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Perceptions of Prospective Mathematics Teachers on Online Learning during Covid-19 Pandemic: Difficulties, Strategy, and Satisfaction

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ABSTRAK

Munculnya pandemi Covid-19 telah menciptakan ketidakpastian yang besar terhadap masa depan pendidikan dan mengharuskan guru dan siswa beralih dari pembelajaran tatap muka ke pembelajaran daring. Penelitian ini menganalisis persepsi calon guru matematika terhadap pembelajaran online. Penelitian ini dilakukan dengan menggunakan metode survei untuk melihat persepsi calon guru matematika dalam pembelajaran daring. Responden terdiri dari 953 calon guru matematika dari 34 provinsi di Indonesia, terdiri dari 172 laki-laki dan 781 perempuan. Instrumen yang digunakan untuk mengumpulkan data adalah angket dan pertanyaan terbuka. Berdasarkan hasil persentase dari masing-masing temuan penelitian ini, data disajikan dan dianalisis secara lebih kualitatif. Ada tiga temuan utama dalam penelitian ini. Pertama, calon guru matematika mengalami permasalahan dalam pembelajaran daring, yaitu permasalahan pada teknologi, jaringan, kuota internet, motivasi dan manajemen diri, kendala dosen, jumlah mata kuliah, faktor sosial ekonomi, sumber belajar, interaksi dengan teman sejawat, dan permasalahan kesehatan. Kedua, calon guru mempunyai strategi untuk mengatasi hal tersebut, antara lain meningkatkan kolaborasi teman sejawat, mengatur waktu belajar, dan mengoptimalkan sumber belajar. Ketiga, calon guru menyatakan ketidakpuasan terhadap pelaksanaan pembelajaran daring dan alasan ketidakpuasan tersebut. Penelitian ini berimplikasi pada guru dan calon guru matematika untuk memahami pembelajaran online dengan memanfaatkan ICT dan meningkatkan upaya untuk mandiri.

ABSTRACT

The emergence of the Covid-19 pandemic has created a great degree of uncertainty about the future of education and has required teachers and students to shift from face-to-face to online learning. This study analyze prospective mathematics teachers' perceptions of online learning. This research was conducted using a survey method to see the perceptions of prospective mathematics teachers in online learning mode. Respondents comprised 953 prospective mathematics teachers from 34 provinces in Indonesia, consisting of 172 men and 781 women. Instruments used to collect data were questionnaires and open questions. Based on the percentage results of each of the findings of this study, the data is presented and analyzed more qualitatively. There are three main findings in this study. First, prospective mathematics teachers experience problems in online learning, namely problems with technology, networking, internet quota, motivation and self-management, lecturer constraints, number of courses, socioeconomic factors, learning resources, interactions with peers, and health problems. Second, prospective teachers have strategies to overcome this, including increasing peer collaboration, managing study time, and optimizing learning resources. Third, prospective teachers express dissatisfaction with the implementation of online learning and the reasons for this dissatisfaction. This research has implications for teachers and prospective mathematics teachers to understand online learning by utilizing ICT and increasing efforts to be independent.

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1. INTRODUCTION

The widespread spread of the Coronavirus in various countries forces us to see that the world is changing. The Corona Virus was still rampant in society. The covid-19 pandemic has resulted in massive changes in all sectors of life. We can see how technological, economic, political, and educational changes occurred during the crisis due to covid-19 (Jandrić et al., 2020; Kim et al., 2021). This change requires everyone to adapt and respond with attitudes and actions and always learn new things. In Indonesia, the covid-19 pandemic has resulted in quite drastic educational changes. This condition is due to policy changes in learning on campus and at school. What stands out the most is the change in the learning system from face-to-face to online learning (Amir et al., 2020; Z. M. Basar et al., 2021). The implementation of the social restriction policy requires students to study at home. In addition, the use of information technology that suddenly shocked educators, students, parents, and everyone at home created panic at the start of the covid-19 pandemic. The covid-19 pandemic has shocked almost every region, from neighborhoods, provinces, centers, and even the world.

