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Mathematics Learning during the Pandemic Era in Elementary School (Teacher's Perspective)

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Abstract. This research aimed to analyze and describe mathematics learning during the pandemic at the Elementary School (SD) level from the teacher's point of view. The research approach used was quantitative through survey methods. Data were collected by a questionnaire and analyzed by descriptive statistics. The research subjects consisted of 60 respondents who worked as elementary school teachers. The results showed that teaching materials, methods, media, and evaluation tools in teaching mathematics during the pandemic were quite varied. The types of complicated mathematics learning to teach were principled learning and problem solving, with the kind of error students often make a technical error (calculation procedure). The obstacles experienced by teachers include students who do not understand the material, limited time, limited parental assistance, and limited facilities and infrastructure. Referring to these obstacles, the teacher believed that to make mathematics learning effective, they need to explore the selection of methods and media, approach with parents, complete facilities and infrastructure, master technology, and time management.

Keywords: Mathematics, Elementary School, Pandemic, Teacher Perspective.

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INTRODUCTION ~ The pandemic has lasted more than a year. It has impacts on various fields, one of which is education. Following up of that, four Indonesian ministers, namely the Minister of Education and Culture, the Minister of Religion, the Minister of Health, and the Minister of Home Affairs, launched a Joint Decree (SKB) regarding guidelines for the implementation of learning during the Covid-19 pandemic (SKB 4 Menteri RI, 2021). The regulation states that learning can be done face-to-face and distance learning (PJJ), which is adjusted to the conditions of each region. The form of distance learning that takes place online or through digital media has two mediums (Joosten, 2017), namely: synchronous and asynchronous is called online learning. Synchronous is a learning process that occurs in real-time. In this context, Chaeruman (2013) says that learning occurs simultaneously but in different space/place dimensions. While asynchronous is learning that gives students flexibility in where and when they know. Online learning reaps various obstacles. As Fauzi dan Sastra Khusuma (2020) mentioned, teachers understand the online learning context. Still, multiple problems are found in its implementation, including 1) availability of facilities, 2) use of networks and the internet, 3) planning, implementation, and evaluation of learning, and 4) cooperation with parents.

Researchers conducted a preliminary survey related to learning in elementary schools (SD) during the pandemic. As many as 74% of 72 teachers said that mathematics was the most challenging subject to be taught during the pandemic. A. Fauzi et al. (2020) mentions that the constraint factors for online mathematics learning for students are: (1) the limited space for interaction with the teacher, (2) the number of formulas used in

mathematics, (3) the objects studied in mathematics have an abstract pattern. At the beginning of the pandemic, Wiryanto (2020) conducted research related to the process of learning mathematics in elementary schools. He mentioned that the Covid-19 pandemic positively impacted technology literacy by getting to know various face-to-face applications and the convenience of learning places because it can be done anywhere. The negative impacts are students' lack of deep understanding, students cannot collect assignments on time due to lack of communication tools, soaring needs for internet quotas, and the learning process being very dependent on signals. How is the online learning process for elementary mathematics after a year of the pandemic? This question is the background for researchers to conduct research related to elementary mathematics learning during the pandemic from the perspective of elementary school teachers.

METHOD

Researchers used a quantitative approach with a survey method. A quantitative approach is a research that involves the study of samples and populations and relies heavily on numerical data and statistical analysis (Borg et al., 2014). The survey method quantitatively describes several population tendencies, behaviours, or opinions by examining a population sample (Cresswell, 2019). Data was collected by using an online questionnaire in the form of a google form. A questionnaire consists of a number of questions printed or typed in a definite order on a form or set of forms. (Kothari, 2004). The questions on the questionnaire contain methods, media, learning resources, learning materials, obstacles, and levels of difficulty in learning mathematics, as well as things that need to be improved to make mathematics learning effective during the pandemic. The data collected will be analyzed descriptively. Descriptive statistics are those that describe your data set and give you some indication as to the frequency of how often things occur, for example, how often a specific symptom or event occurred for a young person (O'Reilly et al., 2018). The data is processed with the MS. Excel and presented in the form of presentations, graphs, and tables. Respondents were taken from elementary school teachers who teach in Java and Sumatra and returned 60 teacher.

RESULTS

The number of respondents was 60 teachers consisting of 9 first grade teachers, 8-second grade teachers, 9 third grade teachers, 8 fourth grade teachers, 13 fifth grade teachers, and 13 sixth grade teachers. The number of students in one class is 8-45 students. The following are data methods that teachers often use when learning mathematics during a pandemic.

