

ANALYSIS OF THE IMPLEMENTATION OF E LEARNING STRATEGIES IN TEACHING AT THE FACULTY OF MATHEMATICS AND NATURAL SCIENCES, UNIVERSITAS NEGERI GORONTALO DURING THE COVID-19 PANDEMIC

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ABSTRACT:

Research has been carried out that aims to analyze e-learning strategies at the Faculty of Mathematics and Natural Sciences, UNG. The main question in research is how the teaching strategy carried out at the Faculty of Mathematics and Natural Sciences during the Covid-19 Pandemic. The research method used was mixed method through a sequential explanatory strategy. Data obtained through a survey on students of the Faculty of Mathematics and Natural Sciences UNG explained by interviews of students and lecturers of the Faculty of Mathematics and Natural Sciences, UNG. The results showed that most of the teaching at the Faculty of Mathematics and Natural Sciences UNG was carried out through E-learning teaching. Various E learning teaching strategies have been carried out during the Covid 19 pandemic, including through assignments and discussions, virtual face-to-face, video and audio uploads. Teaching E learning using several platforms including Learning Management System (LMS) such as the Google classroom Edmodo and the SIAT UNG

application, teaching is also carried out with social media assistance. Some of the obstacles that have been found during the implementation of E-Learning teaching include: knowledge about the use of the E Learning platform / application, the availability of internet access quotas and internet networks that do not support the teaching process of E-learning. The general conclusion of the implementation of e-learning teaching at the Faculty of Mathematics and Natural Sciences, UNG, in general, students gave a positive response to teaching E Learning at the Faculty of Mathematics and Science, UNG in the emergency response to Covid-19.

Keywords: E Learning, Platforms, Learning strategies, The Covid-19 pandemic.

INTRODUCTION:

Online learning or better known as e-learning is learning that is recommended in the era of digitalization. This learning is recommended because almost all activities in the digitalization era or industrial era 4.0 have mostly been carried out through digital

activities such as shopping activities which are mostly done through online shopping. Some online shopping platforms such as: Lazada, shoope, bukalapak and others. Meanwhile, the teaching and learning activities of several platforms are used, including google classroom, edmodo, and others.

The definition of e-Learning means learning through electronic media, such as radio, television, video, CD-ROM, computer networks. Now, e-learning means learning and teaching over the internet. Students and teachers, in this case teachers or lecturers, can learn using resources in the internet system to learn and teach to be more effective (Kaewkiriya, 2013). E-learning is a transformation of the existing learning process at school or college into a digital form that is bridged by internet technology. The implementation of E-learning in education in particular has not been maximally implemented. This is indicated by the minimal use of the internet or applications for teaching activities such as use for E-learning activities (Arota, Mursalin, Odja, 2020)(Hajarati, Mursalin, Odja, 2020).

Since entering the Covid-19 pandemic that has hit around the world, all teachers are required to carry out learning and teaching activities from home. E-learning learning is one that is required in the world of education from elementary to university level. In general, universities already have an E-learning learning system created, but activities are very limited. Especially for UNG, it already has E-learning through SIAT. The Covid-19 emergency response requires teachers and students to study and carry out online learning. Teachers and students need adjustments in implementing online teaching.

Teachers and students who were initially reluctant to carry out learning and teaching E-learning, tried to learn and implement it. Basically, E-learning can support learning but

during the Covid 19 pandemic it became a major teaching strategy. Teachers are expected to make optimal use of ICT to facilitate innovative teaching activities. A student-centered teaching strategy is very suitable to encourage the development of students' knowledge and skills. In this global world, students are not enough to just know information and remember facts, but they must be able to think critically, and solve problems, and have the skills to communicate and work together. In addition, students must be able to adapt, have initiative, be able to access and analyze information and have high curiosity. One way to increase motivation in using multimedia is by providing activities. Therefore, a multimedia learning must be interactive, so as to provide opportunities for students to move.

The delivery of material in E-learning can use an E-learning approach which consists of: synchronous and asynchronous. Synchronous is learning that occurs via real-time electronics, for example through video or audio conferencing activities, and chat. Asynchronous learning events that are free of time (self-paced learning). For example: learning via e-mail, discussion forums, Wiki, Blog, Webcasting, video and or audio files. Asynchronous can be categorized into 2, namely rapid E-learning and traditional E-learning. rapid E-learning is asynchronous learning which contains content / material that is updated regularly, while traditional E-learning contains content that lasts very long because it rarely changes (Rusli, Hermawan, Supuningsih, 2017).