As a result of the covid-19 pandemic, there is an online learning pattern that must be part of every lesson. Students and teachers should try to get used to online learning and teaching (Brown et al., 2020; Dennis, 2021; Kang, 2021). However, most teachers must still be ready to implement an online learning system suddenly. To anticipate this, teachers need technology-based learning based on the capacity and availability of technology (Alobaid, 2020; Raffaghelli et al., 2020; Ray et al., 2020). The critical thing for implementing learning is that teachers and students must have online learning tools. At a minimum, teachers and students must have information and communication technology equipment, laptops, smartphones, and video conferencing support tools (Alobaid, 2020; Engelbrecht et al., 2020; Mathivanan et al., 2021). The existence of minimum equipment that teachers and students must own needs to be considered jointly by both the district/city, provincial and central governments, including parents for schools managed by the community (Engelbrecht et al., 2020; Purcell & Lumbreras, 2021). This condition also occurs in prospective mathematics teachers currently studying at campuses in Indonesia.

Students must stay at home and attend online lectures. Some prospective math teachers, especially those unfamiliar with modern education and integrating technology into education, may need assistance (Bansak & Starr, 2021; Ellis & Bliuc, 2019). This condition will become an obstacle if universities still follow the old lecture model and with students who are sometimes passive. Therefore, there is a need to think about teaching and learning that utilizes technology and changing old models into more modern models to prepare students for the future. Relevant research that has been there before has mainly discussed online learning. Online learning is becoming more prevalent in higher education with the advantages of flexibility and accessibility (Kößler & Nitzschner, 2015). This condition is in line with research namely how students' attitudes on campus when learning online and their continuous attention when taking online courses are seen from independent learning (Zhu et al., 2020). Learning that is carried out online is expected to improve student learning skills. In addition, online learning is expected to be culturally responsive (Al-Balas et al., 2020; Coffey et al., 2020; Smith & Ayers, 2006).

Research on the perceptions of prospective mathematics teachers in online learning is seen from the difficulties encountered, the strategies employed, and the satisfaction in doing so, less than research on online learning in general, as stated above. Several studies on students' perceptions of online learning have focused more on the perceptions and barriers of medical students in learning online during the Covid-19 pandemic (Aker & Mıdık, 2020; Verma et al., 2020; Wu et al., 2021). However, there has been no research that explicitly examines prospective mathematics teachers regarding barriers or difficulties, strategies, and student satisfaction in participating in online learning from several online learning studies. Therefore, this research aims to explore prospective mathematics teachers' perceptions of online learning (Agarwal & Kauhshik, J., 2020; Fatani, 2020). The perception in question is the perception of future mathematics teachers about difficulties, strategies, and satisfaction during online learning during the COVID-19 pandemic. The uniqueness or novelty of this research lies in exploring perceptions of prospective mathematics teachers, which is very useful for research on the next math teacher candidate. The perceptions of prospective mathematics teachers are fully disassembled (in the form of strategic difficulties and satisfaction of prospective mathematics teachers in online learning) in this study results and discussion section. The aims of this study is to analyze prospective mathematics teachers' perceptions of online learning.

2. METHOD

This study employs a survey approach to perform quantitative analysis. By observing selected samples of the population, survey design allows for a quantitative or numerical description of patterns, behaviors, or views in a population (Creswell, 2017). The survey included 953 mathematics education

teacher candidates in Indonesia who are still pursuing their undergraduate degrees. Respondents for mathematics teacher candidates came from 31 provinces in Indonesia, ranging from Aceh to Papua. Jambi Province had the highest number of candidates (15.26 percent), with candidates from three other provinces (Riau, Lampung, and South Sulawesi) accounting for the remaining 0.1 percent. Respondents were prospective mathematics teachers, with 172 men (18.09 percent) and 781 women among them (81.95 percent).

We consider it essential to know where prospective mathematical teachers are living, because during online learning it will affect their perceptions. This condition is supported by several studies emphasizing the impact of residence and sleeping quarters on student learning success during university (Patricia Aguilera-Hermida, 2020; Reynolds, 2020). Therefore the following variables were examined in addition to the primary data in Table 1: data on how prospective mathematical teachers were generated when they entered campus, whether or not they were working, the tuition fee source and the number of online learners. The data summarized in Table 1.

