

# Mathematical Learning Design in the Pandemic Covid-19

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## Mathematical Learning Design in the Pandemic Covid-19

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**Abstract.** The COVID-19 pandemic has become an epidemic that has changed the entire fabric of human life. All countries in the world are doing their best to be able to handle this epidemic properly, including Indonesia. Various kinds of appeals have been given by the government to prevent the spread of the virus from spreading. One of them, all learning activities at school for a while. Learning takes place online during the COVID-19 pandemic. This certainly poses a challenge for teachers to always look for the best way to convey material, especially mathematics, which is not complete without using a blackboard or direct learning. The need for teachers to design mathematics as well as possible becomes homework that must be based on the pandemic. The goal is that students can understand well the material being taught. This article will discuss learning designs that can be done during a pandemic, discussing in detail the steps that can be taken so that online learning can run well. At least this learning lesson can be used as a research innovation in the future whether the learning design can run effectively or not.

### 1. Introduction

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COVID-19 is an epidemic that has changed the pattern of human life. Habits that have been running for so long must change due to the COVID-19 outbreak. The plague that started in China, spread so quickly from one human to another, that without realizing it, this epidemic became an epidemic that spreads across countries. Through this epidemic, everyone is concerned about their health. Regulate a healthy lifestyle so that the body's immunity is maintained. WHO advises to always use masks, wash hands and maintain distance between people to avoid the dangers of COVID-19 (Septiani 2020).

The government has been working to reduce the spread of COVID-19 so that it does not spread. President Jokowi appealed to work from home, worship at home, and study at home (Intan 2020). This is so that everyone is willing to keep their distance, and that COVID-19 does not become more widespread. The Minister of Education and Culture Nadiem Makarim also instructed through the Ministry of Education and Culture Circular No. 36962 / MPK.A / HK / 2020 that during the pandemic the learning has not ended (Kemendikbud 2020). He stated that safety and health during a pandemic is a top priority. (Makdori 2020)

At the end of 2020, Nadiem Makarim also instructed again that online learning in areas with yellow and green zones could be ended, provided that they continued to pay attention to health protocols and the approval of the COVID-19 response task force. Another case with the red zone area. Online learning is still being done for mutual safety. In practice, learning online is certainly not free from various problems. For example, first, parents are stressed because they cannot accompany their children to study because parents do not understand the material at school (Hermansyah 2020) Second, there is a lack of motivation for students to study at home, because they realize that there is no pressure at home to study at all, but instead they just do their own thing. Taking everything for granted, because those who have the burden of collecting tasks are their parents (Cahya, Supriono, and Prihatnomo n.d.) This condition is

prone to stress for parents to take part in online learning. Keempa, teachers who only give assignments without any guidance (Hakim 2020)

Learning mathematics cannot be separated from the obstacles that have been described above. At the elementary school level (SD) mathematics must of course be taught using media as a tool because according to Piaget, the intellectual development of students at the age of 6-11 years they are at a concrete stage (Wiryanto 2020). So that abstract mathematical concepts will make it difficult for elementary school teachers to transfer material to students if it is done without media. This situation requires teachers to teach mathematics not only to provide notes, make summaries, students do assignments, and collect them. Learning in junior high or high school is certainly not enough to just give students a summary of the material, students are asked to learn on their own about certain subjects without any explanation regarding the material. Then given an evaluation without any reward or feedback on what the students were doing.

We all don't know when this pandemic will end, it could be another year or maybe two years. Conditions like this require us as educators to think about how to effectively realize mathematics learning in a pandemic. A lesson is said to be effective if the teacher is able to change students' perceptions about a material that was previously difficult, to become easier to understand. The teacher is also able to analyze student needs, namely the relationship between the abilities possessed by students and the desired expectations to be achieved in the learning process. And teachers understand how evaluation is carried out to determine learning outcomes (Suyanto and Jihad 2013) Analysis of student needs in learning during a pandemic is certainly homework for teachers. Why is this necessary? The goal is only one so that students can achieve learning goals well during a pandemic.

Mathematics learning during a pandemic can be effective if the teacher also pays attention to several things such as the method used. Why should this be considered? The method plays an important role so that students can be well motivated in participating in learning. If students are well motivated, of course online learning can run optimally. Teachers must also understand applications that can be used by parents of students to support online learning. For example, teachers cannot force parents to understand Google classroom if they are unable to operate. Educators must take definite steps regarding applications that can be used to support online learning provided that parents are able to use the application. So that parents of students can participate in the success of learning mathematics virtually. The role of parents in a pandemic can be realized as teachers at home to help students understand the material, and as a motivator for students to always provide support when students are bored or lazy to learn (Cahyati and Kusumah 2020) Cellphone networks are not optimal in every student residence as well. have an impact on the use of existing student mobile applications (Anugrahana 2020). So, teachers also have to determine which applications can be used even though the network is not equivalent to 4G.

