Students’ Responses Toward the Use of Technology Learning Media in Mathematics

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Abstract. Technology learning media has been used in learning mathematics in junior high school. The aim of this study is to describe the responses of junior high school students toward the use of technology learning media. This type of research is a survey study. Participants were 100 junior high school students. Data collection techniques using open-ended questionnaires. Data were analysed using descriptive quantitative method. The gathered data were classified into advantages and disadvantages category to explain how the participants react to their experience in using technology learning media in mathematics classroom. The results showed that the students gave positive responses towards the use of learning media in mathematics classroom since it is interesting, helpful and increased the technology literacy of the students. However, some also reported that the use of media could be difficult, especially the one which asking for internet access, decrease the use of textbook and limit their interaction with classmate. Also, looking too long to the screen can be dangerous for the eye’s health. The findings indicate that their learning style influenced students’ responses. Different styles lead to varying perceptions of the use of learning media in studying mathematics.

1. Introduction

Technology is rapidly growing. Almost everyday humans use technology to help their work. Some human work has also been replaced with technology. In education, especially in learning in the classroom, some teachers have been able to take advantage of technology.

Utilization of technology in classroom learning is technology learning media. Learning media is a tool used as an intermediary to send messages in the form of learning material between the sender of the message and the recipient of the message. Technological tools include computers, internet, and other multimedia technologies [1]. This technology tool can be used as a technology learning media.

In the current learning curriculum, learning is recommended to be students centered. The characteristics of student-centered learning are where students are taught to learn independently to find concepts in a subject matter, students are taught to play an active role in learning, and the teacher is only as a facilitator in learning. The teacher as a learning facilitator means the teacher guides students in learning and gives feedback to students, but their role is not more active than that of students. Technology-based learning media can promote student-centered learning [2][3]. Multimedia technology can be one solution to develop teaching curriculum in learning mathematics [4]. Technology in learning becomes important in improving teaching and learning process [2][5][6][7][8]. Therefore, teachers are encouraged to use technology [9]. Not only teachers are encouraged to be able
to use technology, students are also encouraged to know about technology for fluency when learning to use technology media. 

There are various types of technology-based learning media along with their advantages and disadvantages. Types of technology learning media such as e-learning can improve problem-solving abilities [10] and understanding mathematical concepts [11]. Types of instructional media such as videos can significantly increase knowledge on pre-calculus learning [12] and can also help increase understanding of calculus [13]. Online learning in the form of learning videos can improve learning experiences, motivation, and student activities [14]. Types of technology learning media such as games can increase students’ interest in learning mathematics [15][16][17], increase student motivation [18], Increase students' problem-solving abilities [19], and student learning outcomes [20]. The type of learning media, such as power points can increase self-confidence but do not have a positive effect on the development of student motivation [21]. 

The teacher prepares a scenario and learning media before learning begins. The teacher must be able to choose learning methods and use learning media properly [9]. Learning scenarios and media must be adaptable to the characteristics of students. The teacher must be able to know the characteristics of students in learning so that students will easily accept the subject matter. If the teacher wants to use technology learning media, the teacher must also see whether students can receive the subject matter properly or not. Therefore, students’ responses to technology learning media are very important to know. Knowing students' responses to technology learning media will assist teachers in preparing learning by using technology learning media properly. 

From the description that has been described, the technology learning media has advantages and disadvantages. Not all technology learning media have a positive impact on mathematics learning. Some students are not suitable to use the help of technology learning media in learning mathematics. There are several literature review articles that discuss the advantages and disadvantages of technology learning media [1][7][14]. Therefore, the aim of this study is to describe the responses of junior high school students to the advantages and disadvantages of technology learning media and as a complement to empirical evidence from previous studies. This study can also be used as a reference for the next study on technology learning media in learning mathematics.