Divides learning related to E learning and Blended Learning into two parts, namely: synchronous learning and asynchronous learning. Synchronous learning is a learning process that occurs simultaneously between students and teachers even though they are not in the same place. Asynchronous learning is the process of learning between students and teachers at different times and places. Some

examples of synchronous activities include face-to-face or virtual face-to-face activities. Meanwhile, asynchronous learning activities where students and teachers may be at different times and places. Examples of asynchronous learning activities such as unscheduled discussion forums, work on assignments and others (Chaeruman, 2013).

METHOD:

The research method used is a mixed method. Mixed research combines two forms of research methods, namely quantitative and qualitative. Quantitative data is used to explain qualitative data or otherwise. The strategy chosen is a sequential explanatory strategy. Explanatory strategies are usually used to explain and interpret quantitative results based on the results of collecting and analyzing qualitative data (Creswell, 2014). The survey was conducted on 402 students from the Faculty of Mathematics and Natural Sciences UNG which were spread over 5 departments. After conducting the survey, it was continued with interviews conducted with several students and lecturers.

A survey questionnaire was prepared related to the E learning strategy at the Faculty of Mathematics and Natural Sciences, UNG. In some questionnaire items, students can choose more than one option provided, there are also questionnaires that are only given one choice per student. The interview was arranged in an unstructured manner but was related to the questions in the E Learning survey questionnaire.

Research that has been carried out is included in mixed or combination research, better known as mixed method research, which is a method that combines qualitative research and quantitative research. The type of combination research uses a sequential explanatory strategy. The sequential explanatory strategy is a strategy applied by

collecting and analyzing quantitative data and analyzing qualitative data (Creswell, 2014).

Research was conducted in June 2020 where the Covid-19 outbreak temporarily hit the entire world, including Indonesia. Most of the lectures at the Faculty of Mathematics and Natural Sciences are conducted online, a small part is conducted face-to-face in February and until mid-March 2020. Research sites in the Faculty of Mathematics and Natural Sciences, UNG, in all majors consist of physics, chemistry, biology, and mathematics and geo technology.

Research subjects are all students of the Faculty of Mathematics and Natural Sciences who are willing to fill out questionnaires and responses via google form and interviews spread across 5 departments.

The research procedure was carried out in three stages, namely: preparation of research instruments, data collection and data analysis. The arrangement of the instruments was carried out for questionnaires and interview guidelines about learning strategies. The second stage of data collection was carried out through a questionnaire distributed via google form while interviews were carried out through interviews via cellphone calls. The data analysis process in this study started from examining the data from the questionnaire results and the results of the interviews. The analysis process for the learning strategy questionnaire was carried out through the percentage of each indicator question in the questionnaire.

The data collected was in the form of E Learning strategy data at the Faculty of Mathematics and Natural Sciences during the Covid-19 pandemic. The instruments used were questionnaires and interview guides. Data collection techniques for questionnaires via google form and for interviews conducted via mobile phone calls

The data analysis process in this study started from examining the data from the questionnaire results and the results of the

interviews. The analysis process for the learning strategy questionnaire was carried out through the percentage of each question indicator in the questionnaire. Analysis of the results of the interview prior to identification and classification according to the indicators / questions in the questionnaire. After obtaining the results of the percentage analysis on the learning strategy questionnaire which is supported by the results of the interview, then the conclusion is drawn from each item of the question.

RESULT AND DISCUSSION:

The results of surveys and interviews related to teaching strategies at the Faculty of Mathematics and Natural Sciences show that teaching during the Covid-19 pandemic was carried out online, was postponed or had not been implemented, assignments, and assignments in the form of projects.

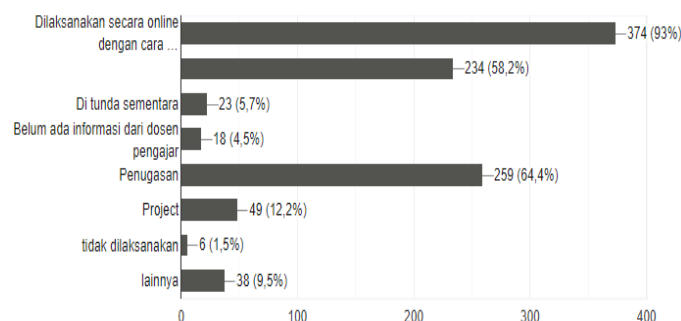


Figure 1. Teaching Implementation Strategy During the Covid-19 Pandemic at the Faculty of Mathematics and Natural Sciences, UNG

Figure 1 shows the highest percentage of teaching in a pandemic is done through online teaching, hereinafter referred to as E learning. There are several teachings that have been postponed or have not been implemented because they are related to the implementation of experiments carried out in the laboratory. Other teaching activities are carried out through assignments in various forms. E learning teaching at the Faculty of Mathematics and Natural Sciences UNG is implemented through

various strategies. Several E learning teaching strategies at the Faculty of Mathematics and Natural Sciences UNG, as shown in Figure 2.