Table 1. Demographic Basic Variables of Study Population

Variables	N	Percent (%)
Gender of Student		
Males	172	18.05
Females	781	81.95
Total	953	
Respondent's Province of Origin		
Nangroe Aceh Darussalam	30	3.15
North Sumatra	19	1.99
West Sumatra	24	2.52
Riau	1	0.10
Riau islands	4	0.42
Jambi	155	16.26
Bengkulu	3	0.31
South Sumatra	123	12.91
Bangka Belitung Islands	19	1.99
Lampung	1	0.10
Banten	10	1.05
West Java	77	8.08
Jakarta	20	2.10
Central Java	94	9.86
Yogyakarta	22	2.31
East Java	52	5.46
Bali	9	0.94
West Nusa Tenggara	19	1.99
East Nusa Tenggara	14	1.47
West Kalimantan	48	5.04
Central Kalimantan	9	0.94
South Borneo	96	10.07
East Kalimantan	7	0.73
Gorontalo	16	1.68
North Sulawesi	16	1.68
Central Sulawesi	3	0.31
South Sulawesi	1	0.10
Southeast Sulawesi	3	0.31
North Maluku	29	3.04
Maluku	25	2.62
West Papua	4	0.42
Total	953	
Residence		
Family/Siblings in residence	866	90.87
Boarding Schools/Dormitories/Orphanages	9	0.94
Boarding with friends / rented	78	8.18
Total	**953**	

Table 1 shows that the total number of participants dominated by mathematics prospective teachers for the first, second and third years, namely 86.78%. The other 13.22 percent are candidates for fourth, fifth and sixth year mathematics teachers. The following data are the source of school fees, namely 18,47% full bursaries, 4,2% partial bursaries, and 77,33% independent costs. It is also explored because this source of tuition fees indirectly affects the achievement of college students. The study of previous study show the effect of tuition costs on the success of students in college supports this condition (Gansemer-Topf et al., 2018; Orr, 2015). Another demographic basic variables of study population is show in Table 2.

Table 2. Another Demographic Basic Variables of Study Population

Variables	N	Percent (%)
Academic Year		
2019/2020	241	25.29
2018/2019	268	28.12
2017/2018	318	33.37
2016/2017	111	11.65
2015/2016	12	1.26
2014/2015 and above	3	0.31
Total	953	
Students work		
Work	188	19.73
Does not work	765	80.27
Total	953	
Source of tuition fees		
Full scholarship	176	18.47
independent costs	737	77.33
partial scholarship	40	4.20
Total	953	
Online Learning		
Yes	950	99.69
Not	3	0.031
Total	953	

This study's instruments used to collect data were questionnaires and open questions. Two experts in the field validate the instrument for content validation. The questionnaire results are presented quantitatively by calculating percentages (Ratminingsih et al., 2022). Then, based on the percentage results of each of the findings of this study, the data is presented and analyzed more qualitatively.

3. RESULT AND DISCUSSION

Result

This section describes the research findings one by one, which consist of online learning tools, online learning difficulties, online learning strategies, and mathematics prospective teachers satisfaction. Difficulties in learning online consist of tools for technology, internet quota, and network, learning difficulties and self-management for students, constraints from lecturers, too many assignments, and socioeconomic factors and health problems. In addition, it also describes the strategies used by mathematics prospective teachers in overcoming obstacles that arise as well as satisfaction and dissatisfaction with online learning.

Synchronous asynchronous education

During the covid-19 pandemic in Indonesia, lectures are given the online learning using Internet-connected laptops, tablets and smartphones. Learning is done both in synchronization and asynchronization. As shown in **Table 3** show the online lectures are available.

Table 3. Synchronous and Asynchronous Learning

Synchronous Learning		Asynchronous Learning	
Online Learning Tools	**Percent (%)**	**Online Learning Tools**	**Percent (%)**
Zoom	72.82	Whatsapp	96.12
Lark Meeting	0.84	Google classroom	77.23
Skype	1.89	E-mail	62.54
Vmeet	0.52	Learning management system	43.13
Umeetme	0.73	Youtube	30.75
Google meeting	24.87	Google form	24.13
Webex meeting	14.38	Google drive	17.52
Big blue button	0.31	Edmodo	13.85
		Telegram	6.82
		Hangouts	4.51
		Facebook	3.25
		Instagram	2.94
		Schoology	1.15
		Twitter	0.42
		Edlink	0.42
		Moodle	0.42
		Big blue button	0.31
		Smartclass	0.10

Table 3 shows that learning tools are mainly done via the Whatsapp app to facilitate asynchronous learning. Furthermore, another tool used by prospective teachers of mathematics is a Google classroom for asynchronous learning.

