ICT on mathematics learning process at Pagaralam elementary school

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Abstract. It is important to make the process of learning activities by the progress of the times, make learning becomes fun. This study aims to see how often teachers use ICT as a medium and source of learning. The research subjects were 14 elementary school teachers in Pagaralam with accreditation B. This study was descriptive qualitative, data collection used was an interview guide with eight questions, video and analyzed throughout the conversation from the data. The results of the study found that ICT as a media and learning resource is rarely used in the learning process due to the limited teacher's ability to use or create ICT-based media in learning mathematics in elementary schools and school facilities to fulfil ICT-based learning. The majority, the use of computer media or laptop is used only as an administration tool in the office.

1. Introduction

Information and Communication Technology (ICT) in the world of education is being discussed. Education and technology are interrelated. The acceleration of information technology that is happening affects the world of education. Technological developments lead to changes where the teacher as a source and provider of knowledge becomes a facilitator and student learning partner [1]. The government's positive response to the development of technology, in this case, the world of education in the 2013 curriculum that has been going on is facilitating teachers to access teaching materials online. This facilitation affects that all teachers must have the ability to use ICT-based media, this is one factor that requires ICT development in the world of education in Indonesia so that Indonesia has better Human Resources and can compete in a technology-based world.

ICT-based learning media include computer technology, multimedia, telecommunications, and computer networks [2]. Potential Utilization of ICT in education includes improving access to education, efficiency and improving the quality of teaching-learning. The application of ICT in learning is grouped into two, the first is ICT as a tool and the second is learning via ICT [3, 4]. The use of ICT is a tool that helps teachers and facilitates the learning process [5]. Using ICT-based media can make children more interest to learn mathematics. Previous research has found that teaching materials made on an attractive ICT basis make students excited because of fun [6, 7]. Learning using ICT also increases student interest and attention [8]. To design ICT-based learning, the teacher in this case as a facilitator must be familiar with using ICT-based media. Computers are no stranger to the ears of the community, and the media most often used by teachers today, especially in the 2013 curriculum is used to fill in data, learning tools, and other administration.
The 2013 curriculum uses a thematic learning approach. Integrated thematic learning defined as the learning which uses a theme to relate some subjects so they could give a meaningful learning experience [9]. The development era nowadays greatly affects the teacher in the learning process. The teacher is expected to update their knowledge and technology to face technology development. One of the teacher’s roles in improving the effectiveness of learning in the classroom is by using technology-based media. Learning by using technology supports memorization, problem-solving, children’s capability development, language and mathematics [10-12]. The computer benefits in the learning media could train students’ motoric ability if it is packed in the form of game and simulation [13]. The comparison research before state using ICT can help the teacher in the learning process is not comparable with the capable teacher in using ICT. Therefore, teacher competence in using ICT must be an increase [14]. Therefore, this is a need to interview the teachers to ask about the problem in using ICT based learning. The computer is a source which is made to support and encourage the development and learning in the age group of pre-school children and elementary school [15, 16].

This article is descriptive qualitative research about how often the use of ICT in the learning process is done by the elementary schools’ teacher in mathematics learning in Pagaralam. The context explains how often the learning process by using ICT media that has been utilized as well as challenges and difficulties faced by elementary school teachers, especially in mathematics. Based on the result of observations and interviews conducted by the researcher in several elementary schools in Pagaralam in October 2018, the fact that the elementary schools in Pagaralam have implemented the 2013 curriculum.

2. Method
This research is a descriptive study with the qualitative method. The population of this study was all elementary teachers in Pagaralam. While the research sample is the public elementary schools in Pagaralam with five sub-districts. and seven public elementary schools with B accreditation were taken, this was considered considering the school facilities and infrastructure were considered good. The selection of teachers in each elementary school as research subjects was determined randomly and each school had two teachers interviewed. The interview guide was submitted as many as eight questions. The subjects of this study were 14 elementary school teachers.

This study intends to describe the situation or events by the state of the field. Qualitative research is a research procedure that produces descriptive data in the form of observations of a person's behaviour [17] — the use of qualitative methods to analyze the answers to interviews provided by respondents, where questions are open and given space to express opinions about teaching with computers. Conversational analysis generally focuses on conversations in an interaction [18].

The process of collecting data using interviews, researchers made interview guides first to find out how often teachers use ICT-based learning media in the learning process and the ability of teachers to use computers and the obstacles faced when using computers, then the guidelines were reviewed by colleagues and experts. The population of this study was all elementary school teachers in Pagaralam. The researcher interviewed the teacher and recorded it with videos so that the conversation could be recorded and analyzed. All data is collected and analyzed so that this data can produce theories that can be used as a strong foundation for reality, are contextual and historical [19].