Table 1. Types of Teaching Materials that are often used

Types of Teaching Materials	n
Cetak	50
Audio	11
Audio visual	33
Interaktif	27

Table 2. Frequently used methods

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Methods	n
Telling	37
Disscussion	32
Demonstration	32
Recitation/Resume	7
Experiment	11
Game	32
Other	5

Table 3. Types of media that are often used

Types of media	n
Real thing	30
Human	7
Model	15
Text	23
Visual	36
Audio	3
Multimedia	35

Table 4. Frequently used application types

Application types	n
Whatsapp	57
Zoom Meeting	21
Google Classroom	17
Google Meeting	15
Email	1
Telegram	1
Other	12

Tabel 6. Frequently used types of test evaluation platforms

Platform evaluation	Jumlah guru
Collection of answers via the application	52
Google form	31
Quizizz	16
Kahoot	3
Other	6

The following data is the level of difficulties in learning mathematics and the delivery of mathematical material during the pandemic. The score criteria are as follows.

0-1 = Very Easy
1-2 = Easy
2-3 = Medium
3-4 = Difficult
4-5=VeryDifficult

Table 7. Difficulties level of learning mathematics during the pandemic

Indicators	1	2	3	4	5	Amount	Average
Determination of learning methods		15	37	8		173	2,88
Determination of learning media	1	14	35	9	1	175	2,92
Preparation of teaching materials	2	20	32	5	1	163	2,72
Class management		11	31	15	3	190	3,2
Study assessment	3	13	36	6	2	171	2,85
Overall average						174,4	2,9

Table 8. Difficulties level of mathematical material delivery during the pandemic

Indicators	1	2	3	4	5	Amount	Average
Teaching concepts	2	15	31	10	2	175	2,92
Teaching procedures	1	4	29	22	4	204	3,4
Teaching strategies	1	4	29	18	8	208	3,4
Overall average						195,7	3,26

Then, the data submitted is the type of error students often make in learning mathematics during the pandemic. These are the criteria:
0-1 = Very rarely
1-2 = Rarely
2-3 = Medium
3-4 = Often
4-5 = Very Often

Table 9. Types of math errors that students often experience during a pandemic

Indicators	1	2	3	4	5	Amount	Average
Conceptual error	2	9	30	17	2	188	3,1
Symbol error	0	17	26	15	2	182	3,0
Technical error	1	5	24	25	5	208	3,5
Overall average						192,7	3,2

DISCUSSION

Learning Components

The learning components include objectives, teaching materials, methods and media, evaluation, students, and educators Curriculum and Learning MKDP Development Team, 2015). Learning objectives are a target to be achieved by learning activities. There are two learning objectives, namely: general learning objectives and specific learning objectives. This goal is formulated based on the learning to be taught. Teaching materials are learning resources that have been systematically processed and arranged to facilitate the learning process (Kurniasih & Arisetyawan, 2019). The forms of teaching materials include print, audio, audiovisual, and interactive teaching materials (Diknas in Prastowo, 2015). Printed teaching materials are materials prepared in a paper form such as handouts, books, modules, student worksheets, photos, brochures, etc. Audio teaching materials are teaching materials that can be heard, such as cassettes, radios, LPs, and audio compact disks. Audiovisual teaching materials are audio teaching materials combined with images such as videos and films. Interactive teaching materials are a combination of two or more media (audio, text, images, animation, and video) that users can control. For example, interactive compact

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disk. Referring to table 1, the teaching materials that are often used by teachers during the pandemic are printed teaching materials (83%) and audiovisual teaching materials (55%). Printed teaching materials that are often used are books and modules. At the same time, audiovisual teaching materials are in the form of learning videos. Based on research, audiovisual teaching materials can improve student learning outcomes in mathematics (Legendari & Raharjo, 2016).

The following components are methods and media. There are various learning methods in elementary schools (Lestari, 2020), namely: lectures, discussions, demonstrations, recitations, experiments, game methods and so on. The lecture method is the most conventional, namely by conveying information orally to students. This method is the most practical and economical, but it has drawbacks, one of which is that students become more passive. The discussion method is a teaching method that puts forward discussion activities in learning to solve problems. This method is done by forming students into small groups. The demonstration method is carried out in a practicum form so that students see firsthand what is being learned. This method can make students focus on the subject matter. The recitation method requires students to make a resume about the material that has been delivered by the teacher. The resume is written in your own words. The experimental method is carried out with practical activities or laboratory experiments to see the subject matter directly. The game method allows students to play while learning. Referring to table 2, more than 50% of elementary school teachers use telling, discussion, demonstration, and games as learning methods. It shows that the methods taught have varied.

