JTAM (Jurnal Teori dan Aplikasi Matematika)
http://journal.ummat.ac.id/index.php/jtam
p-ISSN 2597-7512 | e-ISSN 2614-1175
Vol. 6, No. 4, October 2022, pp. 876-892

Impact of Unprepared Competence and Difficulty in Competence of Mathematics Teachers During Online Learning

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Article History:
Received : 14-06-2022
Revised : 19-08-2022
Accepted : 23-08-2022
Online : 08-10-2022

Keywords:
Teacher Competency Assessment;
Mathematics Competency Difficulty;

ABSTRACT

The purpose of this study was to determine the form of teacher readiness and difficulty when implementing the mathematics curriculum in high school, measured from four teacher competency assessments. Schools in Indonesia are still 50% learning from home until 2022, this situation has an impact on the achievement of student learning outcomes. In 2020, the ministry conducted a survey of 4000 students and the results of the survey and out of 100% of the participants, 58% were of the opinion that online learning was ineffective, 38% lacked attention from the teacher, 35% had poor communication, 62% had poor internet access, and 80% had difficulty learning mathematics online. The method in this research is descriptive qualitative. The technique of collecting data is by means of field observations, interviews and collecting documentary evidence. Data analysis techniques by presenting data, data reduction and intersecting data are drawn into conclusions. The number of people who were observed was 2 with a total of 58 and 13 people interviewed sources. Findings, difficulties arise from unprepared pedagogic competence and professional competence. Teachers have no self-constructed modules, difficulty writing symbols and mathematical proofs online. Students provide an assessment of teacher competence online, from 100% of respondents 80% disagree with pedagogic and 90% disagree with professional competence. This is due to the lack of readiness of the two competencies. In conclusion, online learning is expected by students and teachers to have their own modules. Students argue that the teacher's difficulties when writing symbols, providing examples of questions and proving mathematical formulas can be written in modules and modules can be given to students to study at home.

https://doi.org/10.31764/jtam.v6i4.9164

A. INTRODUCTION

Basically, the responsibility of a teacher is not only to educate the character of students, but also to ensure that students get good results by means and processes of curriculum learning (Burbules et al., 2020). The teacher prepares the material well according to the curriculum which is the main standard (Akala, 2021). PISA is of the opinion that from year to year the achievement of teachers in the mathematics learning process has been categorized as good throughout the world (Hopfenbeck et al., 2018) . However, in December 2019, the COVID-19 disease emerged, causing new problems for the world community, especially Indonesia, which until 2022 had not been completed and the negative impact on education was very significant. Maintaining the success of the curriculum during the conventional implementation process is not easy, due to the COVID-19 virus which is increasing day by day. This type of virus is the Corona virus which spreads quickly (Widodo et al., 2020). This virus

is categorized as a new disease, ranging from ordinary symptoms such as flu, cough, and loss of sense of smell, difficulty breathing to the stage of death (Widodo et al., 2020). This virus has spread quite widely to various regions in Indonesia, this is because it can be transmitted through a virus attached to this object from saliva, sneezing or coughing that has been exposed to this disease (Haas et al., 2020). The lack of clarity of information creates speculation and has a major impact on community activities, especially in the field of education. Indonesia itself is experiencing obstacles in the educational process both at schools and at universities. It is not only the learning process that is problematic but has reached the administrative stage which is not well coordinated. The survey conducted by the Indonesian Ministry of Education and in collaboration with the UNICEF institution on 29 May 2020 and continued on 8 June 2020, received from 4,000 people, from 34 provinces spread throughout Indonesia. The survey results found that 58% of students were burdened during the implementation of online learning, 38% of students thought that the lack of guidance and direct communication from the teacher, this is the first and main problem (Nurgiansah, 2021), 62% of students need smooth internet access, this is deemed necessary in the activities of a good learning process. Basically, communication tools and learning process aids have often been developed by experts on the internet, meaning that online learning is not the cause of the failure of curriculum implementation (Nurgiansah, 2021), but the reality in the field is not like the theory.

The early history of the emergence of the term online in the 1980s, another understanding that can be recognized by the world of education is e-learning (Nurgiansah, 2021). Around 188 countries in the world have used online education processes, internet schools, TV schools, and learning mentoring processes. Various methods that can be used such as Zoom, Slack, Google Meet, Google Classroom and Edu Page, this media can be used as a direct communication tool (Pokhrel & Chhetri, 2021). The development of e-learning learning systems in Indonesia has developed since the beginning of 2015, but is still relatively minimal in its development in the field of education. This is because not a few people think that such models and methods do not provide convenience in implementation (Carlos & Pagliara, 2019). In research conducted by (Carlos & Pagliara, 2019) shows, the situation of the transition of learning from the face-to-face process to the online method 60.5% of students are ready to adapt and able to use technology as a learning tool, but 59% object to the assignments given by the teacher. The given task resulted in a stress level of about 60% of students. We conducted limited interviews with several mathematics teachers and 80% thought distance learning had difficulties during the online mathematics learning process. The teacher also said that the implementation of the learning process during this pandemic did not match the expectations of the curriculum. The learning outcomes obtained by students during the pandemic did not prioritize quality in the learning process. Related to this, there is a gap between the teacher's opinion and expectations of the curriculum (Cahyani et al., 2021). Another fact was also discovered by (Lumbantoruan & Male, 2022) that the online education process during the COVID-19 pandemic showed as many as 92% of students had difficulty interacting and experienced many obstacles during the online learning process. SMRC Public Policy Manager, Tati D. Wardi said 5% admitted that they were still in school and learning, 87% of the total respondents were learning online, while 8% were not studying. Of the

respondents who studied online, 92% had enough problems and difficulties and continued in 2022.

