LEMBAR HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : Disajikan dalam seminar internasional/Nasional
dan dimuat dalam *proceeding*

Judul Prosiding : The Effectiveness of Online Lectures at Mathematics Department of Universitas Negeri Makassar During the Covid-19 Pandemic

Penulis Prosiding : **Nurwati Djam'an** (Co.Author), Nurdin Arsyad, Rosidah

Identitas Prosiding :
a. Judul Prosiding : Proceeding ICoESM
b. DOI : 10.2991/assehr.k.211211.074
c. Tahun Terbit : 2021
d. Penerbit : Atlantis Press
e. Terindeks di : Google Scholar

Kategori Proceeding :
(beri ☐ pada kategori yang tepat)

☐	Jurnal Ilmiah Internasional Bereputasi
☐	Jurnal Ilmiah Internasional
☐	Jurnal Ilmiah Nasional Terakreditasi
☐	Jurnal Ilmiah Nasional tidak Terakreditasi
☐	Jurnal Ilmiah Nasional Terindeks DOAJ dll.
✓	Prosiding Forum Ilmiah Internasional
☐	Prosiding Forum Ilmiah Nasional
☐	Laporan Penelitian

I. Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal Jurnal Ilmiah/ (isikan di kolom yang sesuai)										Prosiding Forum IlmiahIlmiah				Laporan Penelitian		Nilai Akhir Yang Diperoleh	
	Internasional Bereputasi		Internasional		Nasional Terakreditasi		Nasional Tidak Terakreditasi		Nasional Terindeks DOAJ dll.		Internasional		Nasional					
	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2
Kelengkapan dan Kesesuaian unsur isi jurnal (10%)											1,45	1,4					1,425	
Ruang lingkup dan kedalaman pembahasan (30%)											4,35	4,35					4,35	

Kecukupan dan kemutahiran data/ informasi dan metodologi (30%)									4,35	4,35						4,35	
Kelengkapan unsur dan kualitas penerbit (30%)									4,5	4,4						4,45	
Total = (100%)									14,4	14,5						14,45	

Kontribusi Pengusul (Penulis Pertama/Anggota)　　0,6 × 14,45 = 8,67

KOMENTAR/ULASAN PEER REVIEW

●Kelengkapan dan Kesesuaian Unsur:	ok
●Ruang Lingkup dan Kedalaman Pembahasan :	ok
●Kecukupan & Kemutakhiran Data & Metodologi:	ok
●Kelengpan Unsur & Kualitas Penerbit	ok
●Indikasi Plagiasi	ok
●Kesesuaian Bidang Ilmu	ok

Makassar,12 Mei 2023

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LEMBAR REVIEW
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
KARYA ILMIAH : PROSIDING

Judul Prosiding : The Effectiveness of Online Lectures at Mathematics Department of Universitas Negeri Makassar During the Covid-19 Pandemic

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Kategori Publikasi Ilmiah :

☐ Prosiding Seminar Internasional Terindeks Scimagojr dan Scopus.

☐ Prosiding Seminar Internasional Terindeks pada Scopus, IEEE Explore, SPIE.

☑ Prosiding Seminar Internasional.

(Beri √ pada kategori yang tepat)

☐ Prosiding Nasional Terakreditasi.

☐ Prosiding Nasional tidak terakreditasi.

Hasil Penilaian Peer Review :

Komponen yang dinilai	Nilai Maksimal Prosiding = 15					Nilai Akhir Yang Diperoleh
	Internasional terindeks scimagojr dan Scopus	Internasional terindeks pada scopus, IEEE, Explore, SPIE	Internasional	Nasional Terakreditasi	Nasional Tidak Terakredi tasi	
Kelengkapan Unsur Isi Prosiding (10%)			1,5			1,45
Ruang lingkup dan kedalaman pembahasan (30%)			4,5			4,35
Kecukupan dan kemutahiran data/informasi dan			4,5			4,35

metodologi (30%)							
Kelengkapan Unsur dan Kualitas Penerbit (30%)	.			4,5			4,25
Total = (100%)	.			15			14,40

