

## INTERESTS, PERCEPTIONS, AND COMMUNICATION PATTERNS OF PRE-SERVICE MATHEMATICS TEACHER IN LANGSA CITY DURING ONLINE LEARNING

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### Abstract

The aim of this study is to determine the interests and perceptions of mathematics education students in Langsa City towards distance learning, then the next is to study and analyze their communication patterns in learning during the Covid-19 pandemic. The method used in the study was an online survey of 114 mathematics education students from two different universities located in Langsa City, Aceh Province, Indonesia. Survey material contains questions and statements related to interests, perceptions, and communication patterns as the main problems in this study. With all the supports and obstacles, student interest in online learning is very low, 84.21% of respondents are not interested. Then, most of them find it difficult to concentrate while following the lesson. Boredom and difficulty finding relevant learning resources are also part of students' perceptions of online learning. Most of them (79.95%) find it difficult to learn, although 70.18% can still understand the learning material. Furthermore, the WhatsApp application (with all its features) is the most widely used medium of communication to support learning activities (71.93%), both for questions and discussions (both with lecturers and peers). Virtual meeting application is the second most used media for communication (28.07%). The pattern of communication in learning activities is dominated by communication between students and groups of students with a frequency level of 67.64%. Furthermore, communication is carried out between lecturers and groups of students and between lecturers and individuals with a frequency of 24.52% and 7.84%, respectively. According to the results of this study, we argue that it is necessary to develop an integrated blended learning design equipped with a directed communication pattern.

**Keywords:** Communication patterns, Interests, Perceptions, Online learning

### Abstrak

Tujuan dari penelitian ini adalah untuk mengetahui minat dan persepsi mahasiswa pendidikan matematika di Kota Langsa terhadap pembelajaran jarak jauh, selanjutnya mempelajari dan menganalisis pola komunikasi mereka dalam pembelajaran di masa pandemi Covid-19. Metode yang digunakan dalam penelitian ini adalah survei (online) terhadap 114 mahasiswa pendidikan matematika dari dua universitas berbeda yang berlokasi di Kota Langsa, Provinsi Aceh, Indonesia. Materi survei berisi pertanyaan dan pernyataan terkait minat, persepsi, dan pola komunikasi sebagai masalah utama. Dengan segala dukungan dan hambatan, minat siswa terhadap pembelajaran online sangat rendah, 84,21% responden tidak berminat. Sebagian besar sulit berkonsentrasi saat mengikuti pelajaran. Kebosanan dan kesulitan mencari sumber belajar yang relevan juga menjadi bagian dari persepsi siswa terhadap pembelajaran online. Sebagian besar (79,95%) merasa sulit untuk belajar, meskipun 70,18% masih dapat memahami materi pembelajaran. Aplikasi WhatsApp (dengan segala fiturnya) merupakan media komunikasi yang paling banyak digunakan untuk menunjang kegiatan pembelajaran (71,93%), baik untuk tanya jawab maupun diskusi (baik dengan dosen maupun teman sebaya). Aplikasi virtual meeting merupakan media komunikasi kedua yang paling banyak digunakan (28,07%). Pola komunikasi pada kegiatan pembelajaran didominasi dengan komunikasi antara siswa dan grup siswa dengan tingkat frekuensi 67,64%. Selanjutnya komunikasi dilakukan antara Dosen dengan kelompok siswa dan antara dosen dengan individu dengan frekuensi secara berturut-turut 24,52% dan 7,84%. Dari hasil penelitian ini kami berpendapat bahwa perlu dikembangkan desain blended learning terintegrasi yang dilengkapi dengan pola komunikasi yang terarah.

**Kata kunci:** Pola komunikasi, Minat, Persepsi, Pembelajaran daring

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## INTRODUCTION

The Covid-19 pandemic, which has occurred for more than 6 quarters, apart from being a problematic issue, has also become one of the relatively new central themes in the field of education. Various changes and adaptations become a necessity to do and find solutions. Design, methods, and learning media became some of the topics that were widely discussed in responding to this extraordinary event.