Online Learning Difficulties

This study also examined barriers or problems faced by prospective mathematics teachers during the on line learning process, in addition to discussing online learning tools. The results of the study found that the obstacles faced were related to (1) technology tools, (2) networks and internet quotas, (3) student difficulties with learning motivation or self-management, (4) constraints from lecturers, (5) too many coursework, (6) social and economic factor, (7) lack of direct contact between students and their peers, (8) learning resources, and (9) health problems. Table 4 illustrates the total obstacles and difficulties faced in online study by prospective mathematics teachers.

Table 4. Online Learning Difficulties

Difficulties	Indicator	Percent (%)
Technology Tools	✓ Laptops/netbooks/notebooks do not support online apps for learning.	29.59
	✓ The smartphone cannot support applications for online lectures.	16.47
	✓ There are no laptop and support tools available.	0.21
	✓ The smartphone was damaged, so it was difficult to participate in online conferences and borrow a smartphone from a friend.	0.10
Internet and Network Quota	✓ The network is weak or does not even have a signal	49.74
	✓ Internet quota is very wasteful during online lectures	72.93
	✓ Insufficient internet quota	54.25
	✓ Internet packages difficult to purchase because of large social restrictions	19.83
	✓ Hours of power failure is common to lose the signal	0.10
Learning motivation	✓ Failure to understand online lecture material.	72.82

Difficulties	Indicator	Percent (%)
and self management challenges for students	✓ Spend a lot of time on social media access / play (Facebook, Instagram, Twitter, Telegram, Whatsapp, etc.).	38.20
	✓ Spend a lot of time watching Youtube or other movies/drama/video.	24.66
	✓ Spend a lot of time at home/boarding house and dormitory in my hobbies.	18.26
	✓ Very long with family, so sometimes forget to take many tasks or to take online lessons late.	0.10
	✓ Lecturers only teach via Whatsapp.	17.63
	✓ Readers who are not at all explaining the material. Only instructed study material for the group, made a summary and gave tasks.	0.31
Limits by lecturers	✓ The lecture was not scheduled for the lecturer (not disciplined).	0.21
	✓ Readers who answer don't react quickly and don't sometimes answer messages.	0.10
	✓ Lecturers give too many tasks but little explanation.	0.10
There are too many tasks	✓ Too much learning.	68.31
Factor of socio economics	✓ There is no comfortable atmosphere for study in the house/boarding house/dormitory.	34.31
	✓ Work to assist parents because the economic circumstances are falling.	0.10
	✓ Drastically decreased the financial situation.	0.10
Failure to have direct contact with students	✓ It is difficult for students to discuss with friends online studies.	64.85
	✓ Without classmates, students can't study online alone.	43.34
Resources for Learning	✓ The resources available for learning are limited.	51.84
Problems of health	✓ Physical conditions that are not supportive for too long before the computer screen/laptop/smartphone (e.g., eyes get tired, back pain).	39.45

It can be seen from Table 4 show that the biggest barrier for potential teachers in mathematics relating to on-line learning technology is the fact that on-line learning applications are not being supported by laptop/netbook/notebooks. Smartphones for future math teachers cannot also support applications for online lectures. Future mathematics teachers still have no laptops and supporting tools. Another barrier to attend online lectures or first purchase a smart phone from a student is a damaged smartphone. The greatest challenge facing prospective mathematics teachers during their online learning phase is the weaking signal or internet network restrictions. Students living in rural areas are often forced into high places to get a strong signal link to carry out the online math method of studying. The frequent use of online maths often leads to wasteful Internet limits. Power failures frequently in many Indonesian regions often lead to unreliable web signals. The challenges faced by lecturers who conduct online lectures during the COVID-19 pandemic are similar to the analysis results. According to prospective mathematics teachers, sometimes class schedules are irregular; often, lecturers do not respond quickly to student questions and sometimes do not answer messages. Besides that, the lecturer gives too many assignments that need more explanation. However, the percentage of obstacles by this lecturer is only tiny. This condition means these constraints are only casuistic and local in certain areas.