2. Method
This type of study is a survey study of 100 students in Mts Nurul Haramain NW Narmada, West Lombok, West Nusa Tenggara, Indonesia. The selection of research subjects was made by interviewing several students. The characteristics of the selected research subjects were students who have studied mathematics using technology learning media. Data collection techniques used an open questionnaire with one question that is "In your opinion, what are the advantages and disadvantages of learning mathematics using technology-based learning media?". The data were classified into advantages and disadvantage category before be analyzed using quantitative descriptive methods.

3. Result and Discussion
3.1. Advantages of technology learning media
There are several advantages of technology-based mathematics learning media seen from the perception of junior high school students. From the results of data collection, the advantages of technology mathematics learning media are interesting, make learning easier, can improve technology literacy. Figure 1 presents the results of data collection in the form of advantages of technology learning media.
Fig. 1. Advantages of technology learning media

From Figure 1, it can be seen that there are 20 students assume that technology learning media is interesting. There are 70 students assume that learning mathematics is easier to use technology learning media. There are three students who assume that they will be more familiar with technology when they often learn to use technology learning media. Eight students do not know and do not respond to the questionnaire questions.

Of the 20 students who assume that technology learning media is interesting, there are 70% assume that technology learning media makes them feel not easily bored in learning mathematics. There are 25% of students assume that using technology learning media can increase their motivation in learning mathematics. There are 5% of students who assume that technology learning media are interesting in terms of appearance. Figure 2 presents the responses from 20 students who assume the technology learning media is interesting.

Some researchers mentioned that technology learning media could attract students' motivation and interest in learning mathematics. An attractive media display and the content of mathematical material that is optimally packaged will affect students' interest, and motivation in learning and students' views of mathematical material will be positive. Multimedia technology can increase students' motivation and interest in learning mathematics [1][4][15][16][17][18]. Students will be able to learn while having fun [22]. Utilization of technology in learning can also make students have skills in using technology [1].

Fig. 2. Student responses to interesting technology learning media

Of the 70 students who assume that learning mathematics is easier to use technology learning media, there are 19% of students generally assume that learning mathematics is easier to use technology learning media. There are 47% of students assume that technology learning media helps them to understand mathematical material better. There are 16% of students who assume that they easily get information about mathematics material by using technology learning media. There are 6%
of students who assume that they get more information about mathematics material through technology learning media. Application of technology such as the internet will make it easier for students to find information and explore themselves to understand mathematical concepts [3]. Students will get more various types of mathematical material by accessing the internet [23]. When students get more information about mathematical material, then students will have more knowledge about the material. Students who have more knowledge about the material will have many references to find new concepts and will help students develop an understanding of the concepts. There are 6% assume that learning mathematics can be done anytime and anywhere. Technology tools such as laptops and smartphones are easy to carry everywhere. Learning mathematics can be done anytime and anywhere when using technology learning media [1][23]. There are 4% of students who assume that learning by using technology can become lifelong learning. Students will be able to re-learn the material in technology learning media so that it can be said that technology learning media can become lifelong learning. There are 3% of students who assume that using technology learning media makes them not only focus on textbooks. With the ease of learning with technology, learning media can help students in learning mathematics and reduce the boredom of learning mathematics in students. Figure 3 presents details of the responses of 70 students to technology learning media that can help them find it easier to learn.

![Fig. 3. Student responses to the ease of learning using technology learning media](image)

### 3.2. Disadvantages of technology learning media

From the results of data, obtained some disadvantages of technology learning media in mathematics learning from junior high school students' responses. The disadvantages of technology learning media in mathematics learning include the difficulty of using technology, the difficulty of accessing the internet (if the type of technology learning media requires internet access), the use of textbooks will be further weakened if staring at the screen of technological devices (such as computers, laptops, smartphones, etc.) others) for too long it will affect eye health, difficulty understanding math material, boring, difficulty communicating with teachers or friends, and difficulty focusing on learning. Student responses regarding the disadvantages of technology learning media can be seen in Figure 4.
Fig. 4. Disadvantages of technology learning media