In our previous research (Ihsan et al., 2021), we found a change in the perspective of mathematics education students in Langsa City (Aceh, Indonesia) towards the topic of study or research in the field of learning mathematics in schools. Previously, according to them, important research topics were centered on the issue of learning effectiveness, but during the pandemic, they changed perceptions regarding topics with relatively high urgency, such as the problem of learning difficulties, relevant media for online learning, and learning design.

Reviewing the results of other studies related to perceptions and perspectives, we got a lot of new insights which then became the background for us to carry out this research. Some of the studies that we refer to discuss the perceptions and perspectives of online learning during the pandemic, from the teachers, students, and parents. Research from (Rasmitadila et al., 2020) stated that elementary school teachers in five provinces in Indonesia, i.e. DKI Jakarta, West Java, Central Java, East Java, and West Kalimantan, had the perception that online learning needed to be supported by readiness and mastery of technology. This has implications for the perception of the need for IT training for teachers and the urgency of adjusting the national curriculum. Regarding learning in schools, (Sutrisno, 2020) stated that the selection of appropriate and relevant media or platforms can contribute to learning outcomes. But in reality, there are other problems that hinder the implementation of online learning. An example of a case is presented in the results of (Fauzi & Sastra Khusuma, 2020) research, which shows that there are 45 elementary school teachers in Banten and West Java Provinces. The problem that arises is the availability of internet access. In the study, it was also stated that it is necessary to design a learning activity that does not require a large internet connection.

The problems that arise in online learning are centered on the difficulty of internet access, financial problems, and the implementation of online learning itself (Deli & Allo, 2020). For those who have difficulty accessing the internet, independent assignments are expected to be an alternative solution for online learning. Students who have financial problems want free applications to be used as media or learning platforms. Meanwhile, in terms of implementation, respondents recommended voice notes for learning delivery.

According to (Argawal & Kaushik, 2020) online learning should be cheap and affordable for all students, from the most basic level to the postgraduate level. With affordable learning, online learning can be a promising mode of learning to continue even after the pandemic is over (Ionescu et al., 2020) stated in their research results that in Romania, 80% of learning activities during the pandemic were carried out through effective and interactive educational platforms. The use of these platforms brought positive responses from teachers, students, and parents. With effective and interactive online learning, there are no longer problems related to distance, space, and time differences between students and schools (Misra & Mazelfi, 2021). Teachers can provide appropriate learning for each student, then students can adjust their own learning patterns. On the other hand, parents can participate in supervising the activities and learning progress of their children.

During this pandemic, various human activities have changed, 71% of students in Vietnam experienced changes in activities, including learning activities in which 67.5% of respondents experienced major changes in their activities (Nguyen et al., 2020). On the other hand, the effectiveness of work, including learning has decreased. 89.3% of respondents experienced this. From the various changes in activities that occurred, followed by changes in the ways and patterns of communication carried out by most people. Two-way communication that is carried out directly with adjacent physical conditions between the communicator and the communicant, is practically rare during a pandemic.

We also review the communication side that occurs in online learning during the pandemic. With all kinds of restrictions that apply, especially for activities that allow crowds of people, communication activities will certainly experience changes. (Nguyen et al., 2020) stated that 43% of adults in the United States, in the early days of the pandemic, experienced an increase in the use of message communication media (such as SMS,

WhatsApp, e-mail, and even online games). In general, the use of communication media such as voice calls, text messages, and video calls is increasingly being used because almost everyone wants to know news and health conditions from relatives, friends, and family who do not live near their environment. The problem of changing communication patterns that occurs in higher education, one of which occurs between final year students and supervisors (Adnan & Anwar, 2020). Based on the results of this study, information was obtained regarding the perspectives of students who tend to want face-to-face in the process of guiding the final project. Thus, it is deemed necessary to develop a communication system and technology in higher education that can accommodate effective final project writing activities. In accordance with Rahmawati's opinion (Rahmawati, 2020) which revealed that the main problem in communication during this pandemic is the availability of technology that can create and support effective and interactive communication.

