The Influence of Using Computers in Mathematics Learning to Students Mathematical Ability

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Abstract. The use of technology has entered all aspects of human activities, belonging to education. The use of computer-based media in the learning process is very useful. This study aims to describe the results of various studies on the use of computers in the learning of mathematics. The method used is descriptive research. The aspects seen are the various types of software used and their effects on mathematics learning. Based on the results of the research, it can be concluded that the use of computers can help students visualize and understand mathematics material.

1. Introduction
The utilization of information and communication technology (ICT) in learning is very rapid. The development of ICT has made it easier to carry out the mathematics learning process. ICT can be used in providing learning media in understanding mathematical concepts [1]. The use of mathematics software for learning is expected to help understand and increase student interest in learning.

The principle of learning using ICT as a learning aid is useful for delivering lessons to students interactively and providing training and seeing student learning progress. ICT has various forms of application depending on the intent and purpose of using the computer in learning, such as exercises and practice (drill and practice), testing students' abilities about the material that has been given with questions, and explaining the output of the program results. ICT helps students understand material and can repeat the material repeatedly until they master the material [1].

According to Heinich, ICT application forms in learning can be used as tutorials, drill & practice, games/edutainment, mindtools, and simulation [2]. Robert Taylor divides them into three categories: computers as "tutors, tools, and tutees" [2].

The exertion of computers in mathematics learning is increasingly relevant to the characteristics of mathematics. Computers function as learning media that provide visual experiences to students in interacting with mathematical objects. Computer programs are ideal for use in learning mathematical concepts that require repetitive concept, high accuracy, precise, fast, and accurate graphic completion [3]. Computer-assisted learning innovations are excellent for geometric transformations, calculus, statistics, and functional graphics [4].

In addition, Nugroho [5] revealed that learning using computer assistance to obtain knowledge and skills is easier to acquire and re-learn so that students can more easily solve the problems presented. With the use of ICT, the current learning process does not have to be in the same place and time, but it is possible to be in a different place and time, such as the use of e-learning, teleconferencing, and so on. Learning resources are not only in printed books, but can be obtained from the internet, e-books, e-
journals, and so on. In following existing technological developments, electronic media can be used to support learning. Teachers are benefited from various software as learning media that involve students directly [1].

Some computer programs (software) commonly used in mathematics learning include GeoGebra, Matlab, Macromedia Flash, and Animation. GeoGebra, developed by Markus Hohenwarter is a computer program for teaching mathematics, especially geometry and algebra [6]. With its various facilities, GeoGebra used for learning mathematics to demonstrate or visualize mathematical concepts as well as a tool to construct mathematical concepts is one of its utilization. GeoGebra is a dynamic geometry system that increases the level of mathematical knowledge and skills. The use of GeoGebra allows one to complete and extend teaching strategies based on manipulative activities [7].

Matlab (Matrix Laboratory) is an advanced mathematical programming language formed with the premise of using matrix properties and forms. In mathematics learning, Matlab can help teachers and students communicate mathematical concepts [9]. According to Caesarendra [10] several mathematical concepts that can be described using Matlab include matrices, vectors, linear algebra, statistics, polynomials, analysis of functions, curve matching, interpolation, limits, differentials, integrals, Laplace transforms, Fourier transforms, ordinary differential equations, (Ordinary Differential Equation, ODE) as well as, partial differential equations (Partial Differential Equation, PDE).

Macromedia Flash 8 Professional is an animation design maker software. The view that is presented will make students freer to choose, synthesize, and elaborate the knowledge they want to understand. Thus, Macromedia Flash can be utilized to develop interactive multimedia-based learning media. Macromedia Flash can accommodate students who quickly accept lessons and can also manage the students who are slow in understanding [11].

