



## ANALYSIS OF THE ELEMENTARY SCHOOL TEACHERS' ABILITY TO USE TECHNOLOGY ON THE MATHEMATICS ONLINE LEARNING

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### ABSTRACT

In Indonesia, the implementation of online mathematics learning does not always run smoothly, there are various obstacles that occur, such as the lack of gadgets owned by teachers or students, internet networks are still weak, etc. So that the readiness of mathematics teachers in managing online learning is very necessary, especially in utilizing technology. Thus, it is necessary to analyze the readiness of mathematics teachers in carrying out online learning. In this study, we aim to describe (1) online mathematics learning in primary schools during the COVID-19 pandemic; (2) the ability of elementary school teachers to use technology during online learning, especially in learning mathematics; and (3) the content that teachers use to present online learning. We conducted research by distributing an online survey to 56 primary school teachers, over a period of approximately two weeks of data collection. The findings in this study are that most mathematics teachers in schools still use whatsapp and google meet or zoom media in conducting online learning, elementary school teachers still have not mastered learning technology well, and most teachers are still limited to using video downloads from YouTube, PPT and conventional books to present learning.

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## ANALISIS KEMAMPUAN MENGGUNAKAN TEKNOLOGI GURU SEKOLAH DASAR DALAM PEMBELAJARAN MATEMATIKA SECARA DARING

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### ABSTRAK

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#### Kata Kunci:

Guru sekolah dasar  
 Pembelajaran daring  
 Teknologi

Di Indonesia, pelaksanaan pembelajaran matematika online tidak selalu berjalan mulus, terdapat berbagai kendala yang terjadi, seperti minimnya gadget yang dimiliki guru atau siswa, jaringan internet yang masih lemah, dll. Sehingga kesiapan guru matematika dalam mengelola pembelajaran online sangat diperlukan, terutama dalam memanfaatkan teknologi. Dengan demikian, perlu dilakukan analisis kesiapan guru matematika dalam melaksanakan pembelajaran online. Dalam penelitian ini, kami bertujuan untuk mendeskripsikan (1) pembelajaran matematika online di sekolah dasar selama pandemi COVID-19; (2) kemampuan guru SD dalam menggunakan teknologi selama pembelajaran online, khususnya dalam pembelajaran matematika; dan (3) konten yang digunakan guru untuk menyajikan pembelajaran online. Kami melakukan penelitian dengan menyebarkan survei online ke 56 guru sekolah dasar, selama sekitar dua minggu dalam pengumpulan data. Temuan pada penelitian ini adalah sebagian besar guru matematika di sekolah

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masih menggunakan media whatsapp dan google meet atau zoom dalam melakukan pembelajaran online, guru SD masih belum menguasai teknologi pembelajaran dengan baik, dan sebagian besar guru masih sebatas menggunakan video download dari youtube, PPT dan buku konvensional untuk menyajikan materi pembelajaran.

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## 1. INTRODUCTION

Technology was very familiar in the 21st-century generation. Everyone are exposed with interesting and impressive technology [1]. Digital technology has been widely used in every field of professional lives, including in education. A significant amount of research demonstrates that educational technology can usefully support the engagement of online learners [2], [3]. A survey of 2,462 Advanced Placement (AP) and National Writing Project (NWP) teachers finds that digital technologies have helped them in teaching their middle school and high school students in many ways [4]. Since 2018, Indonesian government proposed teacher and educational sector to use technology in learning process. But it have not been achieved well, due to the lack of support from the academic community and facilities in the school environment [5].

However, in 2020, COVID-19 pandemic has plagued Indonesia, so that the Indonesian government through the Regulation of the Minister of Health Number 9 of 2020 trying to minimize the spread of the virus by issuing a ban to crowd and enforce PSBB almost in every region in Indonesia. Minister of Education and culture in 2020 through regulation Number 36962/MPK.A/HK/2020, also instructed that the teaching and learning process is carried out online to prevent the spread of COVID-19. Normally, learning process held by face-to-face meeting in the class, then in the pandemic era, learning process is carried out by relying on technology, especially internet, to hold meeting between teachers and students [3], [6]–[8].