From Figure 4, it can be seen that there are 11 students assume that technology learning media is difficult to use. Technology learning media has not been a priority in schools, so there is still little training in using technology [24]. When technology learning media has not been a priority in schools, teachers and students will not have much experience using technology, so using technology for some teachers and students will be difficult. Some students also felt limitations to access the internet. There are six students who assume that it is difficult to access the internet when this type of technology learning media requires internet access. For students who do not have or have difficulty accessing the internet, learning with the help of technology media can only be used at school [3]. Two students assume that when using technology learning media frequently, the use of books will be increasingly minimal. They assume that if they use technology learning media too often, they will no longer use books. There are 4 students who assume that too often staring at a computer screen, laptop or smartphone would affect their eye health. Reading material on the screen of technology tool is more difficult than reading material in a book [9].

From Figure 4 it also can be seen that there are 16 students assume that learning mathematics with the help of technology learning media does not make them better understand the material. There are 10 students who assume that learning mathematics using technology learning media is boring. There are 14 students assume that using technology learning media makes it difficult for them to communicate with teachers or friends when they experience difficulties with mathematical material. In learning mathematics, some students need a deep explanation from their teacher. This type of online learning reduces social interaction with the teacher or friend [2][7]. Adequate feedback is difficult to do in e-learning media [9], so it allows students not to be able to understand the material. Six students cannot focus on learning mathematics when using technology learning media. They assume when learning to use a type of learning media in the form of games, they will focus more on playing games not to understand the material. Some of them also assume that when using a smartphone, they will be quickly influenced to do other things, like playing games or watching on their smartphone. There are 35 students who do not know or do not respond to the questionnaire questions.

4. Conclusion

From the results of the study, obtained responses of 100 junior high school students to the advantages and disadvantages of technology learning media. The advantages of technology learning media in mathematics learning are: (1) interesting learning media, (a) not easily bored, (b) increasing motivation to learn mathematics, and (c) attractive media display; (2) learning media that makes
learning easier, (a) easier to understand material, (b) easier to get information about mathematical material, (c) more information about mathematical material, (d) can learn at any time and everywhere, (e) promote lifelong learning, and (f) not only focus on textbooks; and (3) can improve technology literacy.

On the other hand, the students also found some disadvantages of technology in learning media for learning mathematics, which are (1) the difficulty of using technology; (2) difficulty in accessing the internet (if the type of technology learning media requires internet access); (3) the use of textbooks will be increasingly weakened; (4) if you stare at the screen at technological devices (such as computers, laptops, smartphones, etc.) for too long it will affect your eye health; (5) difficulty in understanding mathematical material; (6) boring; (7) difficulty in communicating with teachers or friends; and (8) it is difficult to focus on learning.

Some student responses have an intersection of the advantages and disadvantages of technology learning media. There are 33 students assume that technology learning media makes it easy to understand the material while 16 students don't. There are 14 students assume that they are not easily bored learning mathematics with the help of technology learning media, while ten students assume that learning using technology learning media is boring. Some junior high school students are proven to have different learning styles.