Government policies enforce learning from home, encouraging educators to look for appropriate models and strategies and what media can be used in learning from home. Another problem that arises is in areas of Indonesia where it is difficult to get an internet connection (Lumbantoruan & Male, 2022). Not all regions in Indonesia enjoy a smooth internet connection and not all students have communication tools such as cellphones or laptops. This only creates new problems and results in students feeling lazy and stressed because they cannot access and understand the subject matter provided by the teacher smoothly. As a result, teaching and learning activities are not carried out effectively as conventional methods (Lumbantoruan & Male, 2022). While the core of the curriculum itself is to have cognitive, affective, psychomotor abilities and at the same time the orientation of the character formation of students (Albus et al., 2021). The government and the people of Indonesia realize that the curriculum is an important foundation in the education system in Indonesia. The main and first objective of the curriculum is to achieve the national education process by taking into account the development of students, the needs of national development, as well as the development of science, information technology, and cultural arts. Educational problems faced today make it difficult for teachers and are not ready to implement the curriculum used so far, even though in Law Number 14 of 2005 concerning Teachers and Lecturers Article 10 paragraph (1), the success of a teacher is measured by four competencies, namely Pedagogic, Professional, Social and Personality (Mahfud, 2019). In achieving success, there are two main factors in implementing the curriculum, the first determining factor is the suitability of the competence of educators and education personnel with the ability to prepare materials in accordance with the curriculum. In this case, an educator really mastered the professional competencies being taught. The second determining factor is divided into three elements, namely (1) the availability of textbooks or textbooks used by educators as the main material in the formation of materials in accordance with the curriculum; (2) the role of the government in providing assistance, guidance and supervision; and finally (3) strengthening school management and school culture. The 2013 curriculum requires teachers to carry out learning activities based on integrative thematics and a scientific approach (Handarini & Wulandari, 2020).

The Mathematics Education Study Program once held a discussion session with students of senior high school which was conducted online. The surprising thing is that many students answered that online mathematics learning did not attract interest in learning more deeply. This opinion of students contradicts the theory which states that the material presented must be able to attract interest in learning. In the discussion session, students also admitted that their grades were good but did not understand the material being taught. This is a big question, why learning outcomes are high but students do not understand the material being taught. The opinions of students at Yadika High School are in line with the survey and several previous studies. However, the survey did not mention high learning outcomes. The difference between opinions and real facts in the field makes this research conducted at SMA Yadika 11. The purpose of this study is (1) to find out how the form of readiness and the location of the difficulty of mathematics teacher competence in implementing the curriculum which is

carried out online? If the first question has been answered; (2) how are the forms and methods of assessment of mathematics teachers in assessing student learning outcomes during online learning; and (3) to find out how the solutions used by mathematics teachers in dealing with difficulties when implementing mathematics material online?

Norman (2014) the word difficulty comes from the word "difficult" which can be interpreted as someone who is in a situation where the process is not going well. From this understanding, it can be interpreted that the word difficulty arises because of obstacles in designing and implementing the material. The teacher profession has special skills, the teacher is a resource who is able to solve obstacles and overcome difficulties (Naranjo et al., 2020). The teacher takes the role of a facilitator, as a person who is obliged to foster students in a better direction (Lumbantoruan & Male, 2020). The three main tasks of an educator are the duties of the profession, society, and the task of humanizing humans. The teaching profession is expected to be able to develop professional knowledge in teaching and training students at a divided level. Teachers are expected to be able to master their knowledge and apply assistance or carry out development in accordance with technological developments. In the world of education, a teacher is expected to have special expertise in his field to apply it in difficult times such as a pandemic situation. The last stage is that the teacher is expected to be able to humanize humans, meaning that the teacher cannot distinguish between a person's abilities or circumstances in educating students. A teacher must set an example that can be imitated by students how a good attitude is shown by an educator.

Late (2021), the learning process from not knowing to mastering, unable to be capable and the recipient of information being a source of information. The learning process is also defined as a change in a person's behavior through interaction with other people. Learners do not only interact as the main source in the learning process, but interact with all learning resources (Lumbantoruan, 2019). Learning is a structured combination which is divided into human elements, tools, facilities, equipment, and procedures that influence each other to achieve learning objectives (Faris, Dimas Muhamad, 2020). Other procedures that need to be conveyed by the teacher are schedules, models and methods as well as the media used in the learning process (Hanifah et al., 2019). A professional teacher prepares himself before entering teaching. With clear learning objectives, teachers can easily measure the level of student success. The clarity of the material and media provided makes students feel interested in independent learning (Konita et al., 2019). Online learning can be interpreted as a way of communicating between educators and students. Online is done in separate places but at the same time. Online learning is not much different from face-to-face learning. However, in online learning, information and communication can be hampered due to internet interference. To overcome internet disturbances, teachers are required to prepare other alternatives in delivering material, such as videos and learning modules (Mishra et al., 2020). In addition to online weaknesses due to internet connections that can be disrupted, there are also advantages of online learning, namely it can help the process of long-distance communication and save costs, so online learning is very helpful (Ds et al., 2021). The hope is that after educators and students are more independent in using online technology, online learning can be done en masse (Jensen et al., 2021). The teacher explains the material online and provides examples that students can easily access. A teacher must be able to create an

atmosphere that can increase student interest and actively participate in learning (Albay, 2019). Basically online learning does not change the concepts that occur in face-to-face learning, such as the material being taught, the concept of the material provided, communication with teachers and students (Walsh et al., 2021).

Zayyadi et al (2020) Teacher's Pedagogic Competenceis defined as the ability that must be possessed by an educator and is able to design forms of learning related to the basic abilities of the children being taught. (1) Pedagogy itself is a science for the method of educating students (Rissanen et al., 2019). Teacher's professional competence what is required is transparency in educating, assessing and evaluating students; (2) Professional competence in question is the ability of a teacher to manage, design learning and implementation according to his profession properly (Fadli & Imtihan, 2019); (3) Social competence is related to a teacher's communication skills in delivering previously designed material and being able to interact with other teachers, school leaders and parents of students from various professions (Bjørndal, 2020); and (4) Personal competence is the competence possessed by teachers with good personality, attitude, speech, examples and role models by students (Bibliometrics 2018).