Kontribusi Pengusul (Penulis Pertama/Anggota Utama 0,6 × 14,90 = 8,64)

Komentar/Ulasan Peer Review

Kelengkapan dan Kesesuaian Unsur:	Unsur-unsur tulisan lengkap dan sesuai dengan kaidah prosiding internasional
Ruang Lingkup dan Kedalaman Pembahasan	Ruang lingkup pembahasan bagus
Kecukupan dan kemutakhiran Data & Metodologi	Data & metodologi yang digunakan mutakhir
Kelengkapan Unsur dan Kualitas Penerbit	Kualitas penerbit baik
Indikasi Plagiasi	Indikasi plagiasi sangat rendah
Kesesuaian Bidang Ilmu	Sesuai dengan bidang ilmu penulis

Makassar, 12 Mei 2023

Reviewer 1

Prof. Dr. Nurdin Arsyad, M.Pd.
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LEMBAR REVIEW
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
KARYA ILMIAH : PROSIDING

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☐ Prosiding Nasional Terakreditasi

☐ Prosiding Nasional tidak terakreditasi.

Hasil Penilaian Peer Review :

Komponen yang dinilai	Nilai Maksimal Prosiding = 15					Nilai Akhir Yang Diperoleh
	Internasional terindeks scimagojr dan Scopus	Internasional terindeks pada scopus, IEEE, Explore, SPIE	Internasional	Nasional Terakreditasi	Nasional Tidak Terakreditasi	
Kelengkapan Unsur Isi Prosiding (10%)	✓		1,5			1,4
Ruang lingkup dan kedalaman pembahasan (30%)	✓		4,5			4,35
Kecukupan dan	✓		4,5			4,35

kemutahiran data/informasi dan metodologi (30%)						
Kelengkapan Unsur dan Kualitas Penerbit (30%)			4,8			4,4
Total = (100%)			15			14,5

Kontribusi Pengusul (Penulis Pertama/Anggota) = 0,6 x 14,5 = 8,7

Komentar/Ulasan Peer Review

Kelengkapan dan Kesesuaian Unsur:	Unsur prosiding internasional terpenuhi
Ruang Lingkup dan Kedalaman Pembahasan	Kajiani dan pembahasan cukup bagus
Kecukupan dan kemutakhiran Data & Metodologi	Data dan metodologi cukup baik
Kelengkapan Unsur dan Kualitas Penerbit	Unsur dan kualitas penerbit baik
Indikasi Plagiasi	Indikasi plagiasi sangat kecil
Kesesuaian Bidang Ilmu	Kajiannya sesuai dengan bidang ilmu pengusul

Makassar, 10 Mei 2023

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The Effectiveness of Online Lectures at Mathematics Department of Universitas Negeri Makassar During the Covid-19 Pandemic

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ABSTRACT

This study aims to find an overview of the effectiveness of online lectures at the Mathematics Department of Universitas Negeri Makassar during the Covid-19 pandemic, in terms of lecturers' online teaching practices and students' learning achievement and student responses. Data was collected by documentation, questionnaire, and interview techniques. The research subjects consisted of 10 lecturers and 240 students from semesters II, IV, and VI of the 2020/2021 academic year. The results showed that online learning is carried out through synchronous and asynchronous interactions, and assessment methods are used. Moreover, the LMS system has already been implemented in Universitas Negeri Makassar, and it has also been made compulsory for the lecturers to apply in daily lectures. This system enables the lecturer to keep track of students' progress, performance, and attendance. In addition, the results showed that during the covid-19 pandemic, other alternative learning practices were implemented by lecturers, namely: Zoom, WhatsApp, Google Classroom, YouTube, and e-mail. Results of the study also indicated interesting commonalities of the lecturer to the online media as access to learning content and management could any time and any place. Also, their teaching style is appropriately adapted to the online environment. According to lecturers and students, Zoom's most influential online learning media. Meanwhile, the obstacles faced by students and lecturers are internet networks. The results showed that 92% of students completed their courses. The average percentage of learning completeness of students taking mathematics, education, research, and assessment courses was 89.16, with the effect being quite effective. The findings indicated that, while the student faced challenges in online lectures, student responses were positive despite many obstacles related to technology, pedagogy, and psychology. The study's findings suggest that online learning environments provide affordances that allow mathematics lecturers to redefine and reflect on their teaching practices.