Learning media is anything that can be used to achieve learning objectives. Batubara (2020) mentions the types of learning media, including 1) Real objects in the form of animals, plants, natural surroundings, and so on that humans can observe. 2) Humans, namely people who are asked to convey or demonstrate information. 3) Models, namely artificial objects that are three-dimensional, such as miniature buildings, globes, and so on. 4) Text is a series of letters or numbers such as textbooks and storybooks. 5) Visual, namely graphic materials that convey information through the sense of sights such as pictures and charts. 6) Audio is a tool that conveys information through hearing, such as news on the radio, information from MP3, and information from recordings. 7) Multimedia are resulting from computer technology that assembles several media types into one media series. Such as video (a mix of audio and visual) and the internet. During a pandemic, the media often used in elementary mathematics learning is 60% visual media, 58% multimedia, and 50% real objects (table 3).

The next component is evaluation. This evaluation was conducted to determine the achievement of learning indicators (Curriculum and Learning MKDP Development Team, 2015). Refer to table 4 WhatsApp application is the most used application (95%). Then in table 5, the type of test evaluation platform that is often used is the collection of answers via applications (87%) and google forms (52%). It implies that during the

pandemic, teachers and students are technology literate.

Learning Mathematics Difficulties

In this study, the researchers divided the difficulty of learning mathematics based on the learning components. The indicators studied included: determination of learning methods, determination of learning media, preparation of teaching materials, classroom management, and learning assessment. Among these indicators, the indicators that fall into the difficult category are classroom management with a score of 3.2 out of 5. The other three indicators are in the moderate category with a score of 2.72-2.92 out of 5. Overall, the difficulty of learning mathematics during the pandemic is medium category (table 6).

There are 5 proficiencies of math skills where the five components are interrelated (National Research Council, 2010): 1) Conceptual understanding includes understanding mathematical concepts, arithmetic operations, and relationships. 2) Procedural fluency is skills in carrying out procedures flexibly, accurately, efficiently, and precisely. This skill refers to when and how the procedure is performed. 3) Strategic competence, namely the ability to formulate, represent, and solve mathematical problems. These competencies need to be honed using practice. 4) Adaptive reasoning is the capacity to think logically about the relationship between concepts and situations. This component acts as an adhesive and a guide in mathematics. 5) Productive disposition: the tendency to see mathematics as reasonable, helpful, and valuable and have a passion for learning mathematics. Of the five skills, the researcher chose three skills to determine the difficulty in practising these skills: understanding concepts, mathematical procedures, and strategic competencies. Based on table 7, procedural and strategic skills are in the problematic category, and concept understanding is in the medium category. Overall these three skills fall into the category of difficult to teach.

Errors in mathematics can be factual, procedural, or conceptual and may occur for a number of reasons (Fei Lai, 2012). Referring to it, three indicators of quality errors were made, namely conceptual, symbolic, and technical errors. Conceptual errors include misinterpreting terms, properties, facts, concepts, and principles. Symbolic error is an error in the arrangement of symbols in the processing step. Technical errors are errors in understanding the questions and choosing formulas. The three types of errors are included in students' frequent mistakes (table 7). Technical error is the most common doing by students. It is in line with Suciati (2019) that students often make mathematical arithmetic operations, which are process skills.

Teacher Obstacles and Expectations

Refers to google forms that have been shared. Most of the obstacles experienced by elementary school teachers in learning mathematics include: students do not understand the material, limited time, limited parental assistance, limited facilities and infrastructure. Then the respondents mentioned that things that need to be improved so that learning becomes more effective during the pandemic are: the selection of methods and media, approaches with parents,

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complete facilities and infrastructure, mastery of technology, time management. It is in line with the research of Fauzi dan Sastra Khusuma (2020) that the problems encountered are 1) the availability of facilities, 2) the use of networks and the internet, 3) planning, implementation, and evaluation of learning, and 4) collaboration with parents. It is also supported by research by Tay et al., (2021) that in a pandemic situation, technology plays a core supporting role in the teaching and learning process.

CONCLUSION

Elementary mathematics learning during the pandemic has used quite a variety of learning tools. Learning tends to use printed and online learning resources with printed and audiovisual teaching materials. The often-used methods are telling, discussions, demonstrations, and games with visual media, multimedia, and real objects. Applications that are often used in learning are WhatsApp and Zoom Meetings. Applications that are often used for learning evaluation are sending answers via applications and google forms.

The pandemic has given its difficulties in learning mathematics in elementary school. The types of material that are difficult to teach are principles and procedures. The mistakes that students often make are technical errors. Obstacles teachers experienced during the pandemic include: students do not understand the material, limited time, limited parental assistance, limited facilities and infrastructure. Referring to these obstacles, teachers argue that to make learning effective, they need to explore the selection of methods and media, approach with parents, complete facilities and infrastructure, mastery of technology, and time management.

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