B. METHODS

This type of research is descriptive qualitative (Mills, 2019). This qualitative research produces descriptive data that can be described in the form of sentences and is supported by numerical data. This research was conducted at SMA XYX and lasted for three months from the beginning of April to the end of July 2021. The object of this research is all components that are in the school environment of SMA XYZ and the subjects are the principal, vice principal, mathematics teacher and students. This study involved one principal, three deputy principals, six mathematics teachers and 58 students with a total of two classes. The data collection techniques in this research are: (1) Observing and direct observation of the field. In this case, what is observed is the learning tools prepared by the school and what communication tools are used when the learning process takes place online. While what was observed was the teacher's readiness before learning began and the difficulties of the mathematics teacher when implementing the material. In this study, previously prepared an observation sheet in the form of a checklist. The observation instrument is based on indicators of teacher competency assessment and focuses on the form of competency readiness, competency difficulties, and the media used by teachers; (2) The technique of collecting data is by interviewing. In the interview session, one principal, six mathematics teachers and ten students were conducted, so that a total of 16 people were interviewed in measuring the competence and difficulty of teachers. Interview data were analyzed and coded to see data that intersect with each other; and (3) The third part of the data is obtained by collecting documentary evidence. Documentation was obtained during observations, and interviews. The documentation in question is data on the location of teacher competency difficulties and student difficulties (Vijayan, 2021). The results of the observations are seen from the conditions, actual conditions and forms of problem solving faced by teachers and students during the learning process. While the results of the interviews were conducted by direct communication by means of face to face to the data source. Documentation is collected from before the learning process begins, begins, ends and the media used (Al-Balas et al.,

2020). The data analysis technique carried out in this study is by means of data reduction, collected and the last stage is drawing conclusions (Garc & Sanchiz, 2019). The data that has been analyzed are grouped and organized into categories, thus forming a pattern and then synthesizing (Mustajoki & Mustajoki, 2017). The results that have been analyzed are described into words so that they form sentences and make conclusions (Lindgren et al., 2020). The three data that have been analyzed are presented and aligned with other data, so that data intersect with each other and data that intersect and conical. From the overlapping data, it can be seen that the pattern of teacher competency difficulties in the online mathematics learning process (Winkle-wagner et al., 2019).

C. RESULT AND DISCUSSION

1. Result

The results in this study were obtained in the form of data, namely the readiness of teacher competencies during online learning and the data lies in the difficulties of teachers when carrying out the material that has been prepared. The first data that the researcher analyzes is the data from direct observation, then analyzes the interview data and collects documentation data that is relevant to the events in the field during the observation and compiled in the form of coding. The following are the results of data coding through analysis with steps of data presentation, reduction and preliminary conclusions from observations, interviews and documentation, as shown in Table 1.

Table 1. Results of Coding Observations

Code	Keywords	Competency	Interpretation
	Competency Readiness	Pedagogic	1. No learning evaluation 2. At the beginning there was no Learning Implementation Plan (RPP) given to students 3. Lack of understanding of students (Many students who do not understand the material)
		Professional	1. All mathematics teachers who teach do not have modules 2. There is no formulation of learning objectives that can be seen in the Learning Implementation Plan 3. Not ready to use online media as a tool to convey material 4. There is no effective, objective and transparent form of online assessment
		Social	There is a lack of communication in conveying mathematical material
		Personality	Found readiness Personality Competence
	Competency Difficulty	Pedagogic	Teachers have difficulty compiling material in the form of modules according to the curriculum
		Professional	1. Difficulty in applying models and strategies to the material 2. Difficulty in implementing the material in the textbook with the online method 3. Difficulty in writing examples of math problems and symbols on google meet and zoom media
		Social	Difficulty communicating in conveying material concepts and examples of mathematical material in online form
		Personality	No difficulty found in personality competence

Table 1 shows that mathematics teachers do not yet have competency readiness and create new difficulties in the process of implementing online learning. The learning process is not optimal and does not achieve the expected learning outcomes when compared to conventional (face to face). Mathematics teachers are not sufficiently prepared for pedagogic competence and professional competence in online learning. This finding is in line with the theory that teachers' unpreparedness in teaching competence will create new difficulties during the online learning process, as shown in Table 2.

Table 2. Coding of Interview Results

Keywords	Readines	Difficulty	Conclusion Interpretation From Interview Sources
Pedagogic	20%	80%	Lack of readiness in making policies, There is no prepared learning strategy, the readiness of teaching methods is less readiness, and there is no readiness in evaluation. As a result, difficulties in designing learning and implementation difficulties
Professional	10%	90%	Lack of readiness in compiling material, lack of readiness in using learning aid media. As a result, 1) difficulties in the learning process using textbooks, 2) difficulties in writing mathematical symbols, 3) difficulties in explaining and writing examples of mathematical material problems in online media.
Social	70%	30%	Lack of readiness to use media in teaching. As a result, communication difficulties in explaining concepts and examples
Personality	80%	20%	Lack of readiness of a stable personality. As a result, it is difficult to give and show appreciation for thoughts and opinions during the learning process

From Table 2, the first sequence that often appears is the unpreparedness of the teacher in explaining the material in the book, due to the online process, difficulty in writing symbols, and lack of mastery of technology media, this can be seen in the unpreparedness and difficulty in professional competence. The second order frequently discussed by sources is unclear models, non-existent methods and subjective assessment processes. The initial conclusion based on the coding of observation and observation tables as well as the results of interviews is that teachers in Indonesia are not ready in terms of professional and pedagogic competencies and dominantly face difficulties when explaining material online. The teacher does not prepare an alternative module where the assessment process, methods, strategies, use of media and guide students to learn independently. This is the student's expectation from the interview session, as shown in Table 3.

