

## **ANALYSIS OF DIFFICULTIES OF MATHEMATICS EDUCATION STUDENTS IN BLENDED LEARNING AFTER COVID-19 PANDEMIC**

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*Submitted: October 6, 2022*

*Revised: November 17, 2022*

*Accepted: December 14, 2022*

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### **Abstract**

Entering the new normal era in the UINSU Medan, the campus has established a blended learning system as a learning method. Although blended learning is good as an alternative to learning method in the new normal era, it still had limitations. If viewed from the perspective of students, they have difficulties when took blended learning. This difficulty will certainly affect the learning outcomes of the students themselves. This of course cannot be left alone, it is necessary to in depth analysis of student difficulties when took blended learning and then find the right solution to solve these difficulties. This research focuses to find out students' difficulties when taking Calculus Vector Class through blended learning method after COVID-19 pandemic era. This is a descriptive qualitative study. The subjects of this study are students of Calculus Vector class in the fourth semester of the Department of Mathematics Education, UINSU Medan. This research uses interview method and questionnaires as data collection instruments. The results show that students' difficulties are divided into technical difficulties, student adaptation difficulties, and lecturer adaptation difficulties. Learning strategies must be developed to address these difficulties and to bolster students' adaptation to blended learning class.

*Keywords:* blended learning, learning difficulties, post COVID-19

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## 1. Introduction

In early 2020, Indonesia was surprised by the virus that caused the spread of a disease named *Corona Virus Disease* (COVID-19). The virus which was first discovered in Wuhan, China, (Syauqi, 2020) could change the overall order of Indonesian people's lives. All life lines had changed dramatically and one affected by the Covid 19 pandemic was education.

Education had been permanently suspended due to the COVID-19 pandemic. This was because the government's policy limits the mobility of Indonesians. Pujiastuti (2021) said that the Government ceased all forms of activity involving crowds and interactions with people. This lockdown policy is also carried out based on WHO data which shows the number of deaths and numbers infected with the coronavirus is increasing meanwhile, the WHO is still looking for the truth about this deadly virus (Yunus & Rezki, 2020). The move was aimed at reducing the speed and spread of COVID-19. As a result, schools were closed, students were no longer studying as usual, the campus was closed, and teaching and learning activities were not allowed.

This was certainly not a natural situation and the government could not just stop education. There needed to be a solution to keep the learning going even though it was not in the classroom as usual. Finally, the Government introduced a policy of learning from home or more widely known as *SFH* (*Study from Home*). Some people also call it online learning. SFH was the most appropriate alternative to overcome learning problems during the COVID-19 pandemic (Firman & Hermansyah, 2020) Instead of coming to the classroom, students continued to study at home using technology and various apps, and teachers continued to teach.

It had been almost two years since the government implemented the SFH policy. With all its advantages and disadvantages, along with various obstacles faced, SFH was the most appropriate learning during the COVID-19 pandemic. In the middle of 2021, the COVID-19 pandemic began to stabilize. The government had begun to come up with new policies to improve the lives of the people, who had changed dramatically during the COVID-19 pandemic. At last, the word "new normal" came into being. According to Habibi (2020), the new normal is a new way of living or living after the COVID-19 pandemic.

In the new normal era, the spread of COVID-19 had begun to weaken. As a result, the Government had begun to relax the implementation of activities in the public sphere.

Some public activities were beginning to be permitted by strict health protocols. Places of worship were allowed to carry out their activities, markets and shopping places had also been opened, as well as various educational institutions.

After a long period of closure, normal learning activities were finally resumed at school and on campus. However, this was certainly in line with the strict enforcement of health protocols in schools (Ita et al., 2020). Although it was necessary to gradually change to control COVID-19 when conducting education, the situation had begun as usual. Of course, this was also a challenge in the education sector. Governments and education actors must carefully consider how to design a learning appropriate for new normal conditions.