This article is written with the aim of providing a solution in designing learning during a pandemic. This article will discuss the steps that teachers can take to realize effective online learning in mathematics with the support of existing literature in books or journals. It is not necessarily possible to answer all the problems that the authors describe above. However, at least it becomes a written idea that can be used by the teacher in virtual teaching or as a research idea to test the effectiveness of the learning design that I have proposed. That way, this idea can be a contribution to the repertoire of science to realize learning during a pandemic in mathematics.

## 2. Method

The author uses the literature study method in completing this article. The author examines various problems encountered both through journals, online daily media, and the author's experiences while watching online learning. To solve this problem, the author provides a solution supported by literature that comes from articles published in journals, as well as books that are able to answer the problems that the author describes.

### 3. Result and Discussion

The teacher's dream to create effective online learning. Of course this is intended so that students can understand the material well. In order to realize effective mathematics learning during online learning, the teacher must meet several requirements, namely. (Suyanto and Jihad 2013)

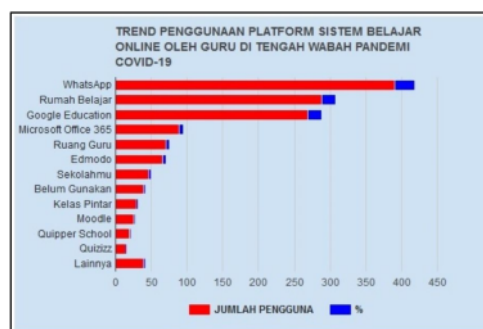
1. Teachers must be able to analyze student needs in online learning.

Analysis of student needs to be done in order for the teacher to know the abilities and what students expect in learning. This needs analysis can be done with a questionnaire, interview, or other method that can reveal students' conditions during online learning so that teachers can also respond to what is available to develop online learning to be more effective. (Reni and Hawadi 2010)

2. The teacher must be able to convey how learning evaluation is carried out. Learning evaluation is an effort made by the teacher to determine the extent to which student learning outcomes include concepts, attitudes, values and process skills (Nuriyah 2014). Learning evaluation needs to be delivered with the aim that students can be motivated to take part in what can be done.
3. Teachers must be creative in teaching virtually. Several things that can be done, namely by creating a good combination of synchronous and asynchronous learning. Synchronous learning is learning that is done by creating virtual classrooms so that students can ask questions properly if they do not understand the material that has been discussed while asynchronous learning is learning that is carried out through an independent learning approach through several ways such as communicating via email, online discussions, as well as making videos posted on discussion forums. However, the thing that needs to be known in asynchronous learning is that there is timely feedback and clear communication so that students can be involved in it (Adawiyah 2020)

So how do you design mathematics lessons during the COVID-19 pandemic? In the following, the authors describe the steps that can be taken in learning mathematics during a pandemic.

1. Make the module easy for students to understand. The model made must meet several requirements such as knowing clear and specific learning objectives so that students can understand well the material to be conveyed. The modules made are of course in accordance with the existing curriculum in the educational unit. For example, at the university level lectures consist of 16 meetings. So the lecturer must be able to design how the module can be delivered properly during 16 meetings. How about elementary to middle school? The teacher, of course, must know how to arrange the right time allocation so that learning can be carried out optimally. Because basically online learning is the same as learning as usual. It's just that this is assisted by internet media. (Sobri, Nursaptini, and Novitasari 2020)
2. The teacher must know what applications can be used by students and parents. The author here advises teachers to use WhatsApp. Why should WhatsApp? Quoting from the results of a survey by the Lembaga Penjaminan Mutu Pendidikan (LPMP) East Java, it was stated that 28.14% used WhatsApp in online learning compared to several other applications.



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Figure 1. Trends in the use of online learning platforms during the pandemic



WhatsApp is also an application that is easily accessed and used by most people in Indonesia. The users consist of school children, students, workers, teachers, and parents. No wonder Indonesia is in the top 3 WhatsApp users in the world (Fajrina, 2020). Its use will not make it difficult for parents of students. Parents of students can also control all tasks on their children's WhatsApp because parents are used to using WhatsApp. In learning WhatsApp can be used as follows.