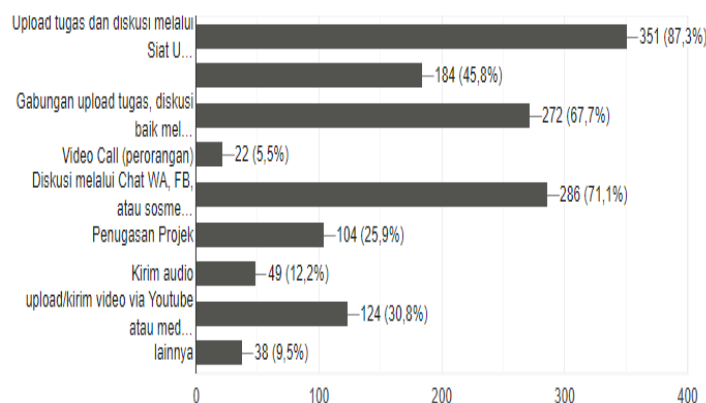


Figure 2. E Learning Teaching Strategy at the Faculty of Mathematics and Natural Sciences, UNG

The strategy with the highest percentage was uploading assignments on various E learning teaching platforms such as google classroom, Edmodo, SIAT UNG, and others (87.3%); chatting through various platforms such as social media and others (71%), virtual face-to-face learning or what is known as video conferencing (45%); video upload (30, 8%); project assignment (25.9%); upload audio (12, 2%), face to face virtual person (5.5%), others (9.5%).

The survey and interview results also show that from the implementation of E learning teaching at the Faculty of Mathematics and Natural Sciences, UNG, the strategy that most teachers respond to student questions or statements is the discussion strategy on all platforms. The second order percentage, the task upload strategy, the third order percentage via video conferencing and the last order percentage is video or audio uploads. The teacher gave the most responses during discussion activities on all E learning platforms. The interview from the teacher stated that discussion activities on E learning were carried out after giving assignments to students related

to the concepts or topics to be discussed. Discussion activities are scheduled and unscheduled (have a long duration). Real time (synchronous) discussion activities get a direct response by the teacher, but discussion activities that are not real time (asynchronous) often get a slow response or even not by the teacher. This is consistent with previous research by Rivalina (2017) who found several reasons for teachers not responding to E learning discussions, including: (1) most students took advantage of e-learning in the afternoon until evening after they returned from work; (2) the material provided during the E-learning will be discussed again at the face-to-face meeting [7].

In general, teaching E learning during the Covid-19 pandemic at the Faculty of Mathematics and Natural Sciences, UNG through two main parts, namely: synchronous and asynchronous teaching. Synchronous teaching strategies through virtual face-to-face either via video or audio and discussions via live scheduled chats on various platforms. Asynchronous teaching through unscheduled assignments and discussions. Synchronous E learning is mostly taught through face-to-face teaching virtually with students. The platforms used in virtual face-to-face teaching include: zoom meeting, google meet, Vicon E learning UNG and Jitse meet. As shown in Figure 2.

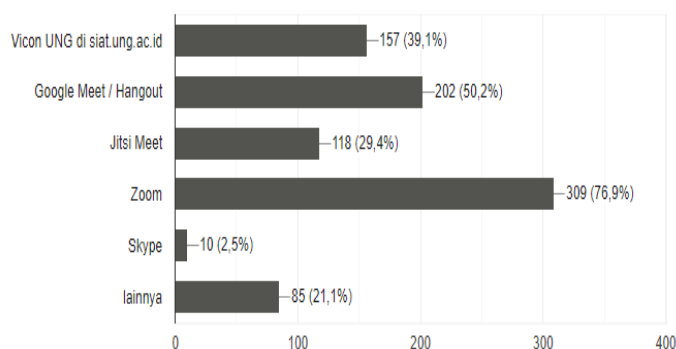


Figure 3. E-learning teaching strategy is synchronous with face to face virtual in the Faculty of Mathematics and Natural Sciences, UNG

Figure 3. Shows the percentage of teaching using a virtual face-to-face platform with the highest percentage in order, is the use of zoom meetings (76.9%), google meetings (50.2%) and Vicon UNG (39, 1%), Jitsi meet (29, 4%) and Skype (2.5%). For virtual face-to-face use with other media, around 21%, other media are social media platforms that can conduct video conferencing.