Finally, the most appropriate solution was found to carry out a post-covid-19 learning lesson, named *blended learning*. *Blended learning* is an integrated combination of traditional learning with an online-based approach (Widiara, 2018). Wardani (Wardani et al., 2018) also said that *blended learning* combines face-to-face learning with computer learning while applying all existing learning models and theories. Based on this understanding, it is clear that there are two elements of *blended learning*, they are face-to-face learning and distance learning using technology assistance. Therefore, it can be concluded that *blended learning* is a form of learning that combines classroom face-to-face learning with distance learning integrated with computers or the Internet.

In practice, teachers can innovate according to class needs (Abdullah, 2018). Some use 50 % face-to-face and 50 % online learning. Some teachers have also applied 75 % face-to-face and 25 % online teaching. It is tailored to the needs and abilities of students.

The same is true of technical implementation. Teachers can give lessons as usual and complete tasks using a computer or Internet system. Besides, teachers use face-to-face learning to deliver materials, then students can learn independently through online systems. As a result of the study, a face-to-face meeting will be held to evaluate students' work.

From the above explanation, it is seen that *blended learning* makes learning proceed flexibly. Teachers can devise a blended learning strategy that adjusts to their needs and students. Flexibility can also be seen in the materials stored by teachers in *e-learning* to enable students to access data anytime, anywhere. In addition, *blended learning* enables students to play an active role in finding

the information they need. Students will focus on positive things when using gadgets, so they can minimize the negative effects of using gadgets (Puspitarini, 2022).

The advantages of *blended learning* have been proved by many studies. One such study (Syarif, 2012) showed that *blended learning* significantly improved students' motivation and academic performance compared to those receiving face-to-face learning. Ningsih (2016) also found that students in Differential Equation courses had more than 70 % of learning outcomes after applying *blended learning*. Ningsih also recommended that lecturers and other faculty members use *blended learning* models to improve students' mathematical skills.

Although *blended learning* has many advantages, there are still some shortcomings in its implementation. Staker & Horn (2012) points to at least four shortcomings (1) Not all regions have good Internet access, so distance learning students will have problems studying, (2) Deadlines for online assignments tend to stress and over-anxiety students, (3) Some students' computer devices can not support *blended learning system*, and (4) online learning tends to cost a lot in terms of internet and gadget quotas.

Lecturers and students at UINSU Medan experienced this. In the second semester of the 2021/2022 school year, the campus established a *blended learning* policy. In practice, lecturers and students would combine face-to-face learning with distance learning. In practice, students are divided into two groups. Alternately they will get face-to-face learning and online learning every week. Face-to-face learning is conducted in classrooms with strict health protocols, while online learning uses mobile phones or laptops. Definitely, in the course of implementing *blended learning*, lecturers and students experienced various difficulties, more or less affected the students' learning effect.

Students' difficulties with blended learning can be seen from the low learning outcomes of students taking Vector Calculus courses. When the UTS was implemented, it was found that student scores were still low. Of course, this is not in accordance with the vision and mission of the Mathematics Education study program at UINSU Medan that Mathematics Education Study Program seeks to produce outstanding mathematics education graduates. (FITK, 2021)

This certainly requires an improvement so that there is no longer a gap between expectations and reality. To find the cause, carried out simple observations. From the results of this observation,

it was found that many students complained about blended learning. There were several things they complained about blended learning process. For examples, the poor quality of the Internet and the high cost of accessing the Internet were among the obstacles faced by lecturers and students in implementing blended learning.

*Blended learning* had its own challenges for the lecturers themselves. For example, the preparation of materials had to be truly well-designed to attract students to study. Also, the submission of materials had to be understandable to students without spending a lot of quotas, especially the Vector Calculus course, which was a little difficult to explain through online learning. In addition, lecturers needed creativity in preparing tasks for students. The assignments had to be well-structured so that students could complete the assignments independently without cheating.

Through the above statement, it is necessary to deeply explore the difficulties encountered in the implementation of *blended learning* at UINSU Medan. Sehingga yang menjadi pertanyaan penelitian ini adalah bagaimana kesulitan mahasiswa pendidikan matematika at UINSU Medan in the course of Vector Calculus conducted in blended learning? Therefore the researcher can describe the difficulties encountered by students in mathematics education at UINSU Medan, in the course of Vector Calculus conducted in *blended learning*.

