Premiere Educandum: Jurnal Pendidikan Dasar dan Pembelajaran
Volume 11 (1) 147 – 159 June 2021
ISSN: 2088-5350 (Print) / ISSN: 2528-5173
(Online)Doi: 10.25273/pe.v11i1.8869
The article is published with Open Access at: http://e-journal.unipma.ac.id/index.php/PE

Mathematical disposition of students', teachers, and parents in distance learning: A survey

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Abstract: This study reveals (1) the mathematical dispositions of students, teachers, and parents in distance learning, and (2) factors forming the mathematical disposition of students, teachers, and parents in distance learning. The method used in this research is a survey-based qualitative descriptive analysis. The subjects of the study were 20 elementary school students, 20 elementary school teachers, and 20 parents who have elementary school-aged children. The research data were collected through questionnaires and interviews. The results showed that the level of students' mathematical dispositions in distance learning was at a moderate level, the parents' mathematical dispositions were at a moderate level but tended to below, while the teachers' mathematical dispositions were at a high level. There are three factors that need to be considered to determine a mathematical disposition, namely the presence or absence of a mathematical disposition, its direction, and its intensity. Meanwhile, an interactive learning atmosphere (teacher-student, and student-student), fast feedback from teachers, the use of technology, and the math content are factors in forming mathematical dispositions. This supports the proposition that the disposition (students, teachers, parents) towards mathematics learning is influenced by rules and practices in schools, teacher-student relationships, and expectations that determine the learning climate.

Keywords: Mathematical disposition, Distance learning, Covid-19.

Received 16 March 2021; **Accepted** 31 May 2021; **Published** 8 June 2021

Citation: Ulia, N. & Kusmaryono I. (2021). Mathematical disposition of students', teachers' and parents in distance learning: A survey. *Premiere Educandum: Jurnal Pendidikan Dasar dan Pembelajaran*, *11*(1), 147– 159. Doi.org/10.25273/ pe.v11i1.8869

INTRODUCTION

The sudden change in the learning process from face-to-face meetings in class to distance learning due to the COVID-19 pandemic made teachers (educators), students, and parents not ready to face it. This change requires that we (teachers, students, and parents) adapt by responding through quick attitudes and actions to learn new things about distance learning.

One of the most important aspects of an effective learning process is the need to communicate both ways (teacher and student or student and student) (Repanta et al., 2020). However, in the implementation of distance learning, many obstacles and problems arise. Two-way communication does not work effectively. The difficulty of interacting during distance learning and the limited learning time causes the teacher to only give assignments.

Mathematics learning requires two-way communication; the teacher guides students, students ask the teacher questions, and students learn from each other (peer-to-peer) to be effective learning (Repanta et al., 2020; Tan et al., 2018). Lacking this kind of interaction means that ongoing distance learning will only function as a mere transfer of information without any actual learning experience.

There is an assumption that distance learning There is an assumption that distance learning shifts the teacher's role to the parents whether parents teach students (their children) at home. Parents have difficulty and are unable to help students learn mathematics. Students begin to get bored and learning motivation decreases. Student learning outcomes also tend not to improve. Stress levels in children (students) and parents increase. Therefore, that at its peak, parents feel overwhelmed and demand the school to carry out face-to-face learning at school or teachers to help students learn at home.

In addition to improving students' mathematical thinking skills (cognitive aspects), learning mathematics must also pay attention to the affective aspects of students, namely mathematical dispositions. Learning mathematics in the classroom must be specially designed so that in addition to improving student learning achievement also improving mathematical dispositions (Dina et al., 2019; Haji et al., 2019; NCTM, 1989).

Mathematical disposition is a mental readiness that is generated through experiences that affect the individual's response to all situations and objects that are interconnected. Mathematical disposition connects with and appreciates mathematics, which is a tendency to think and act positively (Beyers, 2011; Feldhaus, 2014; Kusmaryono et al., 2019). Students 'disposition towards mathematics is reflected in, how they ask questions, express opinions, work together, respond to friends' opinions, help friends, and use approaches in solving problems.

To assess a student's disposition towards mathematics requires complete information about how he thinks and acts in various situations. Dispositions have many components, and a student can show a strong disposition for a particular component or show a weak disposition for another component (Facione et al., 2015). For example, a student has a strong will to look for other ways to solve problems, but he does not desire to see. Whether the way he did in solving the problem was right or there was another better way.