In Indonesia, the implementation of online learning does not always run smoothly, there are various obstacles that occur, such as inadequate gadgets owned by teachers or students, internet networks that are still weak, etc. [9]. Fadilla, Relawati, and Ratnaningsih (2021) stated that there are problem occurs during online learning, i.e. students find difficulty to understand the mathematics material delivered by the teacher, students do not feel motivated to learn, students do not master learning well [7], [10]. Based on investigation conducted by Kusumaningrum and Wijayanto (2020), online learning often constrained by internet networks that are difficult to reach, so the online learning activities are not smooth [11]. In another research, Putri and Munandar (2021) obtained that some students are not active in participating mathematics online learning, due to unstable internet network, internet quota, and teacher explanations that are not heard clearly. [12].

On the previous research conducted by Asmuni (2020), the problem of the mathematics online learning was the teacher still weak on mastery Information Technology (IT) and limited access in students supervision [13]. The similar opinion stated by Sari, et.al. They stated that teachers on elementary school could not conduct mathematics learning optimally because of a lack of ability to provide learning materials and an annoyance of the learning process that causes the unexpected purpose of learning to go unfulfilled [14]. Anugrahana (2020) declared that the use of technology in online learning was still limited to the use of WhatsApp [15]. Then, the results of direct interviews conducted by Faizah, et.al. to the teachers in SMKN 1 Jetis Mojokerto, that they find difficulty to use multimedia during the online learning process, especially the use of video conference [16]. Sugandi, et.al. stated reveal the similar statement that the implementation of the online learning process in majority school emphasizes the use of WhatsApp media

and only a small number of teachers use LMS with very simple content presentation [17]. Even though, based on Rachmadtullah, et.al. claimed that ICT-based learning media is very needed on the online learning, especially related to the Industrial Revolution Era 4.0 which promote students to be sensitive to information disclosure, computerization, computing, and automation [18]. However, the research has not yet been conducted to analyze the ability of elementary school's teachers in Sidoarjo in implementing mathematics online learning, as well as how online learning is carried out. Whereas the main factor for the successfully mathematics online learning is the teacher, whether at the elementary or secondary school level. The readiness of mathematics teachers in elementary school to manage mathematics online learning is very necessary, especially in utilizing technology. But in fact, the ability of the mathematics teachers still in medium category [19], [20]. Bowman etc, based on their research, suggest that very effective when targeting improving teachers' values in addition to enhancing technology-related skills [21]. Several studies have been carried out such as the research conducted by Yusrizal, etc, in Banda Aceh. Until now, there is still no analysis related to the ability of mathematics teachers in elementary schools, so it is necessary to reveal the ability of teachers to find out basic needs in the online learning process. Even though Sidoarjo is a big city with adequate facilities for online learning, it doesn't mean that the teacher's abilities are also good. Though, mathematics teachers in elementary school really need the ability to manage online learning because in elementary school's teachers must be able to develop the right concepts of each material. During this pandemic, elementary teachers had difficulty developing media for brave learning, so that teachers were not able to carry out learning optimally[7]3.

## 2. METHOD

In this research, we aim to describe (1) how mathematics teacher in elementary school conduct online learning during COVID-19 pandemic; (2) the ability of mathematics teacher in elementary school in using technology during online learning; and (3) what kind of content used by teacher to present online learning. Based on the background and the previous research, online learning were limited on using WhatsApp, small number of LMS and very simple presentation to deliver the learning material [14], [15], [17]. This research conducted in the Sidoarjo City, East Java that was no problem with the internet network, and the person who were familiar with gadget. So that, we assume that the internet network at the school is fine and the supporting aids for online learning process is good.

### 2.1 Hypotheses

From the above aim of the research, we conduct the research with the following hypotheses (1) the majority of mathematics teacher in elementary school conduct their online learning by synchronous and asynchronous learning. They use google meet or zoom meeting in conducting synchronous online learning, and use Learning Management System (LMS) to conduct asynchronous learning; (2) mathematics teacher in elementary school still have not mastered learning technology well; (3) most mathematics teacher in elementary school are limited to using video downloaded from YouTube, PPT and conventional books to present learning materials.

### 2.2 Material

We conduct the research by using online survey for about two weeks in collecting the data. The questionnaire used on this research consist of 3 main questions and 2 supporting questions. The 3 main questions were focused to obtain the data about the way

teachers conduct their online learning, the teachers' ability in using technology, and the content used by teacher to present the material during online learning. Besides that, there are 2 supporting questions to observe more details about the Learning Management System (LMS) used by teacher to deliver the material and find out more about each category of the teacher's ability. It used 5 points Likert scale which the criteria are very good, good, neither good nor poor, poor, and very poor.