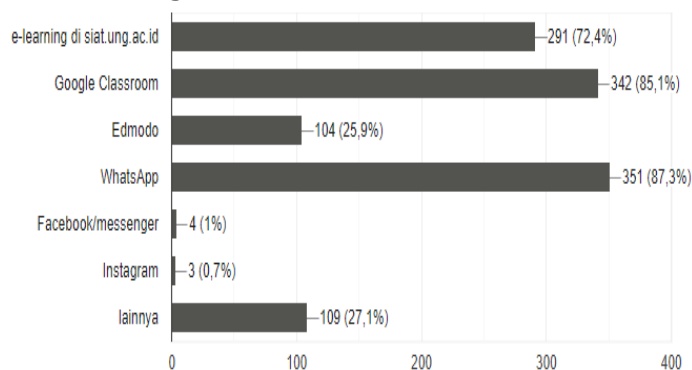


Figure 4. Platform in Teaching E Learning with methods other than face to face virtual

From Figure 4. It shows that teaching using platforms other than face-to-face virtual also varies with the highest percentages, respectively, using WhatssApp (87.3%), Google Classroom (85.1%), Siat UNG (72.4%), Edmodo (25 , 9%). The platform in teaching E Learning with a non-face-to-face strategy is synchronous and a synchronous because the platform can be used scheduled and unscheduled. For teaching that can be synchronous and asynchronous through the assistance of social media (WhatsApp), google classrooms, E learning on UNG, other media. The E Learning platform is the most widely used as mentioned above with the largest order using WhatsApp, google classroom, e-learning on UNG, and other media. The advantage of the E learning platform is that it is not face-to-face virtual, it does not use large internet access quotas. While one drawback is the lack of direct interaction between students and teachers.

The results of teacher and student interviews about teaching using virtual face-to-

face have advantages including students being able to interact directly with the teacher. Teachers can have direct discussions related to the concepts being learned. Teachers can also share material and discuss it sequentially. On some E learning platforms the teacher records teaching activities and can be shared again for learning. Weaknesses of using virtual face-to-face include: (1) internet access quotas of large data usage, so that not all students join teaching activities, (2) some students are on an internet access network that does not support for face-to-face virtual / video conference activities , (3) some students sometimes turn off the camera during video conferencing so that it is difficult to detect activities carried out in accordance with teaching or not in accordance with teaching activities.

One of the factors that causes the implementation of E learning to be less than optimal, both teachers and students lack knowledge in using platforms or applications related to E learning. Regarding training on the use of the E learning application as shown in Figure 6. Social media applications are widely used by teachers and students in learning E learning during the Covid-19 pandemic because it is easy to use and all students and teachers are familiar with social media platforms. Meanwhile, other learning applications that are Learning Management System (LMS) are underutilized by teachers and students because they require knowledge in their use. E learning at UNG has adequate E learning facilities for activities that carry out attendance according to the number of meetings, assignments, materials, even for video conferencing, as shown in Figure 5.

Teaching facilities at the Faculty of Mathematics and Natural Sciences UNG, either face-to-face virtual or not face-to-face, are available through E learning UNG, known as SIAT UNG. From Figure 3 and Figure 4, SIAT UNG E Learning teaching is not the main choice

as a platform in teaching during the Covid-19 pandemic. E learning facilities at UNG are generally complete, both face-to-face virtual and non-face-to-face teaching. The E learning platform of UNG is shown in Figure 5



Figure 5. SIAT UNG E Learning Platform

Figure 5. shows that the E learning facility known as SIAT UNG has covered the entire learning process from attendance, material giving, assignments and even face-to-face virtual work which is also available through the UNG vicon. UNG has required the use of SIAT to perform attendance, input assignment scores, exams, and final grades. However, the use of E learning has not become an obligation for teaching. E learning SIAT UNG needs to get socialization through training for both students and teachers. The need for the introduction and training of E learning both related to the UNG SIAT platform or other platforms. Students state that training related to E learning is obtained from various sources and training places. Figure 6 shows the introduction and training of E learning obtained by students of the Faculty of Mathematics and Natural Sciences, UNG.