There are still so many difficulties with online schooling and college employment. Table 4 shows that 68, 31% of the problems for prospective teacher mathematics students are assigned too many tasks. Due to the fact that online research is more accumulating and much diversion. Prospective mathematics teachers who were respondents in this study claimed that face-to-face courses have a distinct feeling. While not a major hurdle, the success of future math teachers in online learning during the COVID-19 timeframe was also affected by socio economic factors. Adequate home learning services are promised to potential teachers of mathematics with a strong socio-economic status. Facilities and facilities that are more conducive to moderately or weakly socio-economic mathematics instructor candidates.

The social agenda of the COVID-19 pandemic leads to the online implementation of all learning processes. Even without classmates, students study online alone. The challenge of not having the right to get together often contributes to a sweet and uncomfortable environment for prospective math teachers. The findings of this research are followed by the reservations made about insufficient learning opportunities by prospective mathematics instructors. While a large number of learning tools are available, prospective mathematics teachers have difficulty choosing the correct learning resources during online learning. Another finding is that prospective mathematics teachers lament about physical conditions that cannot be found too long in front of a computer/laptop/smartphone device (for example, the eyes get tired quickly, back pain). Complaints about this health issue amounted to 39.45%. Therefore, the physical state of students when learning online is very necessary to pay heed. Health issues impair the attention of students when studying. In addition, this study shows the tactics used during the online learning pandemic by candidates to resolve hurdles. The findings of this study revealed that future mathematical instructor methods are used in five ways to overcome challenges and problems. The approach is to collaborate with on-line peers, to read, to restructure management time to improve it, to optimize learning opportunities and to be involved students. **Table 5** presents the five conclusions.

Tabel 5. Strategies and Indicators of Online Learning

Strategies	Indicator	Percent (%)
Collaboration with Colleagues	✓ Learn with other students	16.26
	✓ Try to bond with other	
Effort	✓ Earnestly learn	5.25
	✓ The spirit of catching up with lagging material	
	✓ Learn to be independent	
Time Management	✓ Time not passing	16.58
	✓ Study and make tasks at the right time	
Optimize Resources	✓ Reading a number of books	24.87
	✓ To learn from youtube	
	✓ To make the internet an educational tool.	
	✓ Accessing/ surfing the internet	
Be an Active Student	✓ Ask and respond to questions in order to better understand the course content	8.92
	✓ Discuss with lecturers	
	✓ Communicate with lecturers	

Satisfaction of Prospective Mathematics Teachers

This study also illustrates the satisfaction of future mathematics teachers. Online learning can be seen from their satisfaction with the study of the mathematics teacher candidates. As many as 78,28 % of prospective mathematics teachers have said that learning from person to person is more enjoyable than online. In this study, as shown in **Table 6** reasons for the satisfaction of prospective mathematics teachers are also noted.

Table 6. Satisfaction of Prospective Mathematics Teachers

Satisfaction of prospective mathematics teachers	Percent (%)
Highly fun	4.20%
It's not more fun than lectures from person to person	78.28%
Satisfied reason	
Learning is more enthusiastic	3.67%
Train self-employed learning	54.98%
Has a much wider range of knowledge and skills to access data and information online	38.20%
Unsatisfied reason	
Boredom	20.67%
More and more concerned about limited ICT management	46.07%
More and more concerned about limited English mastery	24.55%
Compliance with future teachers of mathematics	17.10%

Discussion

This section explains the relationship between the research results presented in the results section and a number of other relevant studies. Exploration of the findings and links with relevant similar research answered the objectives of this study. An explanation of the discussion of prospective mathematics teachers' perceptions towards online learning consists of difficulties, strategies and satisfaction presented one by one in the following description.