Keywords: Effectiveness, Online lectures, Learning achievement, Student responses, Online media.

1. INTRODUCTION

The Indonesian government first announced that there were 2 positive cases of COVID-19 on March 2, 2020. Seeing the condition of the COVID-19 pandemic, the Ministry of Education and Culture of the Republic of Indonesia or the Indonesian Ministry of Education and Culture immediately responded by issuing several circulars related to the prevention and handling of COVID-19. First, Circular Number 2 of 2020 concerning Prevention and Handling of COVID-19 in the Ministry of Education and Culture. Second, Circular Number 3 of 2020 concerning Prevention of COVID-19 in Education Units. Third, Circular Number 4 of 2020 concerning the implementation of educational policies in the emergency period for the Spread of Coronavirus Disease (COVID-19), which among other things, contains directions on the learning process from home [1]. To avoid physical contact and to maintain distance from one another, teaching and learning activities are carried out remotely using "pembelajaran daring" (in a network) or also known as online learning [2]. The terms online learning and "pembelajaran daring" express the same meaning. "Pembelajaran daring" is a term in Indonesian, while online is a term in English. Another term that is very commonly known is distance learning (PJJ). In line with that, Winaya [3] said, "the term pembelajaran daring is an acronym for 'dalam jaringan.' Thus, pembelajaran daring is one method of online learning or carried out through the internet network (dalam jaringan). Another

familiar term is WFH (Work from Home) with the online learning process at schools. The Covid-19 has created many challenges and opportunities for the educational institutes to strengthen their technical knowledge and infrastructure [4]. Moreover, most students already use the internet as a primary need for learning, so this data has policy implications for higher education in Indonesia during the industrial revolution 4.0 [5].

The outbreak of the Covid-19 virus pandemic has had a significant impact on various sectors. University is no exception. During lectures, students are usually given assignments twelve times or in every meeting except for quizzes, UTS, and UAS. Tasks assigned each week will be collected at the next meeting. Still, in the process, many students claim to experience technical problems, such as the unavailability of the internet network at the student's residence, unable to download materials and assignments sent by lecturers or access other sources from the internet, unavailability learning devices such as laptops or smartphones, and lack of understanding of the teaching materials given by lecturers. So, lecturers will often give time slack and understand the conditions faced by students when running online lectures. Like the UTS and UAS exams, not all students can be online when the lecturer has determined. Technical constraints and student limitations are again the main factors. In this case, the lecturer will give time slack to take the UTS or UAS at another time, even if not via Zoom, for example, through a WhatsApp video call. By providing time slack in collecting assignments and taking exams, the objectives of the lecture can be achieved.

Final grades for courses in the Department of Mathematics usually follow a four-part assessment format obtained during lectures, namely 10% quiz scores, 25% assignment scores, 25% mid-semester examination scores, and 40% final semester examination scores. The quiz was held twice, namely at the fourth and twelfth meetings. The midterm exam is held at the eighth meeting, and the end-semester exam is held at the last meeting, which is the sixteenth meeting. To investigate the effectiveness of online lectures at the Mathematics Department, FMIPA UNM during the Covid-19 pandemic, it is seen from the student learning outcomes that have been obtained during the even semester of 2020/2021 FY by distributing online questionnaires. The following is the acquisition of respondents' scores for one semester.

The effectiveness of learning is effective or appropriate or the achievement of learning objectives. In this case, the effectiveness of learning is an effort that produces results or produces useful and purposeful learning for students through the use of appropriate procedures. Two important indicators in the definition of the word learning effectiveness are the occurrence of learning in students and what the lecturer has done. Thus, the focus in efforts to foster learning effectiveness is the learning procedures used by lecturers and evidence of students learning [6]. Meanwhile, according to Gaff, effective learning includes how to help students to

achieve learning goals [6]. To see the effectiveness of learning, it can refer to the quality of the following four aspects: (1) the level of understanding and ability of students, (2) the ability of lecturers to manage learning, (3) student activities in learning, and (4) student responses to learning [7].