- a. Create discussion groups to discuss material that students do not understand. some of the benefits of discussion in learning, namely:
    - Students have a sense of tolerance to respect the opinions of others
    - Train students to get used to expressing opinions and exchanging ideas for the achievement of learning objectives
    - The creation of active learning
    - Students can have self-confidence (Khasanah 2020)
  - b. Post material in the form of pdf, word, learning videos.
  - c. Informs assignment or schedule zoom meeting to create virtual class..
3. Creating a virtual class at Zoom Meeting or Google Meeting in order to deliver material in person. In this virtual class, students have the opportunity to receive the material discussed. The teacher has the opportunity to deliver the material presented in the module or Power Point that has been made. The author advises teachers to use a pen tablet in explaining to students. Pen tablets are computer hardware that can be used for drawing (Guide, 2020). Why do you need a pen tablet? With a pen tablet the teacher can explain difficult material as explained on the blackboard. So that students can also record what the teacher explains as he follows the real classroom learning.



Figure 2. Pen Tablet

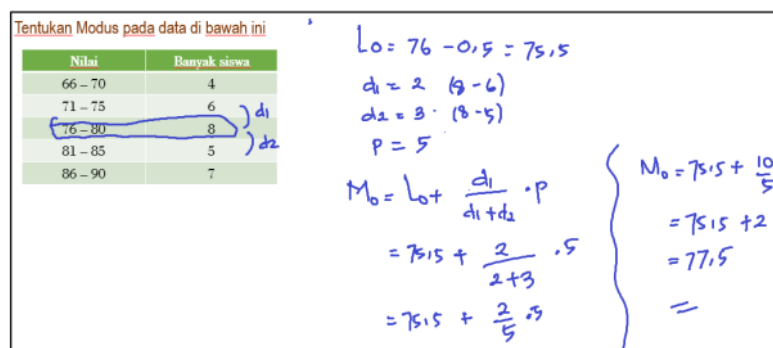


Figure 3. Explain using a pen tablet on statistical material

4. Using google form as an evaluation of student learning outcomes and collection of student assignments. Why not only do the assignment collection via WhatsApp? With Google Form, student assignments will be more organized on Google Drive. Please note that tasks must be scanned using CamScanner in PDF format. The advantage of Google Drive is that files will not be deleted if the cellphone suddenly has an interruption in online learning. Files will remain safe

and can be accessed anywhere. Teachers can make corrections easily because Google Drive can easily access files in pdf format (Ardy M 2018). In terms of student learning evaluations, Google Forms can also be easily accessed by all students on either cell phones or computers by sharing the link on the WhatsApp group that has been created.(Amalia 2013)

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**Figure 3.** Display google form for assignment submission or learning evaluation in the form of essay test

5. Give feedback (feedback) as soon as possible. Feedback here is defined as giving grades to student assignments in a short time. If the teacher does not provide feedback, this can damage student motivation (Sapta 2012) Research conducted by Sabriani states that the structured assignments given if accompanied by feedback can increase motivation and student learning outcomes at SMAN 3 Wantampone (Sabriani 2012). Feedback should be done within a short period of time after the assignment is submitted. That way, students will be motivated by the value they get.

The following is the syntax of online mathematics learning that can be done with the aim of realizing effective learning.

1. The teacher makes teaching materials tailored to the learning objectives and curriculum in each educational unit.
2. The teacher makes groups of students who are taught
3. The teacher informs students of the learning schedule virtually with a Zoom or Google Meet link. During the virtual class, the teacher can use a pen tablet to explain to students. It is as if students are taking lessons in class even though they are assisted by the internet
4. The teacher gives students the opportunity to ask questions via chat on WhatsApp groups or privately with an agreed duration of time. At this stage, students and teachers discuss with students to discuss material that students do not understand or do not understand.
5. The teacher gives assignments to students in accordance with the learning objectives to be achieved
6. The teacher shares the assignment collection link on the WhatsApp group that has been created
7. The teacher announces the grade along with comments on the progress made by students through the WhatsApp group

#### 4. Conclusion

The COVID-19 pandemic has changed the way we live, starting from keeping the environment clean and always paying attention to the health of our bodies with a healthy lifestyle. This outbreak has also transformed the education system in Indonesia into online learning. Various problems arise over time. This needs to be addressed properly so that learning can run effectively. The author describes 7 steps to learning mathematics online by combining various applications such as WhatsApp, Zoom / Google Meet, google form, and a pen tablet to explain to students about math material that needs to be taught with steps that are usually presented on the blackboard. The steps that the authors describe above are certainly not necessarily effective if they are applied at the educational unit level. However, at least this becomes a written idea to solve various problems that exist in online learning. in addition, researchers can utilize this idea as a research to determine the effectiveness of the steps in learning mathematics in the network that have been described above

#### 5. Acknowledgement

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