Speaking of communication problems in learning activities, according to Muthaimah et. al (2021) there are three media that are used the most (mainstream), i.e. zoom, google classroom, and WhatsApp. The results of Bahasoan's research (2020) reveal that the WhatsApp application is the most widely used because it is cheap and commonly used. In line with the results of research by Gunawan et.al (2020), based on the results of surveys and forum group discussion (FGD) in West Nusa Tenggara Province, Indonesia, WhatsApp is an application that is often used in the implementation of online learning.

The use of these online media also brings about changes in communication patterns as stated by Vianingrum and Setyowati (2021) which tend to be impolite and the majority are in the form of non-verbal communication. On the other hand, the results of research by (Misra & Mazelfi, 2021) mention the positive impact of communication during online learning. Students tend to be more adaptive and learn independently with an increased level of student self-confidence.

We can see together that online learning activities have two sides, positive and negative. We deem it necessary to optimize all positive sides and anticipate negative sides. Thus, online learning, both during the pandemic and post-pandemic, can run effectively and efficiently.

The effect of online learning is certainly different from one region to another. Let alone comparing one country to another, comparisons between regions in Indonesia alone certainly show differences. The most significant difference is in terms of the availability of internet access. For further discussion in this study, we want to know the interests and perceptions of mathematics education students in Langsa City. Then they will also study their communication patterns during online learning during this pandemic. With these discussions, we hope for information related to how mathematics learning in mathematics education study programs can run with online mode."

## **METHODS**

In this study, we consider the relevant theories related to online learning design and communication. From the theory of online learning design, we explore information related to respondents' perceptions of what they experience during online learning. Then, from communication theory, we will explore further about the communication patterns that occur among respondents during online learning.

According to (Sutrisno, 2020) there are three basic competencies that must be possessed by teachers in carrying out online learning. By mastering all these competencies, online learning can substitute for face-to-face learning activities. The three competencies are:

- 1) the ability to make instructional designs the ability to make instructional designs;
- 2) mastery of technology in learning; and
- 3) mastery of learning materials

The readiness of teachers in carrying out learning can have an impact on giving positive responses by students. With a high level of teacher readiness, students can be better prepared to accept online learning. Based on research by (Ahmad et al., 2021) in one of the vocational schools in Ciamis, West Java, students feel comfortable in online learning because 80% of respondents responded that 90% of teachers were ready to provide learning.

In discussing communication patterns, it is necessary to review the components of the communication process. According to (Vianingrum & Setyowati, 2021) there are five components in the communication process and action. The five components are:

- 1) The sender of the message or source of information;

- 2) Message;
- 3) Interference;
- 4) The sender of the message or encoding process;
- 5) Message recipient or decoding process; and
- 6) Feedback and influence

Further discussing communication patterns, we also pay attention to theories regarding barriers in the communication process. According to (Rahmawati, 2020) there are at least five types of barriers in communication in guiding final year students, i.e. semantic, individual, interpersonal, physical media, and technology.

To obtain information related to interests, perceptions, and communication patterns from respondents, an online questionnaire was given to be filled out by all respondents in the period May – June 2021. We conducted this research in Langsa, where there are two universities that have department of mathematics education in them. Both universities are state universities. Respondents in this study were 114 students of mathematics education at that two universities.

Respondents came from various levels of active students, from the class of 2016 to 2020. A total of 52.2% of respondents had experienced learning in universities during the pandemic for three semesters, while the rest had only experienced online learning for two semesters (class of 2020). In terms of gender, the majority of respondents are women with a percentage of approximately 89.6%. Moreover 81.7% of respondents took learning from their homes, while the rest did learning outside the home due to problems with online learning support facilities. In more detail, 26.32% of the respondents (as many as 30 people) are final year students. Then the rest are first to third year students with the percentages of 25.44% (29 students), 23.68% (27 students), and 24.56% (28 students) respectively.