Table 3. Documentation/Verification Coding

Indicator	Competence	Interpretation
Readiness	Pedagogic	Lack of material readiness, relying on textbooks (Print), not having modules, not evaluating, not having techniques and strategies, assessment sheets are not shown
	Professional	The material taught is not structured and the Lesson Plan (RPP) is not structured according to the textbook.
	Social	Minimal technology readiness
	Personality	Lack of appreciation for students and the rest in personality indicators are met
Difficulty	Pedagogic	Difficulty in providing material, Difficulty in evaluating and difficulty in judging
	Professional	Difficulty applying material online, difficulty writing examples, difficulty writing symbols and difficulty answering student questions in writing. and the absence of student assessment
	Social	Difficulty Communication when explaining the material, communication is difficult to give examples
	Personality	Solved

Table 3 shows that the documentation is related to the results of observations and interviews, namely the teacher does not appear to have prepared the material and the mathematics modules, methods, strategies and assessments do not exist. The teacher gives a textbook, even though this book can only be used face-to-face and not when studying online, as shown in Table 4.

Table 4. The Third Slice of Data (observations, interviews and documentation)

Indicator	Competence	Interpretation
Readiness	Pedagogic	Teachers are less prepared in Pedagogic Competence. Who is not in the learning strategy, Preparing materials, and Using Media, there is no evaluation sheet, there is no assessment
	Professional	There are no modules, no self-composed materials, no assessment sheets
	Social	Drink mastery of written communication in technology
	Personality	Only one indicator in personality competence is in the spotlight, namely No awards have been prepared and other indicators have been met
Difficulty	Pedagogic	Difficulty in Evaluation, Difficulty in giving assessments and difficulty in implementing the material in the textbook (Print).
	Professional	Difficulty explaining examples of questions, difficulties in writing symbols, difficulties in answering questions and difficulties in giving assessments to students.
	Social	Difficulty communicating orally and in writing in explaining mathematical material
	Personality	Solved

Table 4, is the intersection of the three data that have been analyzed. The overlapping data has answered the indicator. The lack of teacher readiness causes difficulties when implementing the online mathematics learning process. The teacher does not prepare the material, there is no method, the readiness is lacking in using the media, there is no evaluation

and the assessment process is not visible. This resulted in the implementation of the learning process not running smoothly and tended to find difficulties such as difficulty giving examples, difficulty writing symbols and communication that was not smooth, both orally and in writing.

2. Discussion

In the discussion of this research, there are three main objectives as in the background, namely: (1) Research is to find out the form of readiness and difficulty of mathematics teacher competence when implementing mathematics material in the curriculum with the online method; (2) Research also finds out the form and method of mathematics teachers in assessing student learning outcomes online; and (3) Research also finds out how mathematics teachers should deal with difficulties when implementing online mathematics learning.

a. Readiness and Difficulty of Mathematics Teacher Competence when online

From Table 1, Table 2 and Table 3, it is clear that the results of the study recorded and coded observations, interviews and documentary evidence that intersect with each other. The three data intersect on the unpreparedness of the pedagogic competence and professional competence of mathematics teachers, namely preparing learning tools and implementing materials for students. From Table 1, it is known that research observations show that 10% of teachers lack the readiness of professional competency indicators, resulting in 90% of teachers having difficulties in implementation and 20% less readiness in pedagogics which will result in 80% difficulties in implementing them. Mathematics teachers during online learning do not have modules and materials are not prepared by the teachers themselves. Teachers only use printed textbooks as the main source of teaching materials to students. This raises new problems, because the mathematics teacher cannot show the material to be discussed, but the teacher can only direct students orally. This is contrary to the theory that mathematical material must be explained in writing and demonstrated (Lee et al., 2021). The next teacher's unpreparedness in pedagogic competence is the absence of a Learning Implementation Plan (RPP) given by the teacher at the beginning of the material. This shows that the teacher was initially unprepared and impressed only by relying on textbooks. At the time of observation, the school has prepared paid computer facilities, internet and google meet which can be used by teachers in preparing materials, lesson plans and other learning tools. Efforts made by schools in providing facilities are of no use because in reality there are no teachers who use computer facilities that have been permitted by the school. The next unpreparedness was that the mathematics teacher did not design evaluation guidelines. This can be seen when the observation at the end of the lesson the teacher does not evaluate the learning process. Our observations coincide with data during interviews and documentation in Table 2 and Table 3, the results of interviews with 13 sources answered the same, namely the material was not prepared, the RPP was not given at the beginning and there was no evaluation, and this is reinforced by the absence of evidence of material documentation in the form of module, there is no documentation of the learning implementation plan and no evidence of evaluation. In this online learning, teachers also have unpreparedness in professional competence. This was confirmed to

the source during the interview. From Table 2, 90% of sources said that mathematics teachers did not prepare their own materials and mathematics teachers were not ready for online learning to be carried out. This is evident at the time of the interview the teacher had difficulty explaining the material, difficulty explaining examples of questions online and difficulties in writing mathematical symbols in the media. Opinions from these sources were supported at the time of observation and the evidence of documentation was clearly visible and intersected in Table 4, the teacher had difficulty explaining examples and writing mathematical symbols in the media used, namely google meet and zoom media. Unpreparedness in professional competence and pedagogic competence creates new difficulties for teachers. This is in line with the theory that difficulties arise from oneself (Nuutila et al., 2021). This case is the cause and becomes an obstacle to the smooth learning process and it seems that the online learning process is not effective. This has a negative impact on student achievement and the expected outcomes of the curriculum. In our findings, books that are used as the main source during the online learning process create new problems. We also found that teachers do not use learning models and strategies, theoretically an educator must use learning methods and strategies when delivering material (Albay & Eisma, 2021). The learning process looks ineffective, such as explaining concepts, explaining sample questions and giving practice questions. The teacher only explains the material orally from the textbook and like a percentage of other social lessons. Although in mathematics it is not enough just to be verbally intelligent, but examples must be given and show the flow of how to solve mathematical problems.