Synchronous asynchronous education

Whatsapp is the most convenient for sending pictures, documents and pictures (Amry, 2014; Barhoumi, 2020; Susilo, 2014). This research corresponds to almost all lecturers, i.e. around 94%, who are active in using the Whatsapp online learning application (Gunawan & Suranti, 2020). The application is available for all teachers or prospective students on their smartphones. The application Whatsapp is fitted with a WAG feature to join a panel to discuss the lectures. Furthermore, all members can share files of shared types with this application. This is used by the lecturer to distribute teaching materials and tasks. Then students return to the WhatsApp group for their tasks. Furthermore, another tool used by prospective teachers of mathematics is a Google classroom for asynchronous learning. The application for the zoom enables students to understand the material easily by learning mathematics. Students can directly see and hear the lecturer's explanations (Gewin, 2020; Lathifah, Naili Darojatil, 2020; Wiratomo & Mulyatna, 2020). This application helps explain maths so that even face to face the learning atmosphere remains fun.

Online Learning Difficulties

The obstacles or problems prospective mathematics teachers face during the online learning process found in this study are in line with research conducted by several previous studies. Previous research with elementary school teachers as respondents, stated that teachers in online learning experienced problems during the pandemic (Erawati et al., 2021). The results of his research show that teachers experience problems in all dimensions, such as communication problems, learning methods, assessment, use of technology, network, mobile costs, internet data, and problems in online learning. Furthermore, the results of research conducted showed that teachers and students face many problems during online learning and teaching (Hafeez et al., 2022). Due to several issues, most teachers and students are dissatisfied with online learning and teaching. These problems can be solved by acquiring training, technical skills, and the development of information and technology.

Research conducted by previous study presented high school students' views on the covid-19 Period on Mathematics Learning (Rohati et al., 2021). Findings indicate that students expected face-to-face instruction to facilitate direct interaction with teachers and other students. In addition, students want to improve their ability to learn and organize their learning to be more effective. In addition, students expressed their opinions and responses about online mathematics education, including the level of mathematics material and technology (zoom app platform). In addition, the assignment deadlines were extended, and learning videos were used and utilized (Desalegn et al., 2012; Llinares & Chapman, 2019). Teachers can use the findings of this study to evaluate mathematics learning to improve teaching in the classroom, and other teachers can do the same. Technological tools play an essential role in assisting future mathematics teachers in personal learning by several studies carried out by the researcher before the COVID-19 pandemic as well as inline during the COVID-19 pandemic (Chinnappan & Thomas, 2000; Das, 2019). Research conducted by previous study which concentrates on exploring the role of applying ICT tools in teaching mathematics, states that learning and conversational technology (ICT) is an integral part of everyday life, including the teaching and learning process (Das, 2019). Furthermore other study states the importance of knowledge integration and communications technology (ICT) in mathematics teaching and learning at the College and Teacher Training School levels (Febrianto et al., 2015; König et al., 2020).

Rural areas are often forced to go to a high place to get a strong signal connection to carry out online mathematics learning methods. Besides that, the frequent use of online mathematics often causes a waste of internet quota. According to other study the internet has made it possible for students, teachers, and educational technologists, to communicate and create content, services, applications, and innovations for their core business (Barhoumi, 2020; Gunawan & Suranti, 2020). With internet access, various ideas, teaching and learning resources, techniques, and innovations have been widely shared. Findings of other study reports that although the use of the internet for educational purposes has increased among high school students, most of them use the internet as a social media to chat and socialize, watch movies and listen to music (Almasi et al., 2017). Wasted time, late submission of schoolwork, poor academic results, and school avoidance were reported among the effects of internet use in middle-class students. Another

obstacle related to internet use is the frequent power outages in many parts of Indonesia, which often results in unreliable web signals. Learning difficulties, self-management, and prospective mathematics teachers' weak motivation aligns with several other studies. Previous study findings show that students have home computers or smartphones and internet connections (A. M. Basar, 2021). In addition, it was found that their motivation for online learning was low. The next hurdle is that prospective math teachers need help self-regulating. According to previous study self-regulation in online mathematics learning strongly supports the value of online learning as a medium for advancing the development of mathematics for gifted students and all ages (Fung et al., 2014). This mode of engagement with mathematics is essential in actively engaging students in their learning.