## RESULTS AND DISCUSSION

At the beginning of the survey, students were asked questions about the implementation of learning during the pandemic. Most of the students (81.7%) carried out learning activities at home fully while others carried out activities outside the home due to the availability of an internet connection. In this section, we will review three main things in

this research, namely the respondents' interests, perceptions, and communication patterns during learning during the pandemic.

### Students' Interest

We review student interest in online learning from the point of view of the time spent each week. Research results from (Hashim et al., 2021) is referred to as the basis for reviewing study time as one of the things that shows student interest. Logically, someone with a high interest in learning will allocate study time quite often. Based on the results of the survey, in Figure 1 and Figure 2, respectively, findings are presented in the form of the length of time students study (in hours) each day and the number of days allocated to study.

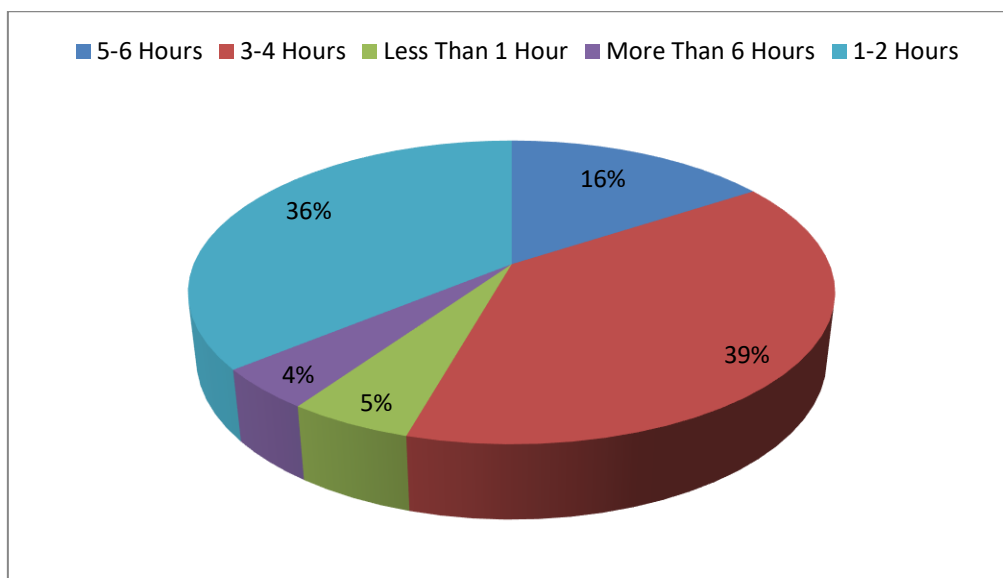


Figure 1. Length of Study Time in One Day

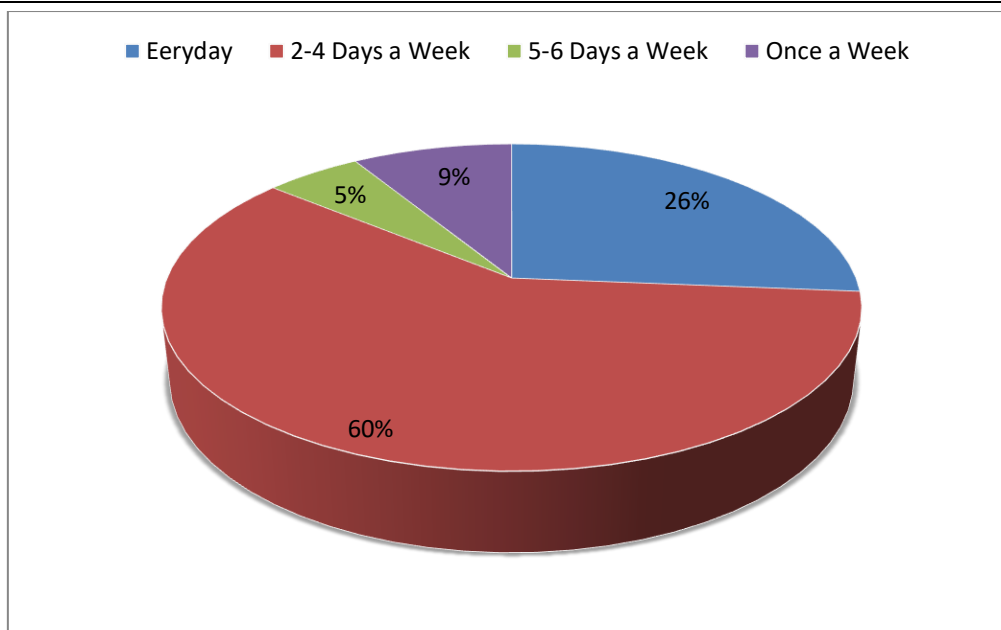


Figure 2. Number of days in a week to study a course

The types of activities carried out by students during the online learning period were also reviewed. This is intended to further examine the interest in learning. Research results from (Harackiewicz et al., 2016) which states that interest can contribute to a more engaged and motivated learning experience. Thus we review what activities are dominantly carried out by students. Table 1 show that more than three quarters of students (respondents) do the exercises independently by using online media and digital learning resources. A small part of the group of students read books (less than half). This does not show high interest and reading habits. Students prefer to work on problems and pay attention to examples for later adoption. It was found that all final students used their study time to work on independent projects such as final assignments and research reports. Overall, interest in learning for pre-service mathematics teachers in Langsa City can still be said to be high, because around 85% still take the time to learn by doing practice questions independently by using media and sources available online. Previously, it has also been seen from the amount of time allocated by students in learning. For one course, students study two to four days with the majority taking three to four hours.



