



## The perceptions of information technology faculty students on online learning of computational mathematics during the covid-19 pandemic

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Article received : 15 Sep 2021

Article revised : 12 Nov 2021

Article Accepted : 16 Nov 2021

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**ABSTRACT:** The implementation of online learning in computational mathematics courses has encountered various obstacles in addition to the decline in student learning outcomes. Therefore, research is aimed to explore student perceptions of online learning that has been carried out. The research used a descriptive method with a quantitative approach. The research subjects were students of the Information Technology Faculty of Unisba Blitar who had taken computational mathematics courses during the Covid-19 pandemic. The results showed that students had a positive perception of the aspects of the learning process although some students felt difficulty understanding theory and skills improvement. Positive perceptions are also shown in the competence aspect of lecturers, who become facilitators in the learning process. Furthermore, in the aspect of facilities and infrastructure, positive perceptions are shown in the ease of access to learning materials, the availability of online learning tools and the use of video conferencing in learning. Meanwhile, the negative aspect is shown in the fulfilment of the internet quota for online learning.

**Keywords:** Perception; online learning; Pandemic; Covid-19

### Persepsi mahasiswa fakultas teknologi informasi

#### terhadap pembelajaran daring matematika komputasi pada masa pandemi covid-19

**ABSTRAK:** Pelaksanaan pembelajaran daring pada matakuliah matematika komputasi mengalami berbagai kendala selain menurunnya hasil belajar mahasiswa. Oleh karena itu, dilakukan penelitian dengan tujuan untuk menggali persepsi mahasiswa terhadap pembelajaran daring yang telah dilakukan. Penelitian menggunakan metode deskriptif dengan pendekatan kuantitatif. Subyek penelitian adalah mahasiswa Fakultas Teknologi Informasi Unisba Blitar yang telah menempuh matakuliah matematika komputasi pada masa pandemi Covid-19. Hasil penelitian menunjukkan bahwa mahasiswa memiliki persepsi positif pada aspek proses belajar walaupun sebagian mahasiswa merasa kesulitan dalam upaya pemahaman teori dan peningkatan keterampilan. Persepsi positif juga ditunjukkan pada aspek kompetensi dosen, yang berperan sebagai fasilitator dalam proses pembelajaran. Selanjutnya pada aspek sarana dan prasarana, persepsi positif ditunjukkan pada kemudahan akses materi pembelajaran, ketersediaan perangkat pembelajaran daring serta penggunaan *video conference* dalam pembelajaran. Sementara, aspek negatif ditunjukkan pada pemenuhan kuota internet untuk pembelajaran daring.

**Kata Kunci:** Persepsi; Pembelajaran Daring; Pandemi; Covid-19

## INTRODUCTION

Pandemic *Covid-19* Indonesia has brought significant changes in various fields, including in the field of education. The Faculty of Information Technology is one of the

faculties at the Balitar Islamic University, which participates in enacting changes in the implementation of the learning process. The learning process which initially took place face-to-face has to change to using internet media, or it is referred to as online learning (Mustofa et al., 2019). The online learning system requires the entire academic to adapt to a new way of learning, namely online learning (in a network) without face to face. This rule is applied to all learning courses, including Computational Mathematics courses.

The implementation of online learning in the Computational Mathematics course is not always learned easily because of various obstacles. Based on the results of the identification of problems in the field conducted by researchers through the process of observation and interviews with lecturers of Computational Mathematics and students who have taken these courses, the following information was obtained: 1) the online learning process is quite difficult for students to understand the material taught by the lecturers; 2) students often experience network problems because most of them live in rural areas; 3) students are less focus when participating in learning because the environmental conditions around them are not conducive, for example, there are family events that coincide with online learning hours; 4) some students often do not attend online lectures because they have to help their parents work to maintain the family economy; 5) the results of the final semester exam for the Computational Mathematics course show that 45% of students get a score of less than 75 out of a total score 100, even 55% of the students who scored less than 75, they got score less than 60. Based on the identification, the researchers attempted to explore information about students' perceptions of online learning in the Computational Mathematics course. This is very important because the results of gaining information can be used to improve and increase the quality of teaching, which is the main agenda of every educational institution (Christiaens et al., 2014).