It in this study, the mathematics materials that the teacher did not prepare and found difficulties were integral, induction and logarithmic materials. The difficulty in explaining these three materials is because they require good pedagogic competence and professional competence. The three materials require accuracy in proving formulas, the ability to provide structured examples and accuracy in providing pictures and graphs. The study also noted the student responses that appeared, namely they did not understand the material being taught, did not understand the examples given, did not understand how to solve the problem, did not know the formula used, did not have a concept to solve it, and did not understand how to draw graphs. This resulted in some students' understanding of the material online to be incomplete and some students said they did not understand at all. During interviews with 10 students, the study noted that the solution expected by students during online learning was that the teacher compiles the material himself and can express ideas and design ways to solve problems into material in the form of modules. With this solution students say, they can study independently at home. This expectation of students is in line with the theory which says a teacher must design or compile material and adapt it to the initial abilities of the students he guides in the form of modules. Modules that have been prepared beforehand by the teacher can be distributed to students as a basis for self-study at home. This is the main obstacle and the first cause of the ineffective online learning process. At the time of the interview with the teacher, the teacher conveyed his limitations in compiling the material and the limitations of using online media as a tool in delivering material. This is confirmed correctly by the

results of observations and documentary evidence that is coded in Table 4, the teacher has difficulty in writing the concept of sample questions, writing symbols and proving the formulas used.

In this interview session, we found a surprising answer from the teacher. Here's a snippet of the conversation with the teacher: Is it difficult to implement the curriculum online during a pandemic? If so, what are the difficulties experienced in implementing online learning? Answer: Yes, (1) the difficulties experienced in explaining the textbook material which is the main source are usually explained on the blackboard face to face. Difficulty in making modules that match curriculum expectations; (2) Another difficulty is when applying logarithmic and integral material, they often have difficulty operating arithmetic concepts, using symbols and drawing graphs in the form of patterns. What are the factors that can cause difficulties in carrying out online learning during the corona virus pandemic? Answer: Internal factors are the operation of the Google Meet application and other media, writing symbols, writing examples, the process of proving formulas, lack of time in implementing learning outcomes, lack of time in compiling evaluations. External factors are the lack of student interest in online learning, students tend to be lazy to complete the homework given, students are not on time to enter the link provided; (3) Is the implementation of the curriculum in line with your learning process and competence? Answer: To be honest, it is not in line with curriculum expectations; and (4) what do you need when online learning is done? Answers, material modules and in accordance with the existing curriculum achievements.

The decoding data in Table 4 proves that the mathematics learning process becomes ineffective due to the unpreparedness factor in two competencies, namely pedagogic competence and professional competence. In reducing the ineffectiveness of online mathematics learning, students and teachers, their opinions intersect on the required solution, namely the existence of a module for each material and complete with examples that are in accordance with the material and in accordance with curriculum achievements.

b. Forms and methods of assessment of mathematics teachers during online learning

Observations were made in coding that one of the learning tools not prepared by the teacher was the assessment method. In Table 1, the mathematics teacher did not prepare an assessment of the material taught to students. This is one form of teacher unpreparedness in the pedagogic competence of teachers in teaching online. This study found that in mathematics teachers in measuring student learning success, only based on the results of the final exam or final test. In this case the teacher dazoes not assess the process during the learning takes place. The theory says that evaluation cannot be separated from an objective assessment process (Hwang et al., 2021). While in the observation, the evaluation process was not carried out. The assessment carried out by the teacher is an assessment that reflects unpreparedness in carrying out online learning. In the final exam, the test made by the teacher is in the form of multiple choice questions, even though the material being tested needs to see the process. The theory says that in mathematics, the most needed initial stage is the process before seeing the final result. Teachers do not have indicators and assessment instruments that are distributed to

students. This research confirms to students by asking about their learning outcomes. There are some of the sources we ask that students in answering multiple choice questions see answers from the internet. The value they get is not purely the result of the concept of their mind. The teacher cannot ensure that students' answers are the result of their own thinking. The teacher's unpreparedness in designing assessments according to the material is part of the weakness of pedagogic competence. From Table 2, 80% of the interviewees think that the teacher does not have a form of assessment, they seem not to have it because it is not shown. This was proven during the learning process, the research did not find in the documentation any assessment sheets or an objective assessment process.

The following is a snippet of a research conversation with students who asked about the learning outcomes assessment process: (1) do you agree with the teacher's assessment method? Answers Disagree, because all the questions were multiple choice, the assessment instruments were not distributed to students, some of the material being tested was not in the textbook, the material being tested was much more difficult, as a result we searched a lot for answers from the internet; (2) then, what about you learning outcomes? Answer: Good grades and all students grades when online learning is good; (3) how can you answer a question when you do not understand the material being tested? Answer: We saw the answer on the Internet; and (4) are the questions tested in the form of essays or multiple choice? Answer: Multiple choice) What are your hopes for future improvements? Answers: (a) distributing assessment instruments, (b) compiling material that is in accordance with what is being tested in the form of modules, (c) creating discussion groups between friends, (d) expecting the textbook compiled by the teacher to be equipped with examples and questions. Being tested, (e) providing special guidance for students who do not understand. In the interview session above, it was confirmed correctly with the data on the documentation, this research asked for an assessment of the mathematics teacher and mathematics teacher only to show the final score of the students without showing the process.

c. The solutions used by mathematics teachers face difficulties when implementing online mathematics materials