**Table 1. Percentage of Types of Learning Activities carried out by Students in Online Learning During the Pandemic**

Types of Learning Activities	Percentage (%)
1. Doing exercises from the lecturer;	85
2. Learn by reading lecture reference books;	43
3. Interactive lectures with online lecturers; Learning through e-learning and media such as google classroom, edmodo, etc.;	87
4. Utilize digital learning resources (e-books, Youtube, Google, etc.);	91
5. Doing Independent Projects	17

### Students' Perception

To obtain data and information regarding student perceptions of online learning during the pandemic, an online questionnaire adopted from (Ihsan et al., 2021). We also adjusted the statements in the questionnaire based on the results of our study on the results of research on several studies related to perceptions and perspectives. We cite a method to find out the perspective of prospective teacher dynamics and optimism in carrying out learning during a pandemic (Breda et al., 2021; Istiqomah & Prastuti, 2021; Nugraha & Prabawanto, 2021). We also used a survey on the perspective of full online learning (Abdullah, 2021; Trenholm & Peschke, 2020) and also on mathematics and mathematics learning (Brelia, 2014; Chiphambo et al., 2020; R j-Lindberg & Hemmi, 2019; Young-Loveridge et al., 2006) as a reference in compiling the questionnaire sheet in our research.

In the questionnaire in question, respondents were given 8 groups of statements filled with their agreement or not. The statement centered on exploring students' perceptions of 1) their understanding abilities; 2) fun learning activities, 3) ease of learning; 4) their ability to concentrate; and 5) the attractiveness of online learning activities. In Table 2, a recapitulation of the level of students' agreeing responses to the group of statements on the questionnaire is presented.

With learning activities that are almost completely online, the results show that more than half of the respondents still understand the content of the material. This is because learning resources that can be accessed and shared can be easily obtained by students. Then in terms of time and place, students tend to feel comfortable because the time and place of learning can be adjusted to their own wishes. However, the response is dominated by perceptions that tend to be negative. This is due to the availability of facilities and the level of readiness of each element of learning, considering the phenomenon of online learning in this pandemic period came suddenly.