As described in the *Newsletter of Open and Distance Learning Quality Council*, the implementation of online learning can run with an internet connection that provides facilities for students in their services and the availability of teachers in case of learning difficulties (O. Saragih et al., 2020). In addition, there are additional requirements, namely: 1) the organizer of the online lecture; 2) positive mindset of lecturers and students in the main function of the internet; 3) design of a learning process system that can be learned by all students; 4) the existence of an evaluation process of a series of student learning processes; and 5) feedback mechanism from the organizers (Mustofa et al., 2019). Based on the description of the online learning requirements, it can be seen that the evaluation process and feedback mechanism from online learning providers need to be carried out. Hence, there is a need for efforts to gather information related to online operations that have been carried out as material for evaluation and providing appropriate feedback. This research can be done by exploring students' perceptions of the online learning that they have gone through, especially in computational mathematics courses. Through gaining information on student perceptions, lecturers are expected to be able to evaluate the learning that has been carried out and ensure that the planned learning competencies have been achieved by students.

The achievement of learning competence in learning activities is an indicator of learning success. However, learning competence in learning will be difficult to achieve if students do not have a positive perception of the learning process they go through. Therefore, information related to student perceptions can be used to evaluate learning, which is one way to measure teaching quality (O. Saragih et al., 2020). This is due to a positive relationship between student perceptions and student participation in learning (Sirjon et al., 2021). Perception is the process of interpreting the stimulus received by the five senses into an understanding. Through perception, students will organize and manage themselves when participating in the online learning process. Therefore, students' perceptions of aspects that play a role in online learning are important things that need to be known. These aspects include 1) online lecture facilities and infrastructure; 2) learning process; and 3) lecturer capability during online learning (Mustofa et al., 2019). The student's perspective on this aspect is a prerequisite for the implementation of online learning, namely the existence of a positive student mindset in the functioning of the internet.

Several studies have been conducted related to the online learning process during the pandemic *Covid-19* (Ningsih, 2020; Rakhmanina et al., 2020; Sadikin & Hamidah, 2020; O. Saragih et al., 2020; Tanjung & Utomo, 2021; Zhafira et al., 2020). Rahmanina (2020) stated that most students are interested in online learning because it is considered more fun and flexible. Based on the medium for implementing online learning, students assess that the platform is very helpful for online learning during the pandemic. This shows that students have a positive perception of online learning facilities and infrastructure during the Covid-19 pandemic (Rakhmanina et al., 2020). The results of this study are slightly different from the research conducted by Saragih (2020), which stated that students have positive perceptions related to lecture implementation and lecturer capabilities but have negative perceptions of the online learning facilities and infrastructure (O. Saragih et al., 2020).

The results of different student perceptions are also shown in the research conducted by Tanjung and Utomo (2021). The results of the research show that students have positive and negative perceptions of the implementation of online learning in a low-tech environment during the COVID-19 pandemic. These positive perceptions include: 1) the ease of using the internet; 2) empowering students through digital literacy; 3) increasing students' knowledge about learning applications. On the other hand, the negative perceptions shown by students include: (1) difficulty in optimally participating due to high demand for internet packages, low network coverage, frequent local power outages; (2) lecturer feedback is needed to improve student-lecturer interaction; (3) discrepancies in the learning schedule and assignment submission in online classes (Tanjung & Utomo, 2021).

Based on the results of several studies, it can be seen that online learning during the pandemic still has weaknesses. This is in line with the results of Sadikin & Hamidah (2020) research which stated that in online learning, students are not properly supervised during the learning process and the weak internet signal and the high cost of quotas are a challenge for students during online learning (Sadikin & Hamidah, 2020). However, in general, students can

take online learning quite well, but most students still prefer offline learning in class through face-to-face compared to online learning (Ningsih, 2020; Zhafira et al., 2020).

Based on the identification of the problem and the study of the results of previous research, this research aims to explore and describe the perceptions of Unisba FTI students towards online learning in the Computational Mathematics course during the Covid-19 pandemic. The results of this study are expected to make a positive contribution to improving the quality of learning at the Islamic University of Balitar, especially at the Faculty of Information Technology in the Computational Mathematics course.