Students' mathematical disposition is said to be good if the student likes challenge and involves themselves directly in solving problems. In solving these problems, students feel the emergence of confidence, hope, and awareness to look back at the results of their thinking (Siregar & Lisma, 2019; Kusmaryono et al., 2019).

The importance of disposition in mathematics learning is to form a conscious, regular, and voluntary tendency to behave in a certain way that leads to achieving of specific goals for mathematics learners. In the context of mathematics, a mathematical

disposition is related to how mathematics students and teachers view and solve problems; Is it done with confidence, curiosity by looking for alternative solutions, persevering, and being challenged, and the tendency of students to reflect on their way of thinking (Feldhaus, 2014; Hutajulu et al., 2019).

The National Council of Teachers of Mathematics (1989) suggests seven components in mathematical disposition: self-confidence, mathematical flexibility, persistence and persistence in mathematical tasks, curiosity in mathematics, reflecting on thinking, appreciating mathematical applications, and appreciating roles of mathematics (NCTM, 1989). These components are associated with the goals of school mathematics education, including: having an attitude of appreciating the use of mathematics in life, namely having curiosity, attention, and interest in studying mathematics, as well as being resilient and confident in problem-solving.

The condition of the Covid-19 pandemic until now has not yet disappeared from this earth. So that the application of distance learning will continue. Therefore, it is very necessary to active roles from teachers and parents to help students study at home. The spirit and motivation of students, teachers, and parents of the application of distance learning must be maintained to remain stable and not decrease, including positive mathematical dispositions in mathematics learning.

It has been presented by several previous results of research on mathematical disposition by experts (Adi et al., 2019; Almerino, Jr. et al., 2019; Colita & Genuba, 2019; Dina et al., 2019; Feldhaus, 2014; Haji et al., 2019; Kusmaryono et al., 2019). Their findings have in common the subjects studied, namely students (at the secondary school and higher education levels). They generally focus more on mathematical disposition research in terms of one side, namely students. While the success of distance learning at the time of the Covid-19 pandemic was alleged, there was an effect of the mathematical disposition from the teacher, and parents, considering elementary school-age students while studying at home through distance learning, the role of teachers and parents cannot be ignored. Therefore, survey research is needed to determine the mathematical disposition of students, teachers, and parents in the application of current distance learning.

This study will reveal (1) the mathematical dispositions of students, teachers, and parents in distance learning and (2) the factors forming the mathematical dispositions of students, teachers, and parents in distance learning. The results of this study are expected to provide new information about the importance of mathematical dispositions for students, teachers, and parents in supporting students' learning success during distance learning (during the Covid-19 pandemic).

METHODS

Research Design

This research design is survey research. The method used is a cross-sectional survey to find out temporary issues. This survey study is to solve problems or problems that are developing today, namely the application of distance learning, especially mathematics learning in the Covid-19 pandemic period. The focus of survey research activities is to reveal the problem, present data, and analyze data from the survey (Nassaji, 2015; Ponto, 2015). The field of this field is carried out with accurate and measurable data based on empirical phenomena.

Participants

The number of research participants was 60 respondents, consisting of 20 elementary school students, 20 elementary school teachers, and 20 parents who have children of elementary school age (6 to 11 years).

Material

The research instrument was a questionnaire and a list of interview questions. The questionnaire contains 20 question items arranged on a Likert scale of 1 to 5 and according to the mathematical disposition indicator. The following shows the mathematical disposition indicators for the preparation of the questionnaire in **Table 1**.

TABLE 1. *Mathematical disposition questionnaire indicators*

Indicators	Descriptions	Questionnaire numbers
Confidence	Confidence in solving math problems, communicating ideas, and giving reasons	1,2,3
Flexibility	Flexibility in exploring mathematical ideas and trying out alternative methods of solving problems;	4,5,6
Usefulness	Tendency to believe or believe about the usefulness of mathematics in other fields to meet current or future needs.	7,8,9
Perseverance	Tendency to persevere and try hard, when necessary, when involved in mathematical activities.	10,11,12
Curiosity	Interest, curiosity, and ability to find in doing math	13, 14, 15
Appreciation	Appreciation of the role of mathematics in culture and its value, both mathematics as a tool, and mathematics as a language	16, 17, 18
Metacognition	Tendency to monitor and reflect on thinking processes and performance of oneself as learners.	19, 20