2. METHOD

This research uses quantitative and qualitative methodologies to evaluate online Mathematics learning based on student responses. In this study, data collection will be used in each part of the research cycle. This study's data collection techniques involve questionnaires, final grades of courses, observations, and interviews during the research. The researcher's data collection instrument employed a questionnaire distributed in a google form and distributed online and discussion. . The research subjects consisted of 10 lecturers (Dos [1]-[10]) and 240 students

3. RESULT AND DISCUSSION

Based on the results of the questionnaire responses given via google form with the following address: *https://docs.google.com/forms/d/11av6lZzDnKZUCstMa MEnsZW1bNLNiLFJulZTVVqLBlU*, we found out:

3.1 Student Learning Outcomes

From the appendix of the recap of student scores for eight courses, it can be seen that 85% of the total respondents completed studying, the remaining 15% did

Table 1. Students' Learning Achievement Score

Subject	Average	Effectiveness
Profesi Keguruan	81.2	Highly effective
Struktur Aljabar Lanjut	88	Highly effective
Matematika Pasar Modal	91.8	Highly effective
Media Pembelajaran Virtual	73.14	Effective
Pembelajaran STEM	91.375	Highly effective
Geometri Dasar	87.6	Highly effective
Matematika Sekolah Menengah dan Pembelajarannya	92.8	Highly effective
Kalkulus Integral	77.54	Effective
Average	89.16	Highly effective

not complete. The average percentage of student learning completeness taking the eight courses (teaching profession, advanced algebraic structure, capital market

mathematics, virtual learning media, STEM learning, and basic geometry, and high school mathematics and learning, and integral calculus) is 89.16, with the level of effectiveness achieved "highly effective."

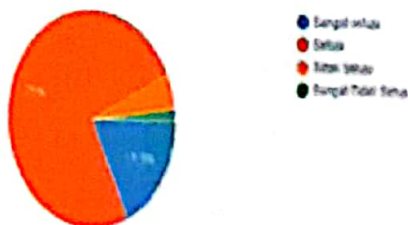### 3.2. Learning mechanism (synchronous and asynchronous)

Figure 1. Virtual class allows for discussion

Based on Figure 1, a collaboration between students occurs in online learning. For some courses, students are divided into groups and present them together and answer questions from other friends. One thing that usually happens is that the lecturer asks students to turn on their video camera during a synchronous session to discuss through visual communication. However, most of the students were unwilling to use their webcam, and some reported that their webcam was not working correctly. When the lecture took place, but only his voice was heard. Of course, it was challenging to get feedback from students to lecturers or lecturers to students. The lecturer explains that the students don't activate the camera; it reduces the lecturer's enthusiasm for teaching. Face to face, looking at each other is a good thing to do learning. This can make lecturers and students focus on their learning. Therefore, it is suggested that consideration be given to promoting this important component in online classes. Based on personal experience, many students avoid asking the teacher questions in the offline classroom. Through online learning, students have a direct private line to the lecturer via e-mail, short message, or chat room without feeling ashamed to ask questions in front of the class for fear of being thought stupid. An online class can relieve that fear.

Interestingly, from the interviews with participant lecturers and the researcher's personal experience, more questions from students were either conducted vocally or through chat rooms. Online platforms should be optimally utilized to assist student and teacher interactions in sending learning materials. However, another essential thing that is urgently needed to overcome the difficulties in distance learning is the student's independence.

3.3. Socio-technical constraints in online teaching and learning

Designing effective teaching and learning strategies requires studying different pedagogies and considering students' and lecturers' current social and technical

conditions during the pandemic. The various obstacles experienced by students and lecturers from the results of the investigation are as follows:

3.3.1. Students may have technical and personal barriers to online learning

Alternatively, teaching videos have positively impacted teaching and learning before the complete transition to online lectures [8]. Students can learn the material by watching the learning video anytime and anywhere. Thus, lecture videos offer flexibility and convenience on the part of students and enable active learning by replaying part or all of the video and increasing accessibility to students [9].