## **METHOD**

### **Research Types and Approach**

This study uses a descriptive research method with a quantitative approach. Descriptive research is research conducted to determine the value of variables, either one or more variables, without making comparisons or connecting with other variables (Sugiyono, 2013). The variable that will be explored is the student's perception of online learning in the Computational Mathematics course. Furthermore, the quantitative approach was chosen because numbers are used starting from the data collection process, data interpretation to the appearance of the results (Arikunto, 2013). The quantitative approach in this study was carried out through a survey method. This method is used because the researcher gives the same structured questions to each respondent using a questionnaire (Adiyanta, 2019).

### **Research Location and Subjects**

The location used in this study is the Faculty of Information Technology, Balitar Islamic University, which is located at Majapahit Street No. 2-4 Blitar. The research was conducted in March – June 2021. The subjects in this study were students of FTI Unisba Blitar, which were determined by the purposive sampling technique. The consideration for selecting this sample aims to get student feedback about online learning that has been done for 1 semester during the Covid-19 pandemic. Thus, the research sample is students who have participated in online learning for Computing Mathematics courses in the odd semester of the 2020/2021 academic year, that is students of the 2020 batch, consisting of 57 students of the Informatics Engineering Study Program and 8 students of the Computer Systems Study Program.

### **Research Instruments and Data Analysis Techniques**

The data collection instruments used in this study were questionnaire validation sheets and questionnaires. The questionnaire validation sheet is used to validate the questionnaire on the validator before the questionnaire is given to the respondent. Meanwhile, a questionnaire was used to determine students' perceptions of the online learning they had gone through. The questionnaire in this study was adapted from research conducted by Maulana & Hamidi (2020), which has been adapted to the conditions of FTI students. The questionnaire consists of 4 aspects: 1) demographics; 2) teaching and learning process; 3) lecturer competence; and 4) facilities and infrastructure. In these aspects it contains

statements with a Likert scale consisting of 5 scales: 1) strongly disagree; 2) disagree; 3) normal; 4) agree; 5) totally agree (Maulana & Hamidi, 2020).

Data analysis was used to analyze the results of the validation of the questionnaire by the validator and the results of filling out the questionnaire by the respondents. The results of the questionnaire validation were analyzed using a Content Validity Index (CVI) approach, while the results of filling out the questionnaire by respondents were analyzed using descriptive quantitative analysis using percentage techniques. The results of the validation by the validator were defined descriptively in the form of categorization of validity: 1)  $0,80 < Mean I - CVI < 1,00$  : very high validity (very good) ; 2) invalid  $0,60 < Mean I - CVI < 0,80$  : high validity (good); 3)  $0,40 < Mean I - CVI < 0,60$  : moderate validity (enough); 4)  $0,20 < Mean I - CVI < 0,40$  : low validity (less); 5)  $0,00 < Mean I - CVI < 0,20$  : very low validity (poor); 6)  $Mean I - CVI < 0,00$  : invalid (Guilford, 1956). Meanwhile, the level of perception refers to the measurement standards, that is: negative perception if the average percentage of the total component items is less than or equal to 40% ( $\leq 40\%$ ) and positive perception if the average percentage of the total component items is more than 40% (Maulana & Hamidi, 2020).

## RESULTS AND DISCUSSION

Student perception of the learning process is a component that plays an important role in evaluating and improving the quality of learning. By knowing student perceptions, lecturers can understand student responses to the learning that has been done. This is very important because students' abilities in learning are quite diverse and influenced by various factors, both internal and external factors. The Covid-19 pandemic is an external factor that can affect student motivation in the learning process (Gustiani, 2020; Niam et al., 2020). For this reason, the online learning process carried out during the Covid-19 pandemic needs to be evaluated and studied in depth so that education providers are still able to maintain the quality of the education provided.