Source: (NCTM, 1989)

Reliability test to determine the extent to which a measuring instrument can be trusted in making measurements. In this questionnaire reliability test using the Cronbach's Alpha formula with the results in the **Table 2.**

TABLE 2. *Reliability of the questionnaire instrument*

Variables	Cronbach's Alpha	Number of participants
Confidence	0.704	20
Flexibility	0.770	20
Usefulness	0.714	20
Perseverance	0.785	20
Curiosity	0.790	20
Appreciation	0.750	20
Metacognition	0.769	20

Source: (NCTM, 1989)

The results of the questionnaire reliability test using the Cronbach's Alpha formula (**Table 2**) show that all variables obtained Cronbach's Alpha values between 0.704 to 0.790 with high-reliability criteria (Taber, 2018). The value of r table used for n = 20 with a significance of 0.444 (Esezi Isaac & Eric Chikweru, 2018). With these results, the results of r count is greater than r table so that the developed questionnaire can be declared

reliable. Meanwhile, the scoring criteria for the mathematical disposition questionnaire were developed by the researcher in **Table 3.**

TABLE 3. *Mathematical disposition criteria (MD)*

Level	Interval score	Category
V	$4.00 < MD \leq 5.00$	Very High
IV	$3.00 < MD \leq 4.00$	High
III	$2.00 < MD \leq 3.00$	Moderate
II	$1.00 < MD \leq 2.00$	Low
I	$MD \leq 1.00$	Very Low

The interview sheet contains several key questions about implementing distance learning during the Covid-19 pandemic. Prepared questions can be developed in the field during implementation and adapted to the situation. At the interview stage, the researcher will take 6 of the 60 respondents taken by purposive sampling technique. The 6 respondents have included 2 teachers, 2 parents of students, and 2 students from different schools. Semi-structured interviews were conducted over the telephone and lasted an average of 10 minutes. The following is a table of the respondent profiles of students (S), teachers (T), and parents (P).

TABLE 4. *Respondents Interview*

Initial	Gender	Participant
S-01	Male	Student IV
S-02	Female	Student VI
T-01	Male	Teacher III
T-02	Female	Teacher V
P-01	Male	Parent IV
P-02	Female	Parent VI

The results of the interview are quoted and described so that they can be appropriately conveyed. Following are the responses from students, teachers, and parents regarding online mathematics learning (distance learning) during the COVID-19 pandemic.

Procedure

This survey study was conducted by following the following steps: (1) Determining research problems through situation analysis, (2) creating research design surveys, (3) developing survey instruments, (4) sample determination, (5) testing instruments, (6) Collecting data, (7) data analysis, and (8) draw conclusions.

Data Collection and Analysis

In this survey study, the results of the questionnaire were analyzed by the percentage technique. Percentage analysis is used to see the frequency of answers and respondents' phenomena in the field. While the interview data that has been collected will be analyzed descriptively through data reduction and data coding. To check the data validity is done by the triangulation method. It is done by comparing the results of the questionnaire with the results of interviews, comparing the circumstances and perspectives of respondents with various opinions and views of experts, and comparing the results of interviews with the contents of other related documents (Creswell, 2014; Miles & Huberman, 2016).

RESULTS

Data retrieval of research through questionnaires and interviews has been carried out. The collected data is presented in the form of tables and images and analyzed carefully. The following results of the survey questionnaire have been obtained from student respondents, teachers, and parents are shown in **Table 5** and **Table 6.**

TABLE 5. *Distribution of mathematical disposition survey results*

	Mathematical Disposition					
Category	Students	Percent	Teachers	Percent	Parents	Percent
Very High	2	10%	3	15%	0	0%
High	4	20%	8	40%	1	5%
Moderate	9	45%	6	30%	10	50%
Low	5	25%	3	15%	7	35%
Very Low	0	0%	0	0%	2	10%
Total (N)	20		20		20	

Mathematical disposition categories are high and very high (see **Table 5**), in the student group it reaches 30%, teachers 55%, and parents only 5%. In more detail, the achievement of each indicator of mathematical disposition can be seen in **Table 6** below.