### 2.3 Participants

The Participants of the research were all teacher of the elementary school in Sidoarjo, East Java. Data collected from 56 mathematics teacher in elementary school using a survey questionnaire. The sampling technique in this study used stratified random sampling because the population consists of several strata and the sample is taken at random from each of these strata. The school was chosen has similar characteristic in scale (large and small), availability of learning facilities, and location of the school.

### 2.4 Procedure

Procedure of the research was started by developing the questionnaire, we sent it to the teachers on the selected elementary school. It can be seen clearly on the Figure 1 below



Figure 1. Reasearch Flow Chart

### 2.5 Data Analysis

The data obtained will be processed and analyzed descriptive quantitative approach. Data analysis technique is the activity of grouping data based on variables and types of respondents, describe the data, test the requirements of the analyst. The data that has been analyzed will be presented in the diagram. The final step in the data analysis stage is drawing conclusions and verification based on data that has been obtained from various sources.

To describe the data for each variable, we used the following formula to determine the percentage of the ability of mathematics teacher in elementary school in using technology:

$$p = \frac{n}{N} \times 100\% \tag{1}$$

Then, we describe the characteristics of the result using these criteria, show on the Table 1.

**Table 1.** Percentage Criteria Range [23]

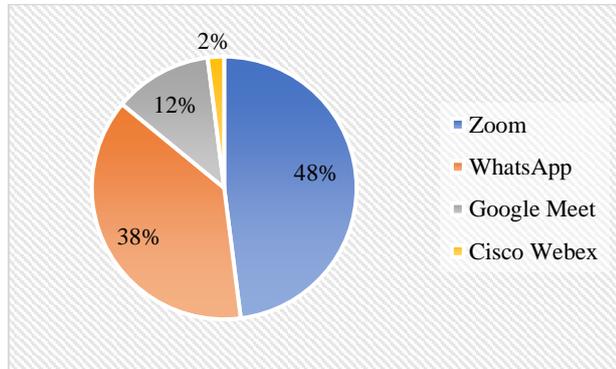
No	Percentage	Criteria
1	0 – 20	Very poor
2	21 – 40	Poor
3	41 - 60	Neither good nor poor
4	61 – 80	Good
5	81 - 100	Very good

## 3 RESULTS AND DISCUSSION

The data obtained from the research were from 56 mathematics teacher in elementary school in Sidoarjo. There are 5 results to prove the hypothesis that has been defined before.

**3.1 How Teachers Conduct Their Online Learning**

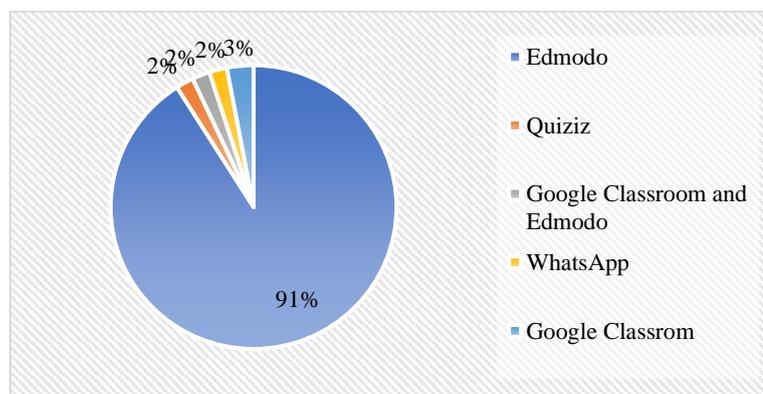
The teacher who fulfilled the questionnaire was conduct online learning during COVID-19 pandemic. They used various application or platform to deliver their learning content. There are two ways to conduct online learning, synchronous and asynchronous. A synchronous learning, teachers use some platform during the online learning. The data about the synchronous platform used by teacher can be seen from Figure 2.