However, one of the disadvantages of using instructional videos is that students are trusted to finish watching the recorded videos independently [10]. If students do not complete this task and make significant learning gains, conducting synchronous sessions will be more difficult. The impact can be students not getting the desired mastery of learning outcomes. To address this potential drawback, problem-solving-based exercises are provided at the end of each video lecture to ensure student commitment to completing the course. Students are asked to answer and submit specific exercises that apply the problem-solving skills discussed in the video. This is an effort, so problem-solving involves a desire to investigate and personalize learning and avoid passively watching videos [11].

The list of learning videos made by one of the lecturers is shown in Fig. 2 with Calculus. Technical knowledge in making learning videos is the main challenge at the beginning of online learning, but slowly according to the participant lecturers, they are used to it. Some teachers record their lectures in their own homes, thus producing lecture videos. It should be noted that videos significantly impact how students process and understand the content. Therefore, video editing software is used to enhance the lecture videos further.
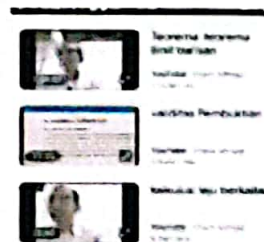

Figure 2. Video of Calculus

3.3.2. The teacher usually arranges asynchronous classes before the learning time is carried out. All instructions are arranged in the LMS then students access it individually and freely. But the limitations of student internet access and speed can be an obstacle.

Asynchronous learning allows students to feel more involved and responsible for their learning progress. However, with this method alone, students cannot get feedback and materials directly from the lecturer. It can

also cause students to feel alienated from their teachers and become less motivated. The case is combined with synchronous sessions using a stable video conferencing platform. Thus, more effective communication between lecturers and students can occur, and students can better understand the material delivery during the pandemic.

In addition to several lecturers making videos, students are given the task of making video presentations on the study of the given topic. For example, for an academic course, students create videos and then share the link in the group before their presentation time so that other students can watch and analyze them. Here are some links to student learning videos: https://youtu.be/ykHnAQvIzIM; https://youtu.be/3R-heyMxMFk.

By being sent early in the group, it is possible to minimize the shortcomings related to internet connection during lectures. In this case, students are allowed to listen before the material to be discussed.

3. 3. 3. The absence of direct interaction with the lecturer makes it quite difficult for students to understand the material in mathematics lessons which involve a lot of calculations that must be taught correctly to students. Limited interaction with friends makes it difficult to discuss the material given by the teacher.

Collaborative interactions and learning activities during face-to-face [12] or online settings [11] are critical. Therefore, synchronous lecture sessions use Zoom meetings, generally used in the Mathematics Department. Students are asked to present and explain their solutions to their classmates during synchronous sessions and answer questions (Supplementary Information, SI-4). This is done to increase student participation and enable them to present their alternative problem-solving. The teacher also makes corrections (if necessary) to the solutions or answers given by students and answers follow-up questions from the problem. This activity provides an opportunity to devote more time to higher levels of Bloom's taxonomy (i.e., applying, analyzing, and evaluating) [13].

In addition to collaboration between students through online learning, lecturers can also collaborate. In particular, learning in the Department of Mathematics applies team teaching. In the Team teaching approach, each lecturer is given the same opportunity, namely terms 1 and 2. This arrangement provides sufficient time for other instructors to prepare their online materials. Online synchronous sessions are usually taught by the lecturer in charge of the first meeting until the eighth meeting. At the same time, other lecturers are also present during the synchronous session (called session 2). This arrangement provides the following advantages: (i) peer review of lessons, (ii) instructor best practices are shared among the teaching team, (iii) standard lectures are provided to all students, (iv) other students are allowed to add something to the course, and (v) other lecturers can provide input in answering questions from students. This Team teaching approach has previously been shown to be effective as it allows students to gain new insights from multiple perspectives and critically evaluate these perspectives.