TABLE 6. *Descriptive statistic of mathematical disposition*

Indicators	Students		Teachers		Parents	
	Mean	STDEV	Mean	STDEV	Mean	STDEV
Confidence	3.00	0.67	3.50	0.87	2.10	0.34
Flexibility	2.50	0.59	3.42	0.97	2.20	0.56
Usefulness	2.40	0.42	3.00	0.78	1.80	0.65
Perseverance	2.60	0.60	3.05	0.96	2.00	0.44
Curiosity	2.40	0.45	3.15	0.72	2.30	0.38
Appreciation	2.50	0.55	3.47	0.95	2.20	0.59
Metacognition	2.70	0.63	3.35	0.81	2.30	0.66
Overall	**2.59**	**0.56**	**3.28**	**0.87**	**2.13**	**0.52**
Levels	Moderate		High		Moderate	

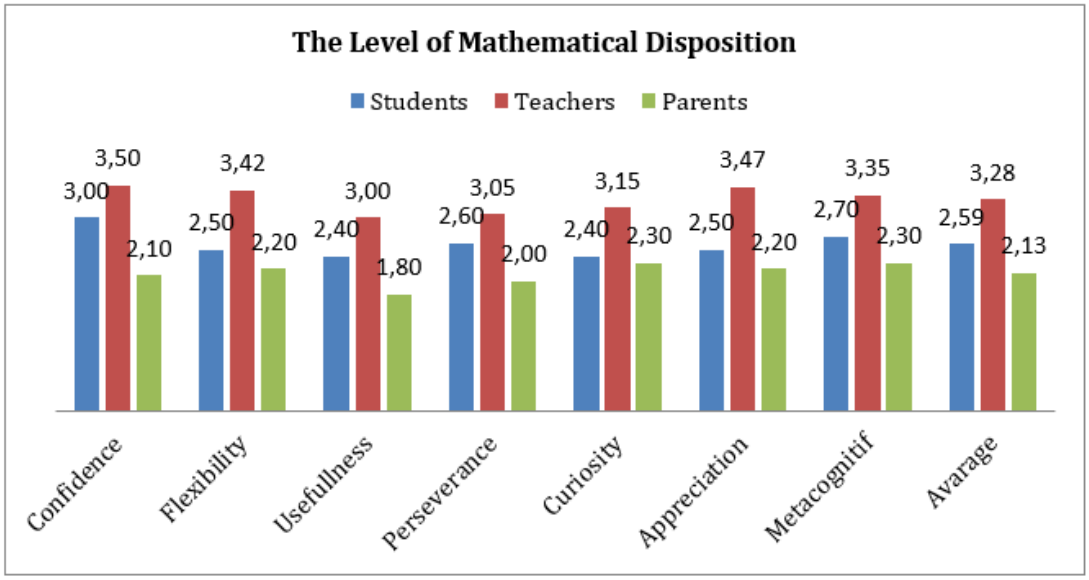

FIGURE 1. *Level of mathematical disposition*

The data in **Table 6** shows the level of mathematical disposition of elementary school students as a whole at a "moderate" level, teachers at a "high" level, and parents at a "moderate" level but tends to below. In **Figure 1**, a comparison of the achievement of the mathematical disposition indicators of students, teachers, and parents can be seen.

To strengthen the survey data that had been obtained (**Table 5** and **6**), further research was carried out through interviews with selected subjects. The following is a snippet of the results of interviews with surveyed subjects.

Mathematical disposition of the students'

1st interview: ...

R : *Do you like math?*
S-01 : *I quite like math*
S-02 : *I don't like math*
R : *Are you confident in learning math class?*
S-01 : *Mathematics is full of challenges, especially when there are quizzes from the teacher*
S-02 : *I was always worried when I was in math class*
R : *Is math useful to you?*
S-01 : *Math helps me learn to solve problems*
S-02 : *It's pretty hard to say*

In the 1st interview students say that mathematics is useful for supporting learning methods to solve problems. However, students are less interested in learning mathematics. Students are always worried about mathematics. Student attitudes (S-02) indicate that students are not confident and have negative mathematical dispositions (Casinillo et al., 2020; Hutajulu et al., 2019). A negative disposition towards mathematics can affect students' beliefs when studying mathematics (Feldhaus, 2014).

2nd interview: ...

R : *Do you solve math assignments persistently?*
S-01 : *Sometimes I give up if there are so many things to think about*
S-02 : *It's a tough task and I don't want to fight for it*
R : *How would you feel if you failed a math assignment?*
S-01 : *Fear of getting punished by parents*
S-02 : *Just ordinary, no problem*

In the 2rd interview, this persistence and diligence attitude has not been possessed by students optimally. Students easily give up in the face of difficulties in learning mathematics and have not made it a learning challenge. Under these conditions, students' motivation to learn seems to decrease. Obviously, distance learning has the effect of decreasing learning motivation and learning outcome (Lin et al., 2017). This contradicts the expectations of teachers and parents that students must study hard and diligently, to get the best results.