## 2. Method

This is a descriptive qualitative study. Based on Lawrence (2016), descriptive qualitative studies are aimed at describing in depth the phenomena that occur in the study subjects. The study was conducted at UINSU campus in Medan, North Sumatra, in the 2021-2022 academic year. The subject of this study are 140 students the fourth semester of mathematics education student who took the Vector Calculus course.

The focus of this study is on the difficulties faced by students in the second semester of 2021-2022 when participating in blended learning. In order to be more focused, the researchers grouped the difficulties into 3 aspects; technical difficulties, student adaptation difficulties, and learning activities difficulties.



**Figure 1.** Qualitative Research Steps

The first step begins with data collection. Researchers collected data through questionnaires and interviews with mathematics education students who used blended learning. After all, data has been collected, it will enter the second step, namely reducing and categorizing data. The authors filter the most relevant data to support the research at this step. The third step, the data display, will be carried out where researchers design a data matrix and determine the type and form of data to be entered. In the last step, conclusions will be drawn on the data that has been reduced and analyzed by the researcher.

The data collection process for the study was conducted through questionnaires and interviews. The questionnaire is about the difficulties encountered by students in implementing *blended learning*. Interviews were also conducted on difficulties encountered in *blended learning*. An interview is a conversation with a particular purpose (Moleong, 2014). This conversation was conducted by two parties, the interviewer who asked the question and the interviewee who gave the answer to the question. The results of questionnaires and interviews can be compared to verify the validity of student statements.

After all the data had been obtained, the researchers analyzed the data and converted it into the required form, such as graphs or curves. From the presentation of the data, researchers came to a conclusion regarding the difficulties faced by students during *blended learning* at UINSU Medan

### 3. Results and Discussion

#### 3.1 Results

This study consists of two parts: the results of a questionnaire provided to students through *Google Form* and the results of a direct interview with students. The researchers compiled a questionnaire about the difficulties of students during *blended learning*. This questionnaire is filled out with the assistance of the *Google Form* application. After receiving the student difficulty data, researchers grouped the data into 3 sections according to the purpose of the study, namely technical difficulties, student adaptation difficulties, and lecturer adaptation difficulties.

#### Results of Student Technical Difficulties Questionnaire

The results of students' difficulties related to technical difficulties are shown in table 1 below:

**Table 1.** Results of Technical Difficulties Questionnaire

Type	Number of Respondents	Percentage
Technical difficulties encountered in online learning	120	85,7
Technical difficulties encountered in face-to-face learning	20	14,3

Based on the results of the questionnaire completed by students, technical difficulties in online learning are more dominant than technical difficulties in face-to-face learning. This can be seen from the percentage of technical difficulties (85.7%) in online learning. This table is higher than the 14.3 % rate of technical difficulties experienced by students in face-to-face learning.

One form of technical difficulties encountered by students in online learning was the poor quality of the Internet and the lack of technical equipment to complete online learning.

For a deeper understanding, the interview results will describe the technical difficulties students face.

#### Results of Student Adaptation Difficulties Questionnaire

After analyzing the questionnaire data about students adaptation difficulties in blended learning, the data obtained are shown in Table 2 below:

**Table 2.** Result of Student Adaptation Difficulties Questionnaire

Type	Number of Respondents	Percentage
Able to follow <i>blended learning</i> well	112	80
Experience various obstacles when participating in <i>blended learning</i>	28	20

According to the questionnaire results in Table 2, 80% of the respondents say they can learn *blended learning* well, and 20% say they still can not learn *blended learning* well. The 20 % also shows that 28 students have problems implementing *blended learning* at UINSU Medan.

From the questionnaires that have been filled out by students regarding the difficulties of student adaptation, it is found that students have started to adapt to *blended learning*. Nevertheless, many students find it difficult to adapt to *blended learning*. The student adaptation difficulties will be more obvious when interviewing students.