To conduct an assessment of the online learning process during the Covid-19 pandemic, the research explored student perceptions at the Faculty of Information Technology (FTI), Unisba Blitar, especially in the Computational Mathematics course. Perception exploration is carried out by first compiling a perception questionnaire, which includes 4 aspects, namely: 1) demographics; 2) teaching and learning process; 3) lecturer competence; and 4) facilities and infrastructure. In the demographic aspect, respondents will fill in data related to gender, age and some information about experiences in online learning. Meanwhile, on the aspects of the teaching and learning process, the competence of lecturers, as well as facilities and infrastructure, respondents will fill in their perceptions on 17 statements related to these three aspects. Before the questionnaire was given to the respondents, the researcher validated the questionnaire first on 3 expert validators to measure the validity of the questionnaire from the aspects of the questionnaire filling instructions, the contents of the questionnaire, and the grammar used in the questionnaire, with the following results.

Table 1. Results of Validation of Student Perception Questionnaire

Assessment Aspect	Relevant Proportion			Mean I-CVI
	Validator 1	Validator 2	Validator 3	
Instructions for filling out the questionnaire	1.00	1.00	1.00	1.00
The questionnaire contents	0.75	1.00	0.75	0.83
Questionnaire language	1.00	1.00	1.00	1.00

Based on Table 1, the results of expert validation from the aspects of the instructions for filling out the questionnaire show that: *mean* I-CVI 1.00, with the average proportion rated relevant from the three experts, is 1.00. This means that the student perception questionnaire has very high validity in terms of the instructions for filling out the questionnaire. From the aspect of the contents of the questionnaire, the mean I-CVI is 0.83, with the average proportion considered relevant from the first expert being 0.75, the second expert being 1.00, and the third expert being 0.75. This means that the student perception questionnaire has very high validity in terms of the content aspect of the questionnaire. Finally, from the grammatical aspect used in the questionnaire, the mean I-CVI shows a value of 1.00, with the proportion assessed as relevant from the three experts, being 1.00. This means that the student perception questionnaire has very high validity in terms of grammatical aspects.

Furthermore, the data mining process was carried out on respondents, namely FTI students, consisting of 65 people, spread over two study programs, namely the informatics engineering study program and the computer systems study program. The selected respondents are students who have taken Computational Mathematics courses with an online learning system. From 65 respondents, it was acquired demographic data as well as respondent experience data related to online learning and the use of devices in online learning, as described in Table 2.

Table 2. Demographic Data of Respondents

		Frequency	Percentage
<b>Class</b>	Informatics Engineering (A)	20	31%
	Informatics Engineering (B)	18	28%
	Informatics Engineering (C)	19	29%
	Computer System	8	12%
<b>Gender</b>	Male	19	29%
	Female	46	71%
<b>Usia</b>	19 years old	29	45%
	20 years old	23	35%
	21 years old	10	15%
	22 years old	2	3%
	> 22 years old	1	2%

Based on the data in Table 2, it was obtained information that the majority of respondents were female, with a percentage of 71%, and the most age is 19 years, with a percentage of 45%. Meanwhile, the second-highest age is 20 years with a percentage of 35%. With this age range, the use of technology is not a difficult thing because many students already have sophisticated technological tools to facilitate their daily activities. This is supported by the data in Table 3, that 72% of respondents have used mobile phones and laptops to assist them in participating in online learning even though 57% of respondents did not have experience in online learning, before the Covid-19 pandemic.

Table 3. Online Learning Experience &amp; The Use of Devices in Online Learning

		Frequency	Percentage
<b>Online learning experience before the Covid-19 pandemic</b>	Never	37	57%
	Once	28	43%
<b>Devices that are often used in online learning</b>	Handphone	16	25%
	Laptop	2	3%
	Handphone & laptop	47	72%
<b>Online learning costs more than offline learning</b>	Yes	39	60%
	No	26	40%
<b>Expenses for internet quota fees (online learning)</b>	< IDR 50.000,00	6	9%
	IDR 50.000 – IDR 75.000	17	26%
	IDR 80.000 – IDR 100.000	18	28%
	IDR 110.000 – IDR 125.000	5	8%
	IDR 130.000 – IDR 150.000	7	11%
	> Rp 150.000	12	18%
<b>Source for fulfilling online learning quota</b>	Independent (by working)	20	31%
	Parents	45	69%

Although online learning support facilities are owned, most of the respondents think that online learning requires more costs in its implementation. This is shown by 60% of respondents who stated that online learning costs more than offline learning or offline learning. There are 28% of respondents who have to pay Rp 80,000 – Rp 100,000 per month for the internet quota. In addition, 69% of respondents are still financed by their parents in fulfilling the internet quota for online learning.