The theory says that there are two factors of difficulty, the first is a factor from oneself and from outside (Walgermo et al., 2018). Based on the coding of overlapping data from the results of direct observations, interviews and documentary evidence, many difficulties were found when explaining mathematical material to students and when operating the media. The difficulty of explaining examples of math problems to students so that they can be accepted by all participants is not easy. Teachers have difficulty with concepts, proofs and writing symbols used. The books provided by the teacher do not make it easier for students and tend to complicate understanding the material. This problem according to the researcher's observations continued on the first, second, third day and so on. Teachers also have difficulty in applying learning models and strategies. The difficulty felt by the teacher during the interview was when he wanted to answer student questions and respond to mistakes made by students in asking, in this case the

teacher acknowledged the limited time and lack of competence in responding quickly in online media and physical ability to check and distribute student work. The teacher admits and it can be seen in the observations that have been coded in Table 2, 20% of unpreparedness of pedagogic competence results in 80% difficulty and 10% unpreparedness of professional competence causes 90% difficulty. The difficulty of writing symbols resulted in the teacher's time being wasted quite a lot in explaining just one material, difficulty using google meet media, difficulty checking assignments and difficulties in explaining material that required accuracy and proof of formulas. According to the researcher's observations, this problem continued the next day and caused online mathematics learning in the classroom to be less effective. Teachers also have difficulty in applying learning models and strategies. The following is a snippet of an interview with a math teacher: (1) what are the difficulties experienced in carrying out online learning during the COVID-19 pandemic? Answer: Difficulty compiling materials, operating media and writing symbols on applications. Finding only one symbol in the media takes 1 to 2 minutes and being able to explain only one or two sample questions takes 2 hours; (2) are there any supporting policies from your relatives/schools to reduce the possibility of difficulties in implementing online learning? If so, what are the supporting policies? Answer: not yet; (3) how to overcome the difficulties that arise outside the school's policy in implementing online learning? Answer: Try discussing it with colleagues who have the same competence; (4) what steps do you expect to solve this problem? Answer: Requires a module that is in accordance with the basic abilities of students; (5) did you not arrange the materials? Answer: No; (6) Why don't you create a module? Answer: Because I realize that pedagogic competence and professional competence alone are not enough to make a module that fits the needs of students, research is needed to adjust the needs of students; (7) if you have difficulty implementing the material online, what kind of tools do you need? Answer, maybe if there is a module according to the material being taught it will help.

Based on interviews with teachers, solutions that teachers do when learning online, do not yet exist. This is indeed proven in interview sessions with students, if students do not know how and answers to math problems, students look for ways and answers from the internet. Indirectly, students admitted that the teacher had not provided a solution to their difficulties in explaining the material online. The data in Table 4 explains that the teacher's weakness lies in professional competence and pedagogic competence. Teachers and students argue that the solution to overcome this problem is to compile a module for each material that is considered difficult to explain online. This is the best solution to be able to run online learning for teachers who have limited competence. Expectations from students and teachers are in line with the theory that mathematics modules can help students get good learning outcomes and teachers are better prepared to teach (Hwang et al., 2021).

D. CONCLUSION AND SUGGESTIONS

Basically every school is given the freedom to choose media and concepts in carrying out the online learning process, due to the unfinished COVID-19 situation. The school initially agreed with the use of google meet media as a means of interacting in explaining concepts,

Whatsapp media, and Google classroom as a tool in collecting assignments. However, the agreement was not implemented because mathematics teachers were not sufficiently prepared in the online learning process. The data that is coding in the interview session, all sources argue that only 10% of mathematics teachers who do not carry out professional competence readiness will have an impact on 90% of teacher difficulties and 20% lack of readiness in pedagogic competence resulting in 80% difficulty in implementation. This difficulty problem continues every time mathematics learning is carried out online during a pandemic. In the observations, the mathematics teacher seemed to have difficulty in explaining, writing symbols, providing mathematical concepts from integral, matrix, induction and logic materials. This can happen because the teacher only uses textbooks as the main source. Teachers during online learning do not yet have an assessment and evaluation of learning and tend to let students look for answers from the internet. Meanwhile, students expect the material to be compiled in the form of modules, equipped with learning methods and strategies. Modules are expected to be designed taking into account the initial abilities of the students being taught. In this case the teacher also expects a module in accordance with the material being taught, but according to the teacher's admission has limited competence in compiling the module and expects other parties to play a role in compiling the module according to the achievements of the curriculum used. Students also expect the availability of indicators, instruments, assessment rubrics when online, which aims to help students achieve better and honest results without looking at answers from the internet and evaluate students as a whole. Evaluation is considered necessary to ensure that students understand the material and the results obtained are in line with curriculum expectations and which are based on honesty. (1) Conduct pedagogic and professional competency training for mathematics teachers on a regular basis and if the learning process is carried out online, then special training is needed on how to design mathematics learning and operate the media used and relate it to the two competencies that are problematic in this regard, study; (2) It is necessary to prepare all components of teacher competence, so as not to cause difficulties in carrying out learning as contained in this study; (3) In this study, the hope of teachers and students to overcome weaknesses is the existence of modules for each material, especially the integral material module, induction module and derivative module; (4) Need to be developed and adapted to field conditions the methods and strategies used; and (5) Every mathematics teacher is expected to be able to develop indicators, instruments and rubrics to assess the material being taught. This is considered necessary in evaluating the achievement of the material and curriculum. This research also needs to be continued by answering the expectations of teachers and students by conducting research on the development of mathematics modules, especially integral modules, derivative modules and mathematical induction modules.