3rd interview: ....

R : *Is distance learning helping your math understanding?*
S-01 : *Often times I don't understand the teacher's explanation, because the screen on my cellphone is not clear*
S-02 : *I can't study online. I have to be accompanied by a teacher*

R : *What do you do if you don't understand (don't understand) learning mathematics?*
S-01 : *Yes, I have to study harder and ask the teacher a lot*
S-02 : *I will ask questions and discuss with friends or find out via the internet*

The results of the interview excerpt imply that the students' curiosity is the initial capital for the implementation of a productive learning process (Casinillo et al., 2020; Hutajulu et al., 2019). High curiosity will encourage students to fulfill the desire to gain knowledge. To fulfill his curiosity that will lead students to the process of searching for more information and then finding (Lin et al., 2017). Efforts that students can make in the search process include asking the teacher directly, discussing with friends, and looking for some material in several other book sources besides handbooks or the internet then comparing and finding conclusions.

Mathematical disposition of the parents

In addition to the student's own factors, the environment also affects students' learning success (Nakayama, et al., 2007). Environmental factors that are meant include the role and readiness of parents in guiding students to do distance learning.

4th interview: ….
R : *Are you good at math?*
P-01 : *Wow. Math is a difficult thing.*
P-02 : *Yes, only for certain things.*
R : *Do you help children (students) while studying at home (online)?*
P-01 : *I can only communicate with the teacher*
P-02 : *I help according to the knowledge I have, but sometimes math is difficult*
R : *What do you do when your child learns remotely at home?*
P-01 : *As much as possible I supervise children's learning*
P-02 : *Motivate children to be enthusiastic about learning*

Parents who always pay attention and motivation to their children, especially in children's learning activities at home, will make children more active and more enthusiastic in learning. So that the learning outcomes or learning achievements achieved by students are better(Lin et al., 2017). They (children) come to know that it is not only themselves who want to progress and succeed, but their parents also have the same desire. The roles of parents in helping children learn from home include: (1) Parents ensure their children learn online safely, (2) Encourage children to learn online, and (3) actively engage with teachers at school.

Mathematical disposition of the teachers

To find out the mathematical disposition of teachers, apart from the questionnaire data, interviews were also conducted with representatives of teachers who teach in elementary schools.

5th interview: ….
R : *Do you solve math problems persistently?*
T-01 : *I will try hard until I find a solution*
T-02 : *I will do it according to the manual only*

R : *Are you always looking for other solutions for your child (student) when learning mathematics (online)*
T-01 : *It is quite difficult to learn math remotely (online) with children*
T-02 : *I just do according to the general procedure*
R : *Do you convey to students the usefulness of the mathematics material being studied?*
T-01 : *I teach problem-solving procedures*
T-02 : *Sometimes*

Based on conversation snippets (5th interview) there is one learning stage that is not carried out by the teacher, namely motivating prospective mathematics teachers by conveying the usefulness of the material to be studied (Feldhaus, 2014). Teachers tend to only teach problem-solving procedures (cognitive and psychomotor aspects) rather than develop mathematical dispositions (affective aspects).

6th interview: ….
R : *Do you solve math problems persistently?*
T-01 : *I will try hard until I find a solution*
T-02 : *I will do it according to the manual only*
R : *Are you always looking for other solutions for your child (student) when learning mathematics (online)*
T-01 : *It is quite difficult to learn math remotely (online) with children*
T-02 : *I just do according to the general procedure, because they are very passive*
R : *Do you do anything when students have difficulty learning mathematics?*
T-01 : *I ask students to follow my example*
T-02 : *With pleasure, I ask students to ask questions*

Paying attention to the teacher's answer during the interview, the teacher is very open, flexible and gives appreciation to students for asking questions about things that have not been understood. The purpose of this statement is for students to be active and for students to to understand mathematics better, the teacher needs to provide examples and encourage alternative solutions (Yeh, et al., 2019).