Based on the description above, it can be seen that the online learning process during the Covid-19 pandemic was a new experience for most students. Students must be able to adapt to the online learning system to be able to follow the lecture process well. Through the following learning perception questionnaire, it is explained how students respond to online learning during the Covid-19 pandemic, especially in the Computational Mathematics course.

Table 4. Data of FTI Students' Perception of Online Learning for Computational Mathematics Courses During the Covid-19 Pandemic

No.	Statement	% Majority of Respondent
<b>The Aspects of Teaching and Learning Process</b>		
1.	The implementation of online lectures can be accessed easily	55% (Agree)
2.	The implementation of online lectures on time and according to schedule	51% (Agree)
3.	The online lectures increase understanding of theory and skills	48% (Normal)
4.	The material presented online is by the Lecture Contract/Semester Study Plan	71% (Agree)
5.	The process of sending assignments is easy and can be sent well	54% (Agree)
<b>The Aspects of Lecturer Competence</b>		
6.	Lecturers always accompany online learning until it's finished	60% (Agree)
7.	Lecturers explain the directions and goals in each online learning	71% (Agree)
8.	Lecturers provide opportunities for students to ask questions and discuss	68% (Agree)
9.	Lecturers respond to questions asked during online learning	65% (Agree)
10.	Lecturers can help your level of understanding of lecture material presented online	58% (Agree)
11.	Lecturers can grow activeness and attitude during online lectures	52% (Agree)
<b>The Aspects of Facilities and Infrastructure</b>		
12.	Materials on online learning are well-available and easily accessible	58% (Agree)
13.	I have the tools/equipment to take online learning at home according to the instructions given	62% (Agree)
14.	I prefer Lecturers to use video conferencing applications (Zoom, Google Meet, etc.) rather than use applications without video (WA Group, Telegram, Google Classroom, etc.)	43% (Agree)
15.	I can fulfil my quota to take part in online learning smoothly	34% (Agree)
16.	I am ready to carry out online learning every day	43% (Normal)
17.	I am satisfied with the online learning that I have done/ that I have participated in	46% (Normal)

Based on the data in Table 4, it can be concluded that in the aspect of the teaching and learning process, respondents gave positive perceptions. This can be seen from the responses given: 1) 55% of respondents agreed that online lectures can be accessed easily; 2) 51% of respondents agree that online lectures are carried out on time and according to schedule; 3) 71% of respondents agree that the material presented in online lectures is by RPS, and 4) 54% of respondents agree that the process of sending assignments is easy. However, related to the process of understanding theory and skills, 48% of respondents only stated "normal". This is supported by the statements of several respondents in Table 5, which explains that they are



quite difficult to understand the material because of their low mathematical ability and unfamiliar with the online learning system. Here are some statements were given by respondents regarding their obstacles in understanding the material in online learning of Computational Mathematics.

Table 5. Students Statements on Aspects of The Teaching and Learning Process

No. Resp.	Statements
R-27	<i>"In my opinion, during the Covid-19 pandemic, learning should still be carried out offline or on campus, because online it seems like it's not enough to understand the material"</i>
R-30	<i>"It seems the same. Maybe for myself, because I am weak in math/counting lessons, so I can't understand what the lecturer is explaining"</i>
R-38	<i>"Online learning using Zoom meetings and Google Meet is good but sometimes I can't understand the material because through face-to-face only, I find it difficult to understand, especially in online learning"</i>

Furthermore, in the aspect of lecturer competence, respondents gave positive perceptions. This can be seen in Table 4: 1) 60% of respondents agree that lecturers accompany students to complete learning; 2) 71% of respondents agree that lecturers provide online learning directions and objectives; 3) 68% of respondents agree that lecturers provide opportunities for students to ask questions and conduct discussions; 4) 65% of students agree that lecturers respond to student questions during online learning; 5) 58% of respondents agree that lecturers can help students to improve their understanding of the materials, and 6) 52% of respondents agree that lecturers can foster student activity in online learning. This positive perception is also supported by several respondents' statements which have been described in Table 6.