Figure 3. Virtual classrooms are designed to provide an efficient learning environment

The majority of students strongly agree that videos help them understand the material. Around 57.1% agree that virtual classrooms are designed to provide an efficient learning environment, as shown in Figure 3. These data indicate that students agree that virtual classrooms are designed to provide an efficient learning environment. However, the student learning environment is different from each other and the student's ability to understand concepts. Common problems, such as power outages, unstable internet connection, and non-academic responsibilities, are obstacles encountered during asynchronous learning.

3. 3. 4. It is important to understand and choose the type of online learning platform and how the platform can help lecturers achieve the teaching goals and suit the student conditions.

The transition to online learning also presents a significant challenge in deciding which online technology is best suited for lectures. It is easy for lecturers to be overwhelmed by the numerous educational platforms and online resources available. However, teachers' collaboration strategies (e.g., creating video lectures, building new activities, team teaching) result in higher quality learning materials. In addition, the exchange of ideas helps teachers make better plans for providing assessments.

The role of the Mathematics Department, which set up a Zoom account for each Course according to its schedule, was constructive. Choosing an alternative platform can reduce the burden on students to install several applications on their cell phones or other gadgets.

3. 3. 5. An unstable internet connection can make students feel stressed while studying synchronize.

The use of WhatsApp, Email, Zoom or google meets as a platform that successfully supports the continuity of the lecture process. The technological challenges are mainly related to internet connection speed and software downloads which seem quite frustrating and impact activeness in the learning process. This also gives rise to different opinions about Syam ok, which is excellent and exciting on the one hand and slow and sometimes unresponsive.

Some Mathematics Department Lecturers allow learning videos via Zoom to be recorded. Students who need learning video recordings cannot participate in the entire virtual lesson because of the network with the evidence

provided. This recording is, of course, with the permission of all participants in the virtual lecture.

3. 3. 6. Some lecturers or students with their family members at home can cause distractions when online learning

The gathering of all family members simultaneously affects student learning conditions. They admit that it is more difficult to concentrate when studying from home. This is what makes several Mathematics Department lecturers who are participants in this study choose to teach campuses to be more focused and reduce distractions if there is a chance for interference from family members at home.

However, success in online lectures depends on many factors, the main factors being signals and quotas. All respondents agree with this statement. In online courses, not only internal factors, such as willingness, interest, and motivation, are needed to attend lectures successfully. However, unique external factors determine success in the lecture process, namely internet signals and quotas.

3. 3. 7. Monitoring students' honesty in doing evaluations through an appropriate assessment method while still training students with numerical and analytical skills to solve problems.

Therefore, it is very important to carry out exams that do not allow students to cheat or reduce internet searches. The difficulty of the given task must be balanced with the given period. In addition, the collection limit must also consider other factors, such as the time it takes to download their answers because their internet connection upload speeds are different. These factors should not be neglected to provide justice for students.

In most mathematics courses, assessment is initially given as a test, group presentation in class, and a collection of individual problems. Questions are given at the end of the course to understand concepts, practice numerical skills, and deepen mathematical knowledge. However, since online learning has been implemented on campus, there have been many assessment strategies adopted by teachers as a reaction to the transition of online education from face-to-face, as shown in the following figure:

Students generally prefer assessment methods such as project-based assessments and open-book exams based on pedagogical factors. In conducting assessments, some lecturers replace exams with projects such as problem-based papers or products relevant to learning outcomes, such as examples for school Mathematics courses. Lecturers give project assignments on making a city using geometry as an alternative solution in learning geometry, as shown in Figure 4.
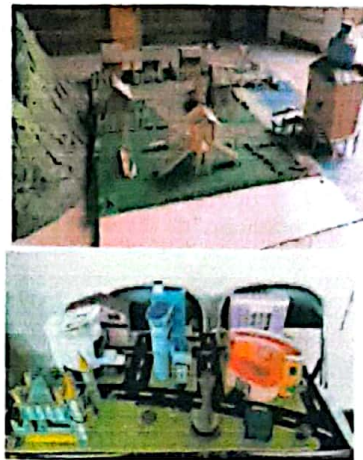