DISCUSSION

The score for each indicator of mathematical disposition in the student group has not been encouraging. In fact, six of the seven indicators are still below the score of 3.00 (see **Table 6**). So it can be said that the level of students 'mathematical dispositions has not yet reached the level of productive dispositions (Colita & Genuba, 2019). It seems that students' mathematical dispositions still need to be improved through creative and innovative learning carried out by teachers. As the opinion of experts (Beyers, 2011; Feldhaus, 2014; Kusmaryono et al., 2019), for effective mathematics learning, learning does not only focus on emphasizing procedures and understanding mathematical concepts but also involves developing students' mathematical dispositions.

Teachers as facilitators and role models in learning must appear perfect in managing distance learning. Like students, to be succeed in learning mathematics, teachers need high mathematical dispositions to reach a score of more than 4.00 to support their performance. On the other hand, parents who are expected to be able to help students study at home have a mathematical disposition level that tends to be "moderate" or towards a "low" level (see **Table 6**). The average score of the parents' mathematical

disposition questionnaire only reached 2.13, even if no indicator reached a score of 3.00. If this situation only makes parents apathetic and does not support student learning at home, it can be expected to affect students' mathematical dispositions.

The use of the internet as a medium for distance learning (online) does not always positively impact all students. This is supported by the students' mathematics disposition questionnaire results, which is still at a low level. It is because various factors influence the success of students in carrying out distance learning. Factors that influence student success include the environment and characteristics of the students themselves (Nakayama, et al., 2007).

In **Table 6**, it appears that the aspects of students' self-confidence in mathematics learning only reach a score of 3.00 (medium category) and other indicators are still below the score of 3.00. Some research results agree that someone confident will positively view himself and the situation they are experiencing. They believe in their abilities for realistic reasons, and they will do what they expect. If their hopes do not come true, they will continue to think positively and accept everything that happens. A study revealed that self-confidence has a positive relationship with student achievement (Arshad, et al., 2015; Ferradas, 2020). Meanwhile, curiosity will be steady if the student has high self-confidence. Students' mathematical disposition will develop when they learn aspects of mathematical competence (Facione, et al., 2015).

To sum up, it can be said that students' positive attitudes and beliefs in facing mathematics can affect their achievement in mathematics (Mazana, et al., 2019). On the contrary, a negative disposition towards mathematics will inhibit the improvement of their learning achievement (Feldhaus, 2014). Disposition is very necessary to support students' confidence in facing problems with high thinking, develop good habits and have a positive view of mathematics (Almerino et al., 2019; Facione et al., 2015).

Although some parents have a low mathematical disposition (see **Table 5** and the results of the 4th interview), parents are also responsible for student learning success. This role is shown by communicating actively with teachers at school. Given the importance of the role of parents in educating their children, several studies have shown that parents have an immense contribution to determining student achievement (Putri, et al., 2020).

Changes in student attitudes or dispositions towards a positive direction towards mathematics are indicators of teacher success in implementing mathematics learning. Teachers' positive attitudes towards mathematics can positively correlate with student achievement(Mazana, et al., 2019). Some of the factors that make distance learning experiences enjoyable are building an interactive learning community, creating and maintaining a positive learning environment, providing feedback quickly, and using various technologies to provide the right content(Chakraborty & Nafukho, 2014). Therefore, every learning process must be accompanied by a strong awareness and dedication in students and educators related to mathematical dispositions.

The results of this study further strengthen the assumption that the learning atmosphere is a forming factor for mathematical dispositions. Therefore, it takes time to change the habits of primary school teachers by implementing an effective distance-learning model (Zhao, 2019). Then the development of mathematical dispositions will be more positive as the teacher's activities are always given more opportunities for students to master mathematics, realize the benefits of persistence, and experience mastery of mathematics (Lane-Garon & Richardo, 2013).

A disposition has many components, and a person can show a strong disposition for a particular component or show a weak disposition for another component. For example, a student has a strong desire to find other ways to solve problems, but he does not desire to see whether the way he is doing in solving the problem is correct or there are other better ways. This situation can change at any time, depending on the incoming stimulus. If the incoming stimulus is considered a challenge, the student will change his disposition (negative disposition) to curiosity (positive disposition)(Picciano, 2017).

Three factors need to be considered to determine mathematical disposition: the presence or absence of a mathematical disposition, its direction, and its intensity. For example, someone states that they like mathematics, and another person says they quite like mathematics so that the two students can be said to have a positive mathematical disposition (same direction) (see **Table 5**). The difference is in the intensity; the first person likes it while the second person quite likes mathematics (see **Table 5**).