Table 6. Student Statements on Lecturer Competency Aspects

No. Resp.	Statements
R-19	<i>"In my opinion, Computational Mathematics Lecturer Competencies are good, such as starting from lectures on time, delivering lecture material systematically, seeking active student participation lecture and many others."</i>
R-31	<i>"The explanations are easy to understand and enjoy the class. The conversation and delivery that is conveyed is more relaxed and not too monotonous."</i>
R-43	<i>"Lecturers are good at teaching computational mathematics courses, the explanation given is quite easy to understand for students."</i>

Meanwhile, in the aspect of learning facilities and infrastructure, respondents gave positive and negative perceptions. Positive perceptions are shown from the data: 1) 58% of respondents agree that learning materials are well available and easily accessible; 2) 62% of respondents agree that they have online learning tools according to the instructions given by

the lecturer; 3) 43% of respondents agree that lecturers use video conferencing applications rather than applications without video; 4) 43% of respondents are ready to do online learning every day, and 5) 46% of respondents are satisfied with the online learning that has been done. Meanwhile, for negative perceptions, it is shown that only 34% of respondents do not experience problems in fulfilling the internet quota for online learning. This means that the percentage of respondents who experience problems in fulfilling their internet quota is much higher. This is supported by student statements as described in Table 7

Table 7. Student Statements on Negative Responses to Internet Quota Fulfillment for Online Learning

No. Resp.	Statements
R-3	<i>"Because I have to buy a quota package every month, I still can't afford to install wifi"</i>
R-21	<i>"Limited quota and expensive quota prices, become obstacles for students."</i>
R-26	<i>"I always have problems in fulfilling my quota because every time I go online, which is on cam, my quota is always sucked up quickly and runs out only for 1 course that lasts 40 minutes."</i>
R-50	<i>"Besides sometimes my brain lags, the network also lags because it often runs out of quota."</i>

In addition to respondents giving their perceptions on the three aspects above, respondents also gave their opinions related to the applications used in online learning. As described in Table 4, that 43% of respondents prefer to explain material through video conferencing applications rather than applications without video. This is supported by survey data which shows that 63% of respondents prefer the online learning process to be carried out through the Zoom application rather than other applications. Through Zoom, respondents can see and hear the lecturers explaining the material and conduct live questions and answers. Meanwhile, if through WhatsApp Group, respondents could not understand because the lecturer explained through writing and voice (audio). However, the percentage of respondents who chose the WhatsApp application is quite a lot, that is 22% of the total respondents. The selection of applications by respondents in more detail can be seen in Table 8 below.

Table 8. Applications in Online Learning

Application	Frequency	Percentage
<i>Zoom</i>	41	63%
<i>WhatsApp</i>	14	22%
<i>Google Meet</i>	7	11%
Another Answer	3	5%

### **FTI Student Perceptions on The Aspects of Teaching and Learning Process**

The results of the analysis show that the perception of FTI students on aspects of the teaching and learning process in online learning for computational mathematics courses shows a positive perception. The implementation of online lectures can be followed properly and the learning implementation is by the predetermined schedule and Semester Study Plan. In addition, students are still able to increase their theoretical understanding and skills, even though the material is delivered online. The process of sending assignments to lecturers can be done easily and sent according to the agreed time. However, lecturers need to evaluate the process of providing material to students. This is because 26% of students stated that they did not agree that online learning in computational mathematics courses was able to improve students' understanding and skills. Some of the factors are the weak mathematical abilities of students and the lecturer's explanation which is quite fast. As a result, lecturers must have the right strategy to help students understand the material being studied even though it is done online.

In online learning, the obstacles to explaining the material can be replaced by making learning videos that can provide descriptions, animations, and examples clearly (Schoenfeld, 2017). Through learning videos, the role of the lecturer is to explain the material and as a substitute learning facilitator (O. Saragih et al., 2020). In addition, lecturers can also arrange modules that contain detailed, clear explanations of the material, and include examples of questions and exercises that are by the material being studied. Thus, students will be trained to learn independently and they can be more active in the learning process (Devesh & Nasser, 2014). The provision of learning videos accompanied by modules will certainly make it easier for students to learn because they can repeat the material learned, according to their needs.