**Results of Learning Activities Difficulties Questionnaire**

Based on the analysis of the questionnaire data on adaptation difficulties of lecturers in *blended learning*, the data obtained are shown in Table 3 below:

**Table 3.** Result of Lecturer Adaptation Difficulties Questionnaire

Type	Number of Respondents	Percentage
Able to carry out <i>blended learning</i> well	127	90,7
Lack of ability to manage <i>blended learning</i>	13	9,3

According to the results of the survey in Table 3, 90.7% of the respondents say that the course lecturer is well adapted to *blended learning*. Meanwhile, 9.3% of respondents state that lecturers are still not able to manage learning using *blended learning*.

Based on the questionnaire completed by students regarding the difficulty of lecturer adaptation, it is found that lecturers have begun to adapt to the study of *blended learning*. Even so, many students are dissatisfied with the lecturer's performance during the *blended learning* process at UINSU Medan. For more details, the interview results will be discussed in the section on the adaptation of lecturers to *blended learning*.

In addition to filling out the questionnaire distributed through Google Forms, researchers also interviewed the subjects. Interviews were conducted by calling subjects one after another to receive interviews about the implementation of *blended learning*. This interview would stop when information was repeated or the same information appeared repeatedly.

**Interview Results of Students' Technical Difficulties**

Table 4 below shows the interview results of some of the technical difficulties students face in implementing *blended learning*

**Table 4.** Interview Results of Student Technical Difficulties

Subject	Interview Results
1	"I don't live in Medan, so my cost is higher when I study in <i>blended learning</i> . I have to pay rent, transportation, and food. Not only that, but I have to pay for a lot of Internet access"
2	"My problem is the poor quality of the network. Especially when sending assignments, the file is too big, but the signal quality is not good. As a result, my homework is often not delivered"
3	"The most difficult thing is when I study online. My laptop is slow so is my cell phone. Thus, I'm not doing it the best I can."

As can be seen from Table 4, the technical difficulties that students face in the process of implementing *blended learning* are the costs, especially for students whose residence is not in Medan. This *blended learning* requires students to participate in online and face-to-face learning. This means that students from outside Medan still have to pay for housing rent, transportation, consumption, and other expenses. In addition, they also spend a lot of money to buy Internet quotas during online learning. This leads to much greater costs.

Another technical difficulty comes from the quality of the Internet, which in some places where students live, and even on the campus of UINSU, sometimes has poor signal quality. As a result, students will have difficulty participating in online learning including the process of sending tasks online. Some students complain about the difficulty of sending assignments because of the big size of the file and the poor quality of the signal.

In addition, students may encounter some difficulties in online learning, such as limited facilities. Some students do not have technology devices that support online learning until their

gadgets respond slowly due to the weight of the applications used during online learning.

Sholichin (2020) found a similar thing in his research many students experience problems in online learning. One of the obstacles most often faced by students is the lack of internet quota and an unstable network. Some students also have difficulties scheduling classes because UINSU divides students into study groups for *blended learning*. These study groups will alternately conduct face-to-face and online learning. On public holidays, classes will be off and students are mostly confused about whether they are included in face-to-face or online classes.

### Interview Results of Students Adaptation Difficulties

During the implementation of blended learning, the results of interviews related to students adaptation difficulties are shown in table 5 below:

**Table 5.** Interview Results of Student Adaptation Difficulties

Subject	Interview Results
1	"I often get confused when it comes to class scheduling, whether I have to take face-to-face or online classes"
2	"I'm confused about the material. This week, I took face-to-face learning, and I understand better than i get online learning"
3	"The most difficult thing is when I study online. My laptop is slow and so is my cell phone. Thus, I'm not doing it the best I can."

The results of student interviews show that students can almost adapt to *blended learning*. Students only need to adapt to the *blended learning* mechanism prepared by the UINSU Medan campus during the first few meetings. However, there are still students who have difficulties in *blended learning*, such as confusion about when to enter face-to-face classes and when to enter online classes. As a result of this face-to face online class change, students also need to focus more on learning materials and doing homework.

Some students also complained about the lack of a conducive atmosphere at their boarding houses when *blended learning* took place. In fact, many still dislike online learning because it is difficult to understand the lecture materials taught online.

Khaerunnisa (2020) did something similar in her research. He stated that there were several obstacles faced by students and teachers in implementing blended learning, namely the lack of

facilities and infrastructure, the lack of facilities owned by students, and the lack of cooperation with parents of students.