According to Maharani [12] Macromedia Flash is widely used by web professionals because of its ability to combine elements of text, graphics, sound, animation, and user interaction of internet animation programs. Macromedia flash has many function that can be developed with; create animated logos, movies, games, navigation on websites, banners, animated buttons, interactive menus, interactive forms, e-cards, screen savers and the creation of entire web content.

In addition, Rahman [13] said that animation and images made with flash can look good for any window size and screen resolution. This happens because flash is made with vector graphic technology so that the size can be changed as needed without reducing or affecting the quality of the image. Loading time, animated images that appear faster than other animation programs. In addition, flash is capable of creating complex graphic animations very quickly, so creating full-screen animations can be directly linked to websites.

Animation media is a collection of images that are processed in such a way as to produce certain movements [14], [15]. In addition, animation media in learning has several advantages, including: (1) Animation Media in learning is able to convey complex concepts visually and dynamically, (2) Digital animation can be used to help provide virtual learning, (3) Animation Media in learning able to attract attention, increase motivation and stimulate more memorable student thinking [16].

2. Materials and Methods
This type of research is descriptive research, which describes the various results of research on the use of computers in learning mathematics. The first step is to collect various studies on the use of various software in mathematics learning. The second step is to describe the effect of the software on student learning outcomes. The third step concludes the effect of various computer uses on mathematics learning.

3. Results and Discussions
This research will look at the various findings on the influence of the use of computers in learning mathematics. The aspect seen is the software used and its influence on student mathematics learning outcomes.
3.1. Results related to Geogebra
The results of the study were viewed from the aspect of the software used and its effect on mathematics learning. The results of research on the use of GeoGebra in mathematics learning have been carried out by several researchers [4], [18], [3], [19], [20], [17], [21], [22], [23]. Mahmudi [4], Asngari [3], and Nur [17] conducted experiments related to the use of GeoGebra in mathematics learning. GeoGebra program can provide students with a clearer visual experience in understanding mathematical concepts.

Suweken [18] conducted an experiment to see the increase in students' motivation and understanding of mathematical concepts. The actions given to students are the use of GeoGebra-based learning media in mathematics learning. The conclusion is that the integration of media in learning mathematics has succeeded in increasing student motivation and learning achievement.

Retno et al. with students whose learning uses the STAD cooperative learning model without the aid of GeoGebra software. Nopiyanti [25] in her research on the development of GeoGebra assisted learning tools on geometry material shows that the tools created have an impact on increasing student involvement in learning seen from student interactions with students and students with teachers as well as students' sense of responsibility towards the learning being carried out.

Supriadi [19] conducted a study to see the effect of GeoGebra-based geometry learning in improving students' mathematical communication skills. The results of his research show that students who learn mathematics using GeoGebra-based learning experience an increase in mathematical communication by 90%, in addition to the critical and creative attitudes during learning shown by students. This shows that after learning using interactive software such as GeoGebra increased much higher than before using GeoGebra software teaching media.

Nopiyani [20] conducted an experiment to analyze the mathematical communication skills of junior high school students with realistic mathematics learning assisted by GeoGebra. The results showed that the mathematical communication skills of students who received realistic mathematics learning assisted by GeoGebra were better than students who received realistic mathematics learning without GeoGebra. In addition, there is a positive response from students towards learning realistic mathematics with GeoGebra. Herawati [21] concluded that the improvement of students' mathematical connection abilities through the Problem Based Learning (PBL) model assisted by GeoGebra software was not better or the same as the PBL model that was not assisted by GeoGebra software.

Nur'aini [22] conducted a research to see learning geometry mathematics realistically with GeoGebra. Learning mathematics using GeoGebra as a whole until the end of the action cycle III, students' independence and problem-solving abilities experience positive changes. An increase in independence and problem-solving abilities can be seen from indicators that appear to be students' ability to complete their own assignments, students' ability to believe in themselves, and students' ability to formulate mathematics problems. So that describing and analyzing geometry in mathematics will be easy to do using the GeoGebra application media.