**Figure 2.** Synchronous Platform Used by Teacher During Online Learning

Based on figure 2, there are several types of Synchronous platforms that used by teachers during during online learning. 48% of teachers use Zoom Meeting platform, 38% used WhatsApp, 12% used Google Meet, and 2% used Cisco Webex for online learning activities. It means that 62% of the teachers have done the synchronous learning process by using Zoom Meeting, Google Meet, and Cisco Webex. There are 38% of teachers used WhatsApp during online learning because of the teachers lack of ability to use synchronous platforms, such as zoom, google meet, etc. whereas the use of WhatsApp is very limited of function for teaching and learning process. It is not equipped with special features that are used for learning activities, such as limited number of participants and cannot directly share the material. So that, training is needed to improve the ability of teachers to use the synchronous learning platform.

Besides the synchronous learning, the teachers also used the asynchronous learning using the Learning Management System (LMS). The LMS used by teachers can be shown from Figure 3.



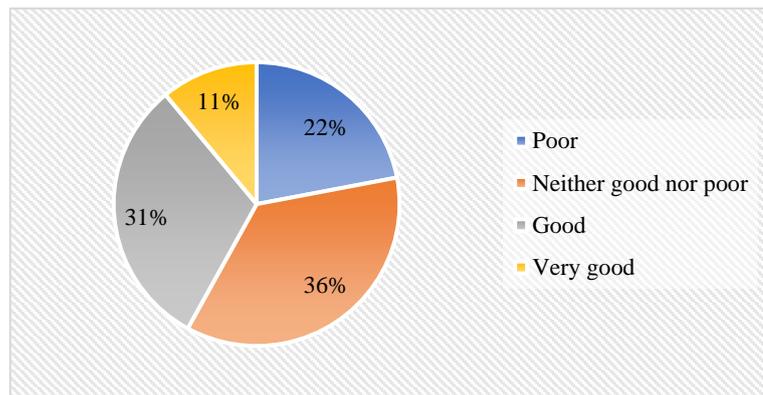
**Figure 3.** Learning Management System (LMS) Used by Teacher During Online Learning

Based on figure 3, it is known that the teachers prefer to use Edmodo to conduct asynchronous learning. 91% of teachers use Edmodo, 2% use Quizizz, and 2% use Edmodo and Google Classroom. The Edmodo has complete, attractive, and easy feature to use.

Most of the teacher used Zoom Meeting to teach, following by WhatsApp. Another video conference that familiar to use by the teacher is Google Meet. By using video conference, the teacher can deliver the material directly to the students. Sometimes it used to deliver the important or basic concept of the learning material. The platforms are easier to use and reach by both the teachers and students. Besides that, the teacher also uses Learning Management System (LMS) such as Google Classroom, Edmodo, etc to teach online. Edmodo is the most application used by teacher.

**3.2 The Ability of Mathematics Teacher in Elementary School in Using Technology During Online Learning**

The teacher’s ability in using technology is the main factor to held online learning. the data can be known from the Figure 4.

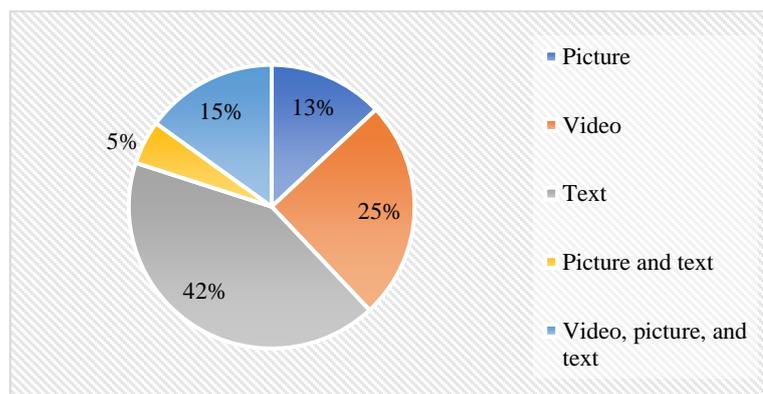


**Figure 4.** Percentage about The Ability of Mathematics Teacher in Elementary School in Using Technology During Online Learning

Based on figure 4, it is known that 36% of teachers have sufficient ability in using technology, 31% have good abilities, 11% have very good abilities, and 22% have poor abilities. It means that there are 42% teachers have been mastered in using technology, but 58% teachers required to improve their ability, especially in online learning management. From the fact that more than 50% teachers have a lack ability in online learning management, so that the implementation of the mathematics online learning in elementary school has not been carried out optimally.