Based on Table 2, we can see that more than half of the respondents perceive that online learning is less interesting, boring, and difficult. Less interesting and boring learning is because students' perceptions of statements about fun online learning are very low. Only about a quarter of the group perceive online learning as fun, and it is dominated by final year students because they don't take many courses. Furthermore, students find online learning difficult because the availability of facilities and infrastructure owned by some students is still not optimal and some even do not have it at all.

<b>Students' Perception</b>	<b>Percentage (%)</b>
1. Perceiving can understand the learning material;	68,42
2. Perceiving that learning from home is fun;	28,07
3. Perceiving that it is easy to get learning resources during the lecture process from home;	39,47
4. Perception can still concentrate when attending lectures from home;	38,60
5. Perceived that online lectures are less attractive;	57,89
6. Perceive that online learning is boring;	62,28
7. Perceives that online lectures	60,53

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are difficult;	
8. Perception that getting online lecture materials or materials is difficult	53,51

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### Communication Pattern

The communication patterns studied in this article are viewed from the communication media used, communicators and communicants, the direction of the communication process, and the frequency of communication in each lecture activity in one week. The results of the research from (Atmaja & Muliana, 2019) were adopted to examine the communication pattern in question.

Based on the communication media, during online learning the Whatsapp (WA) application is more dominantly used. This is because according to students the application is quite easy and cheap. The most common communication is group discussion. It is also often done to share lecture information, sources and lecture materials, and discussion of assignments. Not a few also share answers to assignments and quizzes in the WA group. This is what needs to be anticipated by providing learning media and online learning communication media that only allow discussion and sharing of materials, not sharing answer keys.

In addition to the WA application which is used by 100% of students with a very frequent repetition rate, Google classroom is also a means of communication used by students (all students use it, although with a rare proportion of repetitions). With the Google classroom, the type of communication can be limited to discussions and exchanging information. However, it is possible that there is a process of sharing answers via WA. It is highly recommended, in addition to providing e-learning media, the need for an integrated learning design and with the effective use of time that can eliminate fraud, increase independence and self-confidence.