Rahadyan [23] conducted a study to improve teachers 'understanding of the role of mathematics learning media and increase teachers' knowledge and skills about good and explorative virtual learning media (mathlet). The results obtained are that teachers can improve the quality of the learning process in accordance with the knowledge gained in training, teachers are more creative and innovative in creating the learning process, teachers have an understanding and knowledge of virtual learning media, teachers can use the GeoGebra application to create virtual learning media, teachers can create visual media, teaching materials, and assessment instruments related to algebra and geometry. Some text.

3.2. Results related to Matlab
Research on the use of Matlab in mathematics learning has been conducted by several researchers [9], [1]. Cahyono [9] conducted research related to the use of Matlab software in learning linear algebra. The results obtained by using Matlab as a medium for learning mathematics led students to learn mathematics faster, better and easier, and of higher quality. With the Matlab application, it can
streamline costs and also time in operational learning. In addition, the benefit of this application is that it allows students to explore more about numerical concepts because numerical experiments can be easily carried out and supported by graphical representations.

Kartika [1] conducted an experiment to see the effect of mathematics learning assisted by Matlab software on mathematical communication skills and learning interest of high school students. There was an improvement of mathematical communication skills who receive learning assisted by Matlab software is better than students who receive direct learning.

3.3. Results related to Macromedia Flash
Research on the use of Macromedia Flash in mathematics learning has been carried out by several researchers [26], [11], [27], [12], [28], [29], [16]. Safitri [26] conducted an experiment to produce a valid and practical macromedia flash based learning media on the subject of triangles in junior high schools, and to determine the potential effects arising from the use of these media. The research method used is development research (Development Research). The results of the achievement of students' final scores are very good category 50%, good category 35% while sufficient category 12.5%.

Fahmi [11] conducted a study to produce interactive multimedia on mathematics learning using Macromedia Flash in the standard of competence in understanding the properties of tubes, cones, and balls in grade IX SMP students. This research has succeeded which has good quality (B) according to the assessment of material and learning experts, media experts, and students.

Novitasari [27] conducted an experiment to observe the effect of using interactive multimedia on students' ability to understand mathematical concepts. Based on the results of statistical calculations the ability of students to understand mathematical concepts using interactive multimedia with a quasi-experimental research method shows that the average experimental class is higher than the control class. The results showed that interactive multimedia had an effect on students' ability to understand mathematical concepts.

Maharani [12] conducted a research to obtain valid mathematic teaching materials based on macromedia flash. The development model used is a modification of the Thiagarajan model or the so-called Four-D Model. The production process of teaching materials is carried out in order to develop mathematics teaching materials for vocational students in Real Number Operations on the subject of Comparison, Scale and Percent using Macromedia Flash software. The design of teaching materials based on macromedia flash that was developed contains problems in everyday life, especially in the Real Number Operation application for automotive engineering calculations. The description of the validation results at the development stage shows that the validation results from the media expert are in the valid category, the content / material expert validation is in the valid category, and the results from the expert learning validation are also in the valid category.

Masykur [28] revealed that by using macromedia flash the learning can be increase as well as student skills. Kumalasari [29] conducted a research to design a practical and efficient learning media using macromedia flash on the learning material for differential calculus and integral calculus. The results show that the development of design and effectiveness of practical and efficient learning media has been achieved. This can be seen from the results of the student response questionnaire showing the indicators are very good and the level of validity shows very valid. Nasir [16] conducted a study to determine the use of animation media in mathematics learning at the Paitana Jeneponto Islamic School (MTs) which includes descriptions of student activities, student responses, and improvement of learning outcomes. The conclusion is that learning using animation media in class VII MTs Paitana can improve students' mathematics learning achievement.

4. Conclusion
Based on the research results, the following conclusions were obtained: (1) The use of computers can help students understand math material; (2) Computers can visualize and animate mathematical objects; and (3) Students are motivated to learn mathematics using computers.
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