### Interview Results of Learning Activites Difficulties

The results of interviews related to lecturer adaptation difficulties are shown in table 6 below:

**Table 6.** Interview Results of Lecturer Adaptation Difficulties

Subject	Interview Results
1	"Lecturers focus more on face-to-face learning than online learning"
2	"I don't understand the lecturer's explanation when I study online, because the lecturer only sends me information in pdf format."
3	"Lecturers should also make learning videos so that we can understand the material more easily, especially when learning online"

Interviews with students show that lecturers have begun to adapt to *blended learning*. Similar to students, lecturers also need time at several early meetings to adjust to the blended learning mechanism compiled by UINSU Medan.

Nevertheless, some students complained that lecturers were more focused on face-to-face learning and rather neglected students included in online learning. This causes them to fail to understand some of the material they are learning when they enter the online learning class. Other students also advised instructors not to rely only on modules but also to innovate by making learning videos.

The use of video as a learning media in distance learning is the most appropriate solution to keep students understanding the material being studied. This is stated by Setyaningrum (2021) that the use of learning media in the form of videos can make students understand the material well to improve student achievement

## 3.2 Discussion

Based on the results of the research introduced in the previous section, students face various obstacles when conducting blended learning in the second semester of 2021-2022. In general, the difficulties facing students occur while they are conducting online learning. This was revealed by Dewantara (2020) in a study at PGRI University Yogyakarta that 79% of students wanted face-to-face learning, 20% wanted blended learning and only 1% wanted online learning. Such a low percentage of students indirectly indicates a

low interest in online learning. Of course, this is because students face many obstacles in online learning.

The difficulties faced by the students will inevitably have a great impact on the learning effect. They will lose their motivation to study because of the many difficulties in learning. To this end, action is needed to improve the quality of *blended learning* at UINSU Medan. If *blended learning* is applied again, these difficulties can be easily minimized.

Here are the suggestions to overcome these difficulties: For Internet difficulties, campuses can work with certain providers to ensure good Internet quality and reduce quota costs. This is important because the Internet has become an important part of education. Maghfiroh (Maghfiroh, 2020) pointed out that the Internet is an absolute requirement for education in the era of smart society 5.0 which requires all systems to be internet based of course, lecturers and campuses are largely responsible for the difficulty of adapting to students. In the *blended learning* process, lecturers must be able to create a beneficial learning atmosphere so that students can participate more actively in *blended learning*. In the implementation of blended learning, the campus must also provide students with clear information and adequate facilities and infrastructure, as the environment has a significant impact on the quality of blended learning. A conducive environment coupled with adequate facilities and qualified teaching staff will encourage active learning among students (Arianti, 2019).

Lecturers should also continue to improve themselves for the better to adapt to the difficulties of instructors. Lecturers should innovate a lot through various learning media so that they can concentrate more on their classes. This is in accordance with Abu Amar (2019)'s opinion that in order for the class atmosphere to be favorable for study, the lecturer's performance and ability to grasp textbooks must be good, and the appropriate learning strategy must be selected. Amal also recommends that lecturers deliver lessons in a friendly manner, but still retain academic value. Abu Amar's statement indirectly states that lecturers must continue to improve themselves in choosing strategies or mastering their teaching materials. This research was only conducted at UINSU Medan. So that the results of this study

#### 4. Conclusion

Based on the research results previously described, there are several difficulties faced by students in mathematics education at UIN SU Medan during blended learning, they are (1) Technical difficulties, including cost difficulties, Internet difficulties, adequate technological difficulties, and timetable difficulties; (2) Difficulties in adaptation include confusion in class arrangements, lack of conditions for online learning, and difficulty in understanding materials during online learning; and the third difficulties are (3) Lecturers adaptation difficulties, consisting of a focus on face-to-face learning rather than online learning and a lack of innovation in preparing teaching materials that are easier for students to understand.

From the results of this study, it is hoped that the campus as education providers will pay more attention to the needs of lecturers and students so that blended learning runs well. Likewise for lecturers who teach with a blended learning system. It is necessary to create creativity in teaching so that students are more motivated to participate in blended learning.

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