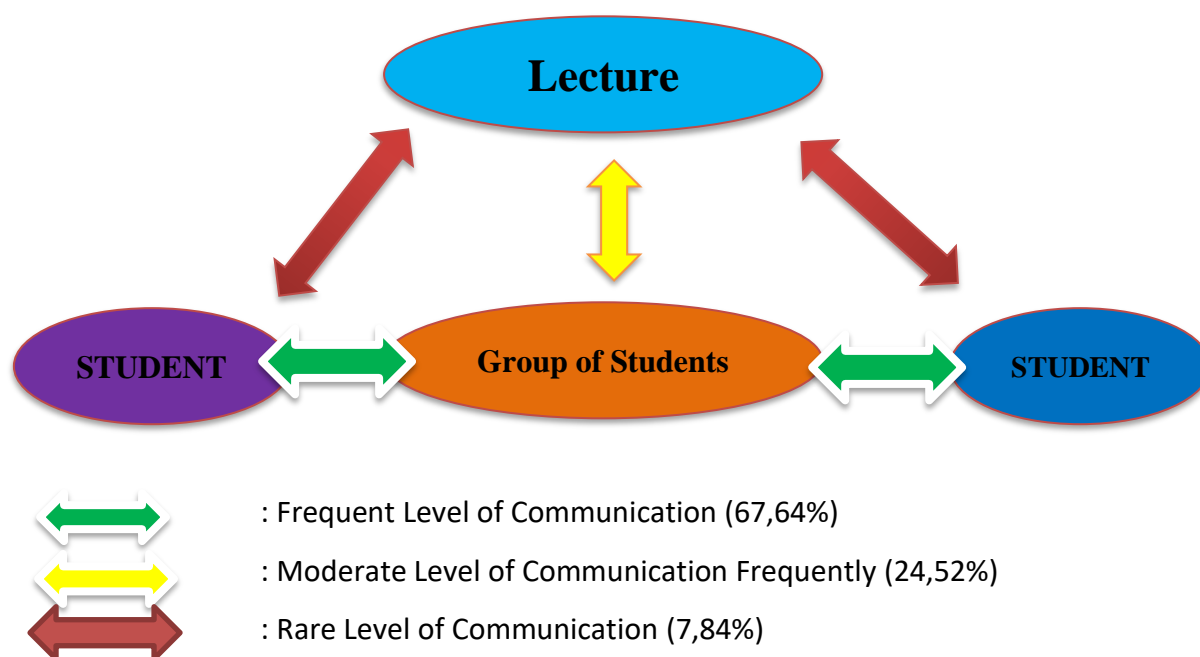


Figure 3. Pattern and Frequency of Communication Between Students and Lecturers during Online Learning in a Pandemic Period

### Problem Findings and Discussion

In this study, several problems were found which in addition to being an obstacle to online learning activities, can also reduce interest in attending lectures. These problems come from learning facilities, as well as from the lecture implementation system. These problems were obtained from student responses based on their experience in attending online lectures. The problems in question are 1) Inadequate availability of internet access; and 2) The system of lecture learning activities is not yet effective and interactive.

The problem of internet access is a necessity in the implementation of online learning. The problems experienced by students related to internet access are dominated by two things, namely the availability of a stable internet network and the availability of internet quotas. For the first sub-problem, it is deemed necessary to obtain an alternative solution. This is because in the post-pandemic period, online learning can still be adopted. Based on the findings of the level of student interest in the previous explanation, because it can adjust the time, place, and other conditions in learning, students can find comfort in

learning which has an impact on good learning interest. On the other hand, based on previous findings related to student perceptions, online learning still needs to be designed in such a way that it is not difficult (user friendly), interesting (not boring), and interactive. Regarding the problems related to the availability of the internet, it is deemed necessary in the post-pandemic period to design a blended learning that combines offline learning in the classroom with online learning. In this perspective and view, it is hoped that learning can be designed that can still accommodate the advantages of online learning that can generate interest and on the other hand learning remains interactive and interesting.

Furthermore, problems regarding the lecture system, in line with the alternative solutions to the first problem, are deemed necessary to design a learning system that preserves the advantages of online learning and can stimulate student activity and can further improve student abilities. Based on this view, it also leads to the need for a blended learning design that is centered on students' independent exploration activities who still receive direction from the lecturer.

Connected with the results of analysis and studies on student communication patterns during online learning, blended learning is deemed necessary to be applied, in which case we recommend implementing flipped-classroom. With such implementation can create a classroom atmosphere with active learning and interactive engagement among students and improve not only student-instructor and peer to peer communication but also overall academic achievement (Karjanto & Simon, 2019).

## **CONCLUSION**

Based on the results of this research and study, conclusions can be drawn regarding the interests, perceptions and communication patterns of pre-service mathematics teacher students in the city of Langsa in online learning during the COVID-19 pandemic. In general, these results lead to one recommendation, the use of online learning as a supplement to class activities.

It was found that due to being able to make adjustments to time, place, and conditions, students could find comfort in learning. Although of course because they are not used to it and learning tends to only "transfer" activities in the classroom to online conference activities, it certainly makes learning less than optimal. The communication

pattern that has occurred has not shown an intense discussion between lecturers and students. Learning resources seem to only come from lecturers, even though the discussions between students are quite intense. It takes a learning system that still accommodates discussions between friends, as well as between students and lecturers that are more intense.

With the experience of implementing online learning, of course there are some lessons and plans for improvement in the post-pandemic period. Based on the three aspects that we studied, flipped-classroom learning is highly recommended as a form of blended learning that mixes and matches discussion activities in class and online independent exploration outside the classroom.

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