REFERENCES

Akala, B. M. (2021). Social Sciences & Humanities Open Revisiting education reform in Kenya : A case of Competency Based Curriculum (CBC). *Social Sciences & Humanities Open*, *3*(1), 100107. 1-8. https://doi.org/10.1016/j.ssaho.2021.100107

Al-Balas, M., Al-Balas, H. I., Jaber, H. M., Obeidat, K., Al-Balas, H., Aborajooh, E. A., Al-Taher, R., & Al-Balas, B. (2020). Correction to: Distance learning in clinical medical education amid COVID-19 pandemic in Jordan: current situation, challenges, and perspectives (BMC Medical Education,

(2020), 20, 1, (341), 10.1186/s12909-020-02257-4). *BMC Medical Education*, *20*(1), 1–7. https://doi.org/10.1186/s12909-020-02428-3

Albay, E. M. (2019). Social Sciences & Humanities Open Analyzing the effects of the problem solving approach to the performance and attitude of fi rst year university students. *Social Sciences & Humanities Open*, *1*(1), 100006. 1-7. https://doi.org/10.1016/j.ssaho.2019.100006

Albay, E. M., & Eisma, D. V. (2021). Social Sciences & Humanities Open Performance task assessment supported by the design thinking process : Results from a true experimental research. *Social Sciences & Humanities Open*, *3*(1), 100116. 1-9. https://doi.org/10.1016/j.ssaho.2021.100116

Albus, P., Vogt, A., & Seufert, T. (2021). Signaling in virtual reality influences learning outcome and cognitive load. *Computers and Education*, *166*(April 2020).1-16. https://doi.org/10.1016/j.compedu.2021.104154

Bibliometric, A. (2018). *A Bibliometric and Topic Analysis on Future Competences at Smart Factories*. 1–13. https://doi.org/10.3390/machines6030041

Bjørndal, C. R. P. (2020). Student teachers ' responses to critical mentor feedback : A study of face-saving strategies in teaching placements. *Teaching and Teacher Education*, *91*, 103047. 1-12. https://doi.org/10.1016/j.tate.2020.103047

Burbules, N. C., Fan, G., & Repp, P. (2020). Geography and Sustainability Five trends of education and technology in a sustainable future. *Geography and Sustainability*, *1*(2), 93–97. https://doi.org/10.1016/j.geosus.2020.05.001

Cahyani, O. D., Nurmawati, L. A., & Cahyasari, E. (2021). *Evaluasi Pembelajaran Jarak Jauh terhadap Hasil Belajar Mahasiswa Baru pada Masa Pandemi Covid-19 (Studi Kasus pada Mahasiswa Baru Tahun Akademik 2020 / 2021 Program Studi Administrasi Pendidikan , Fakultas Ilmu Administrasi , Universitas Brawijaya) COV*. *19*(2), 297–314.

Carlos, J., & Pagliara, F. (2019). *The Research Topics on E-Grocery : Trends and Existing Gaps*. 1–15. https://doi.org/10.3390/su11020321

Ds, L., Jr, L., Tiangco, C. E., Angela, D., Sumalinog, G., Sabarillo, N. S., & Mark, J. (2021). Education for Chemical Engineers An effective blended online teaching and learning strategy during the COVID-19 pandemic. *Education for Chemical Engineers*, *35*(May 2020), 116–131. https://doi.org/10.1016/j.ece.2021.01.012

Fadli, S., & Imtihan, K. (2019). Penerapan Multi-Objective Optimization on the Basis of Ratio Analysis (Moora) Method Dalam Mengevaluasi Kinerja Guru Honorer. *Jurnal Informatika Dan Rekayasa Elektronik*, *2*(2), 10-19. https://doi.org/10.36595/jire.v2i2.109

Faris, Dimas Muhamad, dkk. (2020). Preposisi Dalam Artikel Opini Harian Kompas Edisi Implikasinya Dengan Pembelajaran Menulis Paragraf Di Smp Kelas Viii. *Jurnal Parafrasa: Bahasa, Sastra Dan Pengajaran*, *2*(2), 35–40. doi: 10.31941

Garc, I., & Sanchiz, D. C. (2019). *Using Mobile Devices for Improving Learning Outcomes and Teachers ' Professionalization*. 1–12. https://doi.org/10.3390/su11246917

Haas, M. De, Faber, R., & Hamersma, M. (2020). Transportation Research Interdisciplinary Perspectives How COVID-19 and the Dutch ' intelligent lockdown ' change activities , work and travel behaviour : Evidence from longitudinal data in the Netherlands. *Transportation Research Interdisciplinary Perspectives*, *6*, 100150. 1-14. https://doi.org/10.1016/j.trip.2020.100150

Handarini, O. I., & Wulandari, S. S. (2020). Pembelajaran Daring Sebagai Upaya Study From Home (SFH). *Jurnal Pendidikan Administrasi Perkantoran (JPAP)*, *8*(3), 465–503. https://doi.org/10.26740/jpap.v8n3.p496-503

Hanifah, H., Supriadi, N., & Widyastuti, R. (2019). Pengaruh Model Pembelajaran E-learning Berbantuan Media Pembelajaran Edmodo Terhadap Kemampuan Pemecahan Masalah Matematis Peserta Didik. *NUMERICAL: Jurnal Matematika Dan Pendidikan Matematika*, *3*(1), 31–42. https://doi.org/10.25217/numerical.v3i1.453

Hopfenbeck, T. N., Lenkeit, J., Masri, Y. El, Cantrell, K., Ryan, J., Baird, J., Hopfenbeck, T. N., Lenkeit, J., Masri, Y. El, Cantrell, K., Ryan, J., Lessons, J. B., Systematic, P. A., Hopfenbeck, T. N., Lenkeit, J., Masri, Y. El, Cantrell, K., Ryan, J., & Baird, J. (2018). *Lessons Learned from PISA : A Systematic Review of Peer-Reviewed Articles on the Programme for International Student Assessment Lessons Learned from PISA : A Systematic Review of Student Assessment*. *3831*. 1-9. https://doi.org/10.1080/00313831.2016.1258726

Hwang, G. J., Wang, S. Y., & Lai, C. L. (2021). Effects of a social regulation-based online learning framework on students' learning achievements and behaviors in mathematics. *Computers and Education*, *160-165*, 104031. https://doi.org/10.1016/j.compedu.2020.104031

Jensen, L. X., Bearman, M., & Boud, D. (2021). Computers & Education Understanding feedback in online learning – A critical review and metaphor analysis. *Computers & Education*, *173*(December 2020), 104271. 1-12. https://doi.org/10.1016/j.compedu.2021.104271