### **FTI Student Perceptions on Lecturer Competence Aspects**

Lecturers are one of the keys to success in the learning process (Su & Wood, 2012). Therefore, lecturers are required to improve and develop their competencies to provide maximum educational services. The results of the analysis show that students give positive perceptions on aspects of lecturer competence. Positive perceptions are given by students because lecturers accompany students to complete learning, provide direction and learning objectives, provide opportunities for students to ask questions and conduct discussions, and provide responses to student questions during online learning.

Although in the aspect of the learning process some students find it difficult to understand the material online, the lecturers still try to help students improve their understanding of the material and foster student activity in online learning. Observations on student learning trajectories must still be carried out because students' diverse cognitive abilities will lead to different learning trajectories when understanding the material (Febrinita & Amalia, 2021). It means the role of the lecturer in determining the right online learning strategy is very necessary because the lecturer is one of the keys to success in producing quality and competent students (Qurbani, 2017). For this reason, the learning process is not

only carried out by students, but lecturers must also improve their quality by increasing their competencies.

### **FTI Student Perceptions on Facilities and Infrastructure Aspects**

As described earlier, the implementation of online learning can run with an internet connection that provides facilities for students in its services (O. Saragih et al., 2020). So it cannot be denied, that the role of facilities and infrastructure in online learning greatly determines the smoothness of the learning process carried out. The results of the analysis show that students give positive and negative perceptions on aspects of online learning facilities and infrastructure. Positive perception is shown in the ease of access to learning materials, the availability of online learning tools used, and the use of video conferencing applications in online learning. This is seen from the tendency of students who prefer the use of the Zoom application in learning. However, the number of students who like to use WhatsApp is quite a lot. This is because the application is very familiar, easy to use and does not require a lot of quotas (Wargadinata et al., 2020).

In terms of online learning readiness, some students stated their readiness to do online learning every day, but most students still chose offline or face-to-face learning. Through face-to-face learning, students can understand more about the material because of the explanation from the lecturer (Marmah, 2014). In addition, students also complained about the fulfilment of internet quotas used in online learning (Sadikin & Hamidah, 2020). Most of the students still depend on their parents to fulfil their internet quota. For students who use Wi-Fi at home, they may be able to save more on internet quota, while those who do not have Wi-Fi, must purchase an internet quota package to participate in online learning. In case, this is an obstacle for students with moderate economic conditions (Tanjung & Utomo, 2021). In addition to the problem of quotas, poor signals due to power outages and weather are also obstacles to do online learning. Therefore, students hope that the university can provide quota subsidies for students with medium and low economic levels so that they can take part in online learning well and smoothly. In addition, the alternative of providing free Wi-Fi in the campus area can also be done if the university has problems in providing a free quota to students.

### **CONCLUSION**

During the Covid-19 pandemic, almost all courses were given through an online learning system, one of which was the Computational Mathematics course at FTI Unisba Blitar. The results showed that students gave positive perceptions on aspects of the teaching and learning process as well as aspects of lecturer competence. Meanwhile, in terms of facilities and infrastructure, students gave positive and negative perceptions. Positive perceptions are shown in the ease of access to learning materials, the availability of online learning tools, and the use of video conferencing applications in online learning, while negative perceptions are shown in the fulfilment of internet quotas for the online learning process. Although most students are satisfied with the online learning that has been carried out in the Computational Mathematics course, they still prefer offline or face-to-face learning because they are better

able to understand the material. Therefore, in further research, it is necessary to develop a learning model accompanied by appropriate learning tools, to be carried out online without reducing the quality of education provided to students.

In addition, the results of gaining information about student perceptions are expected to be used as a reference in the evaluation process of the online learning that has been held. Through the evaluation process, the tertiary institution providing online learning can provide feedback in the form of efforts to improve the quality of online learning in the next period to provide positive benefits to lecturers and students, for example increasing lecturers' creativity in providing educational services accompanied by increased student learning motivation (S. Saragih et al., 2021).

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