Figure 4. Student Project Assignments

3.4 Reflections on the online teaching experience

1. Positive Reflection
• All instructors felt that the online experience was positive with a steep learning curve.
• Interviewed by Dos [1], Dos [2], Dos [3] felt that online learning would add more flexibility and accessibility to education. Furthermore, Dos [3] stated, "It is better if universities open up new opportunities regarding distance learning, due to the availability of a more flexible and convenient platform for students."
• Dos [1] and Dos [2] feel that the online learning model is innovative and should be appropriately used to support each subject's learning objectives.
• Most of the interviewees expressed satisfaction with the efforts of campus services in providing tools and training for faculties if needed regarding the use of Syam ok (the University's e-learning system after the use of MIPA learn (faculty e-learning) was deactivated).
• Dos [4], Dos [5], Dos [6], Dos [7], Dos [8], Dos [9] felt that online migration amidst COVID-19 could be the seed for a blended learning approach. DOS [10] considers online curriculum delivery a very effective methodology, as students appear to be more engaged online than in class. Shy students seem to be more open online.

• All respondent lecturers feel that teaching can now be delivered flexibly anytime and anywhere, allowing them to attend events and conferences still while providing their education remotely.
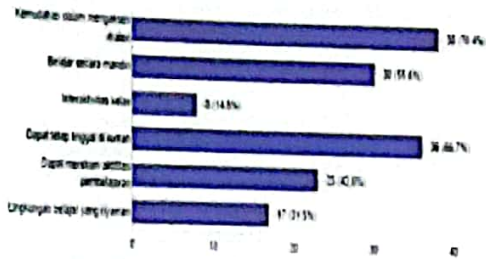

Figure 5. What are the supporting factors of online learning? Choose what you think is right.

Positive reflections from Lecturers are also supported by the results of the student response questionnaires as follows:

Around 70.4% of students experience ease in accessing online learning materials. Although there are many learning disorders at home, another finding from this study is that 66.7% consider that the supporting factor for them to study well during online learning is being able to stay at home. The third highest choice as a supporting factor is that they can learn independently (55.6%). Furthermore, the supportive aspect of online learning is that students can record learning activities (42.6% of students).

2. Negative Reflection
• Dos [2] feels that undergraduate students will benefit more if they study and have activities on campus.
• Dos [3] emphasize the need to pay more attention to the online exam and its fairness

Negative reflections from students related to the difficulties and obstacles faced when conducting online lectures as shown in Figure 6, including: (1) around 91.1% of students said technical problems, which include limited devices, internet quotas, and internet difficulties, (2) lack of interaction with students (55.4 % of students) in this case a direct explanation, other things that are inhibiting factors (3) lack of self-discipline (44.6%). According to interviews, students are more disciplined if they go to college than study from home.
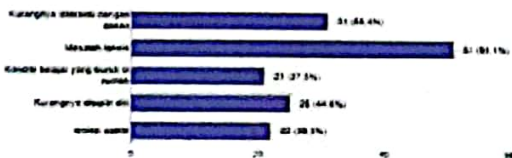

Figure 6. What are the inhibiting factors of online learning? Choose what you think is right.

4. CONCLUSION

The results of students' learning achievement score showed that the average percentage of student learning completeness taking the eight courses (teaching profession, advanced algebraic structure, capital market mathematics, virtual learning media, STEM learning, and basic geometry, and high school mathematics and learning, and integral calculus) is 89.16, with the level of effectiveness achieved "highly effective." Students' perception revealed that the use of video is a choice for lecturers and students to make it easier to understand the learning message. The option of a platform, appropriate media, assessment, and learning methods in online education should suit the characteristics of students. Results of the study also indicated interesting commonalities of the lecturer to the online media as access to learning content and management could any time and any place. Notably, according to the students, the main obstacle to e-learning is technical problems, including limited devices, internet quotas, and internet connection.

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