The finding that the families' socio-economic circumstances often lead to the successful learning of their students. As previous study study found that the COVID-19 school quarantine hurt students' knowledge, social skills, socialization, and psychological and physical health (Gaidelys et al., 2022). This condition also causes macro and microeconomic problems. In short, research shows that distance education decreases student achievement and knowledge, miscommunication with peers, and conflict situations. Because of this, there are health concerns and additional financial challenges for parents and educational institutions providing distance education. Households are also experiencing additional spending on the infrastructure needed for distance learning and tutoring services. Other study also conducted similar research, showing that the socioeconomic conditions of parents affect student achievement (Safitri et al., 2021). Based on research findings, prospective mathematics teachers perceive that there are too many assignments during online learning. In line with research conducted by which explored the impact of the COVID-19 pandemic on student learning life (Al-Kumaim et al., 2021). Found that these students experienced obstacles when using IT platform applications for online learning. These barriers include work and excess information received from instructors. What is interesting about the findings of this study is the failure to contact students and their peers. Previous study revealed that most students still prefer it, class, up classes online (Alawamleh et al., 2022). This condition is because they need help taking online classes, such as shortages of motivation, understanding of the material, decreased communication between students and their instructors, and feelings of isolation caused by online classes (Barrot et al., 2021; Chu & Li, 2022). Other study found that student-to-instructor and student-to-student interactions cannot fully establish a cognitive, social presence and affective social presence (Wut & Xu, 2021).

Online Learning Strategy to Overcome Obstacles

Strategies are implemented by prospective mathematics teachers to tackle online learning constraints so that they are adapted to and accustomed to the conditions of the COVID-19 pandemic, which still occurs in Indonesia. Moreover, in line with the research carried out an active student there is a need for good management of time on the online learning, collaboration, effort and optimism resources (Mishra et al., 2020; Mulenga & Marbán, 2020; Sari et al., 2021). In addition, prospective teachers might implement a strategy to utilize appropriate learning resources and media to support online learning. One is utilizing media considered practical for its use in the learning process (Adedoyin & Soykan, 2020; Buelow et al., 2018). The high percentage of student dissatisfaction with the learning environment in their online classes shows this condition. This condition contrasts with research by previous researchs that has found online learning to be exciting and enjoyable for students. (Agarwal & Kauhshik, J., 2020; Yeh et al., 2019). Limited English mastery is why prospective mathematics teachers feel that the lack of satisfaction with learning online is so. Many of the materials for teaching are from English sources. About 17 percent of prospective teachers of mathematics had to use English learning resources. In addition, prospective mathematics teachers are restricted from English to Indonesian in translating teaching materials. Google can translate the language with google and several apps, but most of them do not fit in with the context discussed.

Furthermore, prospective mathematics teachers gave open answers to the online lectures. Prospective professors of mathematics said that learning online made them lazy. Another thing is that the final grade is concerned due to the difficulty of understanding the lecture material delivered face to face. Some interviewees responded quickly because almost all of the courses were being taught online and had to be on the laptop continually. Prospective mathematics teachers also reported that the network factor and the Internet quota are decreasing quickly because of online learning. Prospective teachers of mathematics also complained of the Internet and the network factor, which is decreasing rapidly because of on-line learning. Online learning must also provide a great deal of time according to future mathematics teachers as teachers can't always answer questions during learning in the Google classroom. Another problem is that discussions with classmates are difficult because they do not interact face-to-face. The

potential mathematical professors also complained about schools in this era of the COVID-19 pandemic that are having difficulties researching.

4. CONCLUSION

There are three key findings in this research. First, prospective mathematics teachers experience difficulties in online learning, such as technological tools, internet networks & quotas, learning motivation and self-management, teacher limitations, excessive coursework, socioeconomic factors, learning resources, and lack of direct contact between students and others. Secondly, prospective mathematics teachers have several online learning strategies, including partnerships, effort, time management, resource optimization, and active students. Students have expressed unconsciousness of online learning and its restructuring. Finally, prospective math teachers are unhappy with the online learning process and the reasons for dissatisfaction. This research implies the need for teachers and prospective mathematics teachers to understand online learning by utilizing ICT and increasing learning independence.

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