References
[1] Zakaria N A and Khalid F 2016 The benefits and constraints of the use of information and communication technology (ICT) in teaching mathematics Creat. Educ. 7, 11 p 1537–1544.
[2] Nayef B H 2015 The advantages and disadvantages of using multimedia in education J. Al-Turath Univeristy Coll. 2, 19 p 96–104.
[3] Keong C Horani S and Daniel J 2005 A study on the use of ICT in mathematics teaching Malaysian Online J. Instr. Technol. 2, 3 p 43–51.
[4] Zhang J 2012 Multimedia technology in mathematics teaching optimization in International Conference on WTCS 2009, AISC 117 p 357–363.
[5] Gabarre C Gabarre S Din R Shah P M and Karim A A 2014 IPads in the foreign language classroom: A learner’s perspective 3L Southeast Asian J. English Lang. Stud. 20 1 p. 115–128.
[6] Daud M Y and Khalid F 2014 Nurturing the 21st century skills among undergraduate students through the application and development of weblog Int. Educ. Stud. 7, 13 . 123–129.
[7] Arkorful V and Abaidoo N 2015 The role of e-learning, advantages and disadvantages of its adoption in higher education Int. J. Instr. Technol. Distance Learn. 12, 1 p 29–42.
[8] Uysal Ş 2016 Educational advantages and disadvantages of computer-assisted instruction: Commentary on paper by Foster et al. [Peer commentary on “Improving mathematics learning of kindergarten students through computer- assisted instruction,”] by M. E. Foster, J. L. An Inonu Univ. J. Fac. Educ. 17, 3 p 297–304.
[9] Repolusk S 2009 Interactive e-learning materials in the mathematics classroom in Slovenia Probl. Educ. 21st Century 14 p 94–108.
[10] Lu’uulimakun U and Wutsqa D U 2018 The Effectiveness of E-learning Media with Guided Discovery Method from The Perspective of Student’s Mathematics Problem Solving Skill Proc. 5th Int. Conf. Res. Implement. Educ. Math. Sci. (5th ICRIEMS) 1 p 169–176.
[11] Lu’uulimakun U and Wutsqa D U 2019 Does the use of e-learning media with guided discovery method affect students’ understanding of mathematics concept? J. Phys. Conf. Ser. 1320, 1 p 1–8.
[12] Kay R and Kletskin I 2012 Evaluating the use of problem-based video podcasts to teach mathematics in higher education Comput. Educ. 59, 2 p 619–627.
[13] Kinnari-Korpela H 2015 Using short video lectures to enhance mathematics learning - experiences on differential and integral calculus course for engineering students Informatics Educ. 14, 1 p 69–83.
[14] Hajhashemi K Anderson N Jackson C and Caltabiano N 2015 Online learning: Can videos enhance learning? in The Eurasia Proceedings of Educational & Social Sciences (EPESS) 2 p 238–241.
[15] Yeh C Y C Cheng H N H Chen Z H Liao C C Y and Chan T W 2019 Enhancing achievement and interest in mathematics learning through Math-Island Res. Pract. Technol. Enhanc. Learn. 14, 1.
[16] Rondina J Q and Roble D B 2019 Game-based design mathematics activities and students’ learning gains Turkish Online J. Des. Art Commun. 9, 1 p 1–7.
[17] McLaren B M Adams D M Mayer R E and Forlizzi J 2017 A computer-based game that promotes
mathematics learning more than a conventional approach *Int. J. Game-Based Learn.* 7, 1 p 36–56.

[18] Vos N Van Der Meijden H and Denessen E 2011 Effects of constructing versus playing an educational game on student motivation and deep learning strategy use *Comput. Educ.* 56, 1 p 127–137.

[19] Brezovszky B *et al.* 2019 Effects of a mathematics game-based learning environment on primary school students’ adaptive number knowledge *Comput. Educ.* 128, p 63–74.

[20] White K and McCoy L 2019 Effects of game-based learning on attitude and achievement in elementary mathematics *Networks An Online J. Teach. Res.* 21, 1 p 1–17.

[21] Susskind J E 2005 PowerPoint’s power in the classroom: Enhancing students’ self-efficacy and attitudes *Comput. Educ.* 45, 2 p 203–215.

[22] Sedig K 2007 Toward operationalization of “flow” in mathematics learnware *Comput. Human Behav.* 23, 4 p 2064–2092.

[23] Smedley J 2010 Modelling the impact of knowledge management using technology *OR Insight* 23, 4 p 233–250.

[24] Afolake N Jaleel A A and Shittu K 2014 Evaluating the impact of technology integration in teaching and learning *Malaysia Online J. Educ. Technology* 2, 1 p 23–29.