards the use of technology in the form of videos because students assume that videos make learning more interesting [16]. Other similar studies conclude that students' responses to technology in learning can increase greater interest and broader knowledge [17].

Technology can encourage students to improve mathematics learning achievement. Technologies such as Internet and other media provide learning motivation for students, and it which correlates with students' mathematics learning outcomes [18]. Another study also discusses technology that can improve learning achievement, and the research states that computer-assisted learning (CAL) can improve students' math scores and increase students' interest in learning [19]. In addition, one of the softwares from computers, Computer-Assisted Instruction or CAI, can help and improve children's mathematical achievements [20].

Technology can make students pay more attention when learning mathematics. This is in accordance with the theory which states that technology helps teachers because students can pay attention when learning in class [21]. Moreover, technology makes students pay more attention in class, although in this case it means more works and learning during the learning process [22].

In mathematics learning aided by technology makes students more active. This is in accordance with the statement that technology makes students more participated when learning in class [22]. Hence, the interaction with the technology can make students work on something positive related to the learning

process [23]. Cloud service that is used in mathematics education can improve learning outcomes because students can think optimally and actively participate in mathematics learning [24].

The role of technology in learning can help students to understand mathematics learning materials. Such technology in the form of e-books can help students who have difficulty in understanding materials with traditional textbooks [25]. Technology in the form of the internet can develop the useful website applications in learning, one of which is a blog. The use of blogs can support the learning process because students are given the opportunity to explain, justify, and express their opinions, and criticize other people's reasons through an interactive learning environment that provides an opportunity to clarify understanding and misunderstandings that may not exist in conventional or face-to-face learning [26].

Learning mathematics with the help of technology fosters students' curiosity as evidenced by students daring to ask if they encounter difficulties when learning mathematics. For example the use of the Interactive Geometry Software (IGS) for mathematics instruction can increase the desire to know students [27]. In addition, technology in the form of robots encourages children to ask questions about science by starting conversations about topics discussed in class [28]. The use of other technologies such as the internet in learning using the form of e-learning can improve the quality of learning and provide a better understanding of mathematics [29].

Technology provides a sense of comfort in the process of learning mathematics, so students are mostly learning at home. There is also the theory which states that the level of satisfaction and comfort of students is high when participating in online learning [30]. Moreover, students feel comfortable to learn using technology, such as mobile phones, and most students show interest in using cell phones to learn [31].

Students feel more enthusiastic with the technology-assisted learning. Learning with the help of technology such as computers in the form of computer education games using scratch can develop positive dispositions significantly and can help to activate children's reflections on mathematical experiences in everyday life [32]. In addition, applications that are programs from a computer can affect how to learn mathematics. The use of applications for mathematics has a positive influence on students' involvement or enthusiasm in learning [33].

Students do not feel loss if they do not follow mathematics learning with the help of technology. This can happen because there are still many learning methods that make students understand the material without the help of technology, for example with the help of teaching aids. This can support the students' interest to learn mathematical materials with a happy feeling [34]. The benefits of using teaching aids in mathematics are finding concepts and formulae that will be used to solve mathematical problems to provide better mastery of concepts [35].

Students are enthusiastic in participating in mathematics learning with the help of technology. As in the theory that Minecraft also makes students eager to learn, it encourages students to discuss each other [36]. Clicker can also make students more eager to participate in learning [37].

This survey still has limitations in terms of lack of depth revealing data about student perceptions, with relatively few subjects. Furthermore, there are still many various technologies in learning. In this study, we did not explore more about the learning technology used in the classroom, especially during mathematics learning. In further research, it is recommended to reveal learning with other technologies and more varied ones.

5. Conclusion

Generally mathematics can be categorized as a quite difficult lesson, but mathematics is important to learn. Therefore, it needs fun strategies to learn math which can be easily understood by students, and one of them is with the help of technology. Students' perceptions of learning with the technology are positive. With a delivery system technology and communication between learners and teachers, teachers with teachers or learners with other learners, and learners with learning resources can be made with different forms and ways, either simultaneously or not.

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