CONCLUSION

Based on the findings and discussion of the research, it can be concluded that the level of students' mathematical disposition in distance learning is at a moderate level, the mathematical disposition of parents is at a moderate level. However, it tends to below, while the teacher's mathematical disposition is at a high level. Three factors need to be considered to determine a mathematical disposition: the presence or absence of a mathematical disposition, direction, and intensity. An interactive learning atmosphere (teacher-student and student-student), fast feedback from the teacher, technology, and mathematical content are factors forming mathematical dispositions. This supports the proposition that rules and practices influence the disposition (students, teachers, parents) towards mathematics learning in schools, teacher-student relationships, and expectations determining the learning climate (Colita & Genuba, 2019). Therefore, every learning process must be accompanied by a strong awareness and dedication in students and educators related to mathematical dispositions.

As a suggestion that mathematics learning (distance learning) in the midst of the COVID-19 pandemic can run well, (1) teachers motivate students through creative and innovative learning planning so that students do not feel bored; (2) Parents participate actively in building motivation to learn for their children and continue to accompany their learning process; (3) Students should take the time to explore the material and prepare discussion questions; and (4) students, teachers, and parents must work together to improve positive dispositions in distance learning.

The limitation of this survey research only includes 60 respondents with each student, teacher, and parent as many as 20 respondents at the primary school level. It would be better if other researchers could survey at the senior high school level with many respondents. Surveys with more significant and more extensive respondents will certainly provide empirical data that can be significantly generalized.

ACKNOWLEDGEMENT

Thanks to the leaders of the Universitas Islam Sultan Agung Semarang and the Chairperson of the LPPM who have provided research funding support so that this research can run smoothly.

REFERENCES

1. Adi, M., Siregar, P., & Lisma, E. (2019). The effect of disposition student mathematics learning achievement in medan state 28 junior high school. *Journal of Community Service and Research*, *3*(1), 22–27.
2. Almerino, Etcuban, & De Jose. (2019). Students' affective belief as the component in mathematical disposition. *International Electronic Journal of Mathematics Education*. *14*(3), 475-487. https://doi.org/10.29333/iejme/5750
3. Arshad, M., Zaidi, S.M.I.H., & Mahmood, K. (2015). Self-Esteem and academic performance among university students, *Journal of Education and Practice, 6*(1), 156-162.
4. Barham, A.I. (2020). Exploring in-service mathematics teachers' perceived professional development needs related to the strands of mathematical proficiency.

EURASIA Journal of Mathematics, Science and Technology Education, 16(10), 1-18. https://doi.org/10.29333/ejmste/8399