3. Results and Discussion
The benefit of technology can be effective and efficient in learning process [20] — the competence of teacher in use ICT important to make innovative learning media. The capability of the teacher to use ICT must be improved [14]. The teachers were still difficult in using ICT based media learning in class and using the computer to make administration in school. The researcher interviewed the teachers of different age and different time work. From the 14 teachers who were interviewed, eight answered under 20 years, and others about six answered up to 29 years. While interview, it was found the teacher that will be pension a year later. It showed that the teachers who were interviewed had time working which was no longer and the teacher ratio in the time working could be said as the same. In
the case of learning sources, it was found that 12 teachers or 85% answered from the books, experiences, tools and two teachers or 15% answered the same but added by the sources from the internet and electronic media. This data showed that there was still a small number of teachers that found the learning sources based on ICT.

There was 12 people or 85% mentioned that learning mathematics by using number card, palm leaf, fruits, leaves, fingers, stone, abacus, and media that usually utilized in the classroom. The rest of the teachers answered the same but added by the laptop as the mathematics learning media. It is how that the use of ICT media in the learning process is still lack. The next question was about using a computer in the learning process, there was nine answered that they had not used the computer during the learning process, and five said that they had used the computer in the mathematics learning process. This data showed that utilizing the computer media in the learning process had not been optimal. The resulting interview in the infrastructure side said that six schools or 92% had facilitated the school with LCD and laptop, but the teacher's ratio in the classroom was not equal with it. And based on the teacher answer with ICT in learning resource, process, media and happy using ICT in Figure 1, reported that there are 14 teachers or 100% happy if learning process with ICT.

![Figure 1. The teacher answer with ICT in learning resource, process, media](image)

From the answer of the teacher, the difficulties which were faced by the teacher in using a computer is described in Figure 2. In Figure 2, we found that there were still many teachers who had not mastered the computer as much as 9 teachers and as many as 3 teachers were constrained to children who were too noisy and very hyperactive children with images displayed, as much as 2 teachers constrained in school facilities that have not provided school LCD and computers. Facilities are important for the implementation of ICT-based learning [21, 22].
Figure 2. The problem teacher using ICT in the learning process

In the case of the attitude, the teachers were very happy when using a computer in the learning process. There were 14 teachers or 100% answered happily. It was illustrated in Table 1.

Table 1. The reason for teachers positive feedback if using a computer in the learning process

| Subject | Answer |
|---------|--------|
| Teacher 1 | Because the learning process becomes easy, appealing to students |
| Teacher 2 | Because it reduces energy and time, explain it |
| Teacher 3 | Because it's interesting, we need to download many applications |

Table 2 illustrates that the teacher was very happy with the computer because it could attract children to learn, easy, efficient in time and energy. Some of the respondents' answers when interviewed illustrated the difficulties faced in utilizing computer media.

Table 2. The reason for teachers answer problem about using a computer

| Subject | Answer |
|---------|--------|
| Teacher 1 | I hadn’t mastered it when I typed wrong; I get confused, I haven’t mastered it |
| Teacher 2 | There’s a because I haven’t mastered it, so I need to ask for help. I can get even only a little |
| Teacher 3 | There’s a difficulty, one of them is the children who are very enthusiastic to show up. Thus, the classroom becomes noisy |
| Teacher 4 | The difficulty which is faced in the classroom is there is no available LCD, so it is not used in the learning process |

It could be concluded from the answers above that the difficulties which were faced in using computer consisted of many aspects such as the teacher who had not mastered how to use the computer media, the hyperactive students that made the classroom environment hampered and the unavailability of the school infrastructures. Moreover, to solve the problem of a noisy classroom environment, there were some ways which were used by the teachers, such as used the clapping game or asked the students to come forward. The teachers who had not mastered computer yet not only stayed silent during the interview. Many teachers were still in the learning process of using the computer, even though in the learning process it was rare to be used. The teacher was near to the computer technology. It was because the majority of teachers used the computer to do an
administration, these were following answers from the interview’s result about the computer usage which was generally used by them. The teachers’ answer is illustrated in Table 3.

| Subject  | Answer                                                                 |
|---------|------------------------------------------------------------------------|
| Teacher 1 | It is usually used for the administration like making learning devices |
| Teacher 2 | The use is to enter the students’ score                                |
| Teacher 3 | For school management, administration, learning media, just it         |
| Teacher 4 | I use it for school administration                                      |

From the answers in Table 3, it could be concluded that the teachers had known the computer and often used it to arrange the school administration, 2013 curriculum used the application in arranging the administration included the learning devices until entry the students’ score, so the teachers must use the computer to input the data.

4. Conclusion
In the interview process with the teacher regarding the ICT-based mathematics learning process, it can be concluded that teachers rarely use ICT-based learning processes, especially in the field of mathematics, the problem of school facilities needs to be completed later to facilitate teachers in ICT-based learning. The problems found are many teachers who have not mastered the use of particular computers. So that the teacher still uses abstract words in learning mathematics, there are also those who use objects in the surrounding environment. While the attitude of the teacher is very positive in the answer to the question if using ICT in the learning process, from the way it is produced that the teacher is very happy if using a computer in the learning process can be more efficient time and energy and children easier to understand because it attracts children's attention. But teachers have often used computers to school administration and learning devices.

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