Konita, M., Asikin, M., & Noor Asih, T. S. (2019). Kemampuan Penalaran Matematis dalam Model Pembelajaran Connecting, Organizing, Reflecting, Extending (CORE). *PRISMA,Prosiding Seminar Nasional Matematika*, *2*, 611–615. https://doi.org/10.31004/joe.v1i2.77

Lee, J., Lee, H. J., Song, J., & Bong, M. (2021). Enhancing children's math motivation with a joint intervention on mindset and gender stereotypes. *Learning and Instruction*, *73*, 101416.1-13. https://doi.org/10.1016/j.learninstruc.2020.101416

Lindgren, B. M., Lundman, B., & Graneheim, U. H. (2020). Abstraction and interpretation during the qualitative content analysis process. *International Journal of Nursing Studies*, *108*.1-6. https://doi.org/10.1016/j.ijnurstu.2020.103632

Lumbantoruan, J. H. (2019). *Pengembangan Bahan Ajar Persamaan Diferensial Berbasis Model Brown Di Program Studi Pendidikan Matematika Fakultas Keguruan Dan IlmuPendidikan Universitas Kristen Indonesia Tahun 2017 / 2018*. *3*(2), 147–168. https://doi.org/10.33541/edumatsains.v3i2.886

Lumbantoruan, J. H., & Male, H. (2020). *Analisis Miskonsepsi Pada Soal Cerita Teori Peluang Di Program Studi Pendidikan Matematika*. *4*(2), 153–168. https://doi.org/10.33541/edumatsains.v4i2.1380

Lumbantoruan, J. H., & Male, H. (2022). *Analysis of Mathematics Teacher Difficulties in Implementing 2013 Curriculum Online International Journal of Business , Law , and Education*. *3*(1), 1–15. https://doi.org/10.56442/ijble.v3i1.36

Mahfud, C. (2019). *Evaluation of islamic education curriculum policy in Indonesia*. *9*(1), 34–43. https://doi.org/10.25273/pe.v9i1.4016

Mills, K. A. (2019). Big data for qualitative research. In *Big Data for Qualitative Research*. 1-91. https://doi.org/10.4324/9780429056413

Mishra, L., Gupta, T., & Shree, A. (2020). International Journal of Educational Research Open Online teaching-learning in higher education during lockdown period of COVID-19 pandemic. *International Journal of Educational Research Open*, *1*(September), 100012. 1-8. https://doi.org/10.1016/j.ijedro.2020.100012

Mustajoki, H., & Mustajoki, A. (2017). A New Approach to Research Ethics. In *A New Approach to Research Ethics*. 60-80. https://doi.org/10.4324/9781315545318

Naranjo, J. E., Sanchez, D. G., Robalino-lopez, A., Robalino-lopez, P., Alarcon-ortiz, A., & Garcia, M. V. (2020). *applied sciences A Scoping Review on Virtual Reality-Based Industrial Training*. 1-31. https://doi.org/10.3390/app10228224

Norman, D. A. (2014). *Cognitive Engineering* (Issue May). 31-61. https://doi.org/10.1201/b15703-3

Nurgiansah, T. H. (2021). *Jurnal basicedu*. *5*(1), 367–375. https://doi.org/10.31004/basicedu.v5i1.669

Nuutila, K., Tapola, A., Tuominen, H., Molnár, G., & Niemivirta, M. (2021). Mutual relationships between the levels of and changes in interest, self-efficacy, and perceived difficulty during task engagement. *Learning and Individual Differences*, *92*(December 2020). 1-12. https://doi.org/10.1016/j.lindif.2021.102090

Pentang, J. T. (2021). *Socio-Constructivist Learning and Teacher Education Students ' Conceptual Understanding and Attitude toward Fractions*. *5*(1), 23–44. https://doi.org/10.22437/irje.v5i1.12187

Pokhrel, S., & Chhetri, R. (2021). A Literature Review on Impact of COVID-19 Pandemic on Teaching and Learning. *Higher Education for the Future*, *8*(1), 133–141. https://doi.org/10.1177/2347631120983481

Rissanen, I., Kuusisto, E., Tuominen, M., & Tirri, K. (2019). In search of a growth mindset pedagogy : A case study of one teacher ' s classroom practices in a Finnish elementary school. *Teaching and Teacher Education*, *77*, 204–213. https://doi.org/10.1016/j.tate.2018.10.002

Vijayan, R. (2021). *education sciences Teaching and Learning during the COVID-19 Pandemic : A Topic Modeling Study*. 1-15. https://doi.org/10.3390/educsci11070347

Walgermo, B. R., Frijters, J. C., & Judith, O. (2018). Early Childhood Research Quarterly Literacy interest and reader self-concept when formal reading instruction begins. *Early Childhood Research Quarterly*, *44*, 90–100. https://doi.org/10.1016/j.ecresq.2018.03.002

Walsh, J. N., Brien, M. P. O., & Costin, Y. (2021). The International Journal of Management Education Investigating student engagement with intentional content : An exploratory study of instructional videos. *The International Journal of Management Education*, *19*(2), 100505. 1-9. https://doi.org/10.1016/j.ijme.2021.100505

Widodo, A., Nursaptini, N., Novitasari, S., Sutisna, D., & Umar, U. (2020). From face-to-face learning to web base learning: How are student readiness? *Premiere Educandum : Jurnal Pendidikan Dasar Dan Pembelajaran*, *10*(2), 149-160. https://doi.org/10.25273/pe.v10i2.6801

Winkle-wagner, R., Lee-johnson, J., & Gaskew, A. N. (2019). *Critical Theory and Qualitative Data*. 1-244.

Zayyadi, M., Nusantara, T., Hidayanto, E., Made, I., & Dijah, C. S. A. (2020). *Content and Pedagogical Knowledge of Prospective Teachers in Mathematics Learning : Commognitive*. *8*(March), 515–532. https://doi.org/10.17478/jegys.642131