5. Beyers, J. (2011). Development and evaluation of an instrument to assess prospective teachers ' dispositions with respect to mathematics. *International Journal of Business and Social Science*, *2*(16), 20–33.
6. Chakraborty, M., & Nafukho, F.M. (2014). Strengthening student engagement: What do students want in online courses? *European Journal of Training and Development, 38*(9), 782-802.
7. Casinillo, L. F., Palen, M. A. E., Casinillo, E. L., & Batidor, P. G. (2020). Assessing senior high student's learning experiences in mathematics. *Indonesian Journal of Educational Studies*, *23*(1), 44–60. https://doi.org/10.26858/ijes.v23i1.13437
8. Colita, M., S & Genuba, R. L. (2019). School climate and mathematical disposition of grade 10 students*. International Journal of Trends in Mathematics Education Research*, *2*(4), 173-178.
9. Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches*. SAGE Publications, Inc. 2455 Teller Road Thousand Oaks, California 91320.
10. Dina, Z. H., Ikhsan, M., & Hajidin, H. (2019). The Improvement of Communication and Mathematical Disposition Abilities through Discovery Learning Model in Junior High School. *JRAMathEdu (Journal of Research and Advances in Mathematics Education)*, *1*(1), 11–22. https://doi.org/10.23917/jramathedu.v1i1.6824
11. Esezi Isaac, O., & Eric Chikweru, A. (2018). Test for significance of Pearson's correlation coefficient (r). *International Journal of Innovative Mathematics, Statistics & Energy Policies*, *1*(1), 11–23.
12. Facione, P.A., Giancarlo, C.A., Noreen, C., & Gainen, J. (2015). The disposition toward critical thinking. *Journal of General Education*, *44*(1), pp. 1–17.
13. Feldhaus, C. A. (2014). How pre service elementary school teachers' mathematical dispositions are influenced by school mathematics. *American International Journal of Contemporary Research*, *4*(6), 91–97.
14. Ferradás, M. d M., Freire, C., Núñez, J.C, & Regueiro, B. (2020). The relationship between self-esteem and achievement goals in university students: The mediating and moderating role of defensive pessimism. *Sustainability, 12*(7531), 1-14 https://doi:10.3390/su12187531
15. Haji, S. Yumiati, & Zamzaili. (2019). Improving students' productive disposition through realistic mathematics education with outdoor approach**.** *Journal of Research and Advances in Mathematics Education, 4*(2), 101-111.
16. Kusmaryono, I., Suyitno, H., Dwijanto, D., & Dwidayati, N. (2019). The effect of mathematical disposition on mathematical power formation: Review of dispositional mental functions. *International Journal of Instruction*, *12*(1), 343-356. https://doi.org/10.29333/iji.2019.12123a
17. Lane-Garon, P.S., & Richardo, T. (2013). Mediator mentors: Improving school climate, nurturing student disposition. *Conflict Resolution Quarterly, 21*(1), 47-67.
18. Lin, M. H., Chen, H. C., & Liu, K. S. (2017). A study of the effects of digital learning on learning motivation and learning outcome. *Eurasia Journal of Mathematics, Science and Technology Education*, *13*(7), 3553–3564. https://doi.org/10.12973/eurasia.2017.00744a
19. Mazana, M.Y., Montero, C.S., & Casmir, R.O. (2019). Investigating students' attitude towards learning mathematics. *International Electronic Journal of Mathematics Education, 14*(1), 207-231. https://doi.org/10.29333/iejme/3997
20. Miles, M. B., & Huberman, M. A. (2016). Qualitative data analysis: A resource book on new methods. In *Universitas Indonesia_UI Press* (11th ed., Issue 1). Universitas Indonesia (UI-Press).
21. Nakayama, M., Yamamoto, H., & Santiago, R. (2007). The Impact of learner characteristics on learning performance in hybrid courses among japanese students.

Electronic Journal e-Learning, 5(3), 195-206.
22. NCTM. (1989). *Principles and Standard for School Mathematics*. Resto, Virginia: The National Council of Teachers of Mathematics, Inc.
23. Nassaji, H. (2015). Qualitative and descriptive research: Data type versus data analysis. *Language Teaching Research*, *19*(2), 129–132. https://doi.org/10.1177/1362168815572747
24. Picciano, A. G. (2017). Theories and frameworks for online education: Seeking an integrated model. *Online Learning Journal*, *21*(3), 166–190. https://doi.org/10.24059/olj.v21i3.1225
25. Ponto, J. (2015). Understanding and evaluating survey research. *Journal of the Advanced Practitioner in Oncology*, *6*(2), 168–171.
26. Putri, I.A.S., Yasa, P.N.S., & Ningsih, N.A.P. (2020). The influence of teacher teaching and guidance of parents on student achievement with mediation of learning motivation in Santo Yoseph Denpasar. *Jagadhita, 7*(2), 138-147.
27. Rapanta, C., Botturi , L., Goodyear, P., Guàrdia, L., & Koole, M.(2020). Online university teaching during and after the covid-19 crisis: Refocusing teacher presence and learning activity. *Postdigital Science and Education*, *2*(7), 923–945. https://doi.org/10.1007/s42438-020-00155-y
28. Siregar, M.A.P, & Lisman, E. (2020). The effect of disposition on student mathematics learning achievement in Medan State 28 junior high school. *Journal of Community Service and Reserch*, *3*(1), 22-27.
29. Taber, K. S. (2018). The use of Cronbach's Alpha when developing and reporting research instruments in science education. *Research in Science Education*, *48*(6), 1273–1296. https://doi.org/10.1007/s11165-016-9602-2
30. Tan, F.D.H., Whipp, P.R, Gagne, M., & Quaquebeke, N.V. (2018). Students' perception of teachers' two-way feedback interactions that impact learning. *Social Psychology of Education*, *2*(9), 1-20 https://doi.org/10.1007/s11218-018-9473-7
31. Zhao, F. (2003). Enhancing the quality of online higher education through measurement. *Quality Assurance in Education, 11* (4), 214-221.

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