**3.3 Kind of Content Used by Teacher to Present Online Learning**

The teacher can present their learning material in many kinds of contents. The data present on the Figure 5.



**Figure 5.** Content Used by Teacher to Present Online Learning

Based on figure 5, it is known that 42% of the content presented by teachers in online learning is in the form of text, 13% is in the form of images, 15% is a combination of all elements (video, image, text), 25% is video, and 5% is in the form of images and text. Mostly, teacher used text to present their learning material, due to the limited ability of teachers in managing learning content. As a result, the learning presented becomes very monotonous and less interesting. Thus, it is necessary to combine the content presented in the online learning, not only using text but also various content of presentation.

They convenience to provide content in text by using e-book or conventional book owned by students, such as BSE (Buku Sekolah Elektronik), followed by video. They are easy to serve by downloading from YouTube or the teacher just send the link of the video to the students by WhatsApp.

There are three indicators to analysing the teacher's ability in using technology. The indicators are (1) How Teachers Conduct Their Online Learning; (2) The Ability of mathematics teacher in elementary school in Using Technology During Online Learning; (3) Kind of Content Used by Teacher to Present Online Learning. Based on the result of the research, it can be discussed as follows.

Firstly, There are two ways to conduct online learning, synchronous and asynchronous. Teachers mostly conduct the online learning synchronously by using video conference, Zoom Meeting followed by google meet. Both of the platform is easy to use by either teachers or students. Its relative ease of use, cost-effectiveness, data management features, and security options [24], [25]. Otherwise, very limited teachers used Cisco WebEx to conduct the online learning. It is caused by the application is not too familiar to teachers and students, not compatible for every gadget. Septantiningtyas, et.al. took research that aims to find the effect of the Google meet application. The result of the research obtained that learning by using Google Meet has a positive impact on the students interest because it so convenience to use, flexible, and can be implemented everywhere [26]. Nasution (2021) stated that the online learning tend to get positive result by using google meet and quizziz [15], [27]. Many teachers also held online learning asynchronously using WhatsApp and LMS such as Google Classroom and Edmodo. Most of the teacher used WhatsApp to support their online learning. WhatsApp is the most familiar application used in daily live by students, teacher, and parents. The results of this study are coherence with the results of research conducted by Amin and Sundari (2020) that WhatsApp mobile messenger application receives more positive agreement and preferences [28]

Secondly, the ability of teachers to use technology is in the middle range. 36 % teachers are in the "Neither good nor poor" category. It means that majority of the teacher is limited to use video conference and LMS. They cannot develop teaching materials by utilizing technology, such as e-book and interactive multimedia. Ningsih (2021) find that the teacher were lack of preparation in providing learning material based on technology [29][30][18].

Thirdly, 42% teachers use text for content learning. They used e-book or conventional book owned by students. They are not mastered well to provide the content of learning based on ICT. Besides that, videos downloaded from YouTube are the main choice for teachers to use in delivering learning materials because they are easily accessible and have many choices. Agusriadi (2021) was found that the implementation of Zoom Meeting integrated with YouTube was successful with a high level of attendance of the participants, a level of likeness that was evenly distributed in all material presented by the resource persons, and a very high level of satisfaction with the guidance committee services [31]. By using YouTube, learning becomes more interesting and increases the

positive stimulation of students to learn English [32]. The third content used is integrated text, picture, and video. It presented by Slide on Power Point.

This research was conducted limited to the general knowledge about the ability of the teachers in online learning management, so it is necessary to carry out further research to identify the factors causing the low ability of teachers and to find out the solutions about improving teachers' ability in managing online learning.

#### 4. CONCLUSION

Based on the data analysis and discussions, we find that the most teachers in schools still use WhatsApp and google meet or zoom media in conducting online learning. It showed by Synchronous platform mostly used by teacher during online learning is Zoom. Then LMS mostly used by teacher during online learning is Edmodo. Elementary school teachers still have not mastered learning technology well. That known from the data of The Ability of Elementary School's Teacher in Using Technology During Online Learning showed 36% teachers are in the "Neither good nor poor" category. Most teachers are limited to using video downloaded from YouTube, PPT and conventional books to present learning materials. The data from instrument of content used by Teacher to Present Online Learning showed 42% teacher used text content. 25% teacher use video from YouTube. Then 15% teachers use text, video, and picture served by PPT.

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