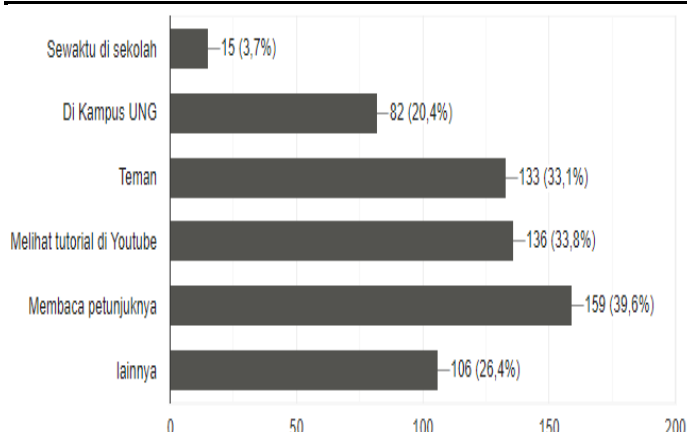


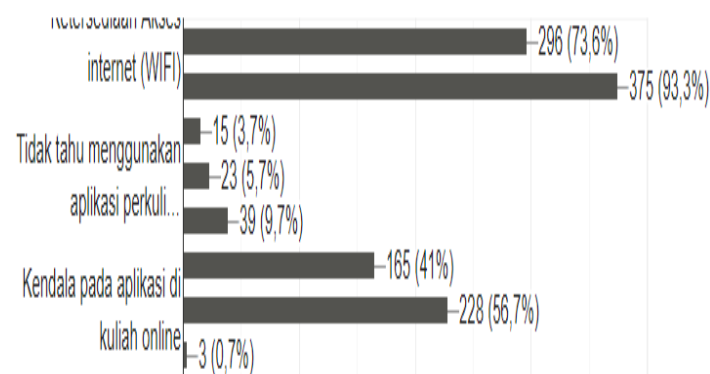
Figure 6. Places and Sources of Introduction to E Learning for Students of the Faculty of Mathematics and Natural Sciences, UNG

Figure 6 shows various sources and places to obtain information and an introduction to E learning for students of the Faculty of Mathematics and Natural Sciences, UNG. The percentage of all sources and places where it is absent reaches half. The highest to lowest percentage of sources and places of introduction to E learning for Mathematics and Natural Sciences Faculty students are reading instructions from books, tutorials on YouTube, friends. While the place for E learning identifiers for FMIPA UNG students is the highest percentage on the UNG campus and the lowest is at their home school. The percentage of obstacles related to the introduction of a learning platform or application as shown in Figure 7 shows a fairly high percentage, namely 56.7%.

The need for introducing E learning training in teaching and learning on campus has been revealed by previous research. The university should pay attention to the difficulties of students and teachers in implementing E learning [8]. This difficulty is related to the various abilities of students and teachers in implementing digital learning. The ability of students for digital activities is very high but for teaching it needs attention because

students' knowledge is diverse about the application.

In addition to the constraints related to knowledge about the E learning platform / application, students of the Faculty of Mathematics and Natural Sciences UNG also experience several obstacles in teaching E learning, this is shown in Figure 7.



In implementing the e learning strategy in teaching students, there are various obstacles. The biggest obstacle is the availability of internet access quotas (93.3%) and the existence of internet network access according to 73.3%, knowledge of platforms / applications 56.7%. For facilities such as smartphones and laptops, it is very small, namely: 3.7%. Previous research also by Popovici & Mironov (2015) found that E learning-related facilities or hardware (smartphone or ipad) were mostly owned by students (Popovici, Mironov, Cosmina, 2015). Related to the constraints on the availability of internet access quotas in the implementation of E learning teaching at UNG. Higher education leaders, in this case the Chancellor of UNG, provided internet access quotas to all UNG students including students of the Faculty of Mathematics and Natural Sciences [9]. This package assistance is highly expected by students, a survey of students of the Faculty of Mathematics and Natural Sciences showed 92.8% stated that internet access quotas assistance was very necessary, 5% said it was necessary, 1.5% was quite necessary and only 0.5% was not necessary. How necessary

internet access quotas is in the implementation of E learning teaching.

In general, the implementation of teaching E Learning for the Covid-19 emergency response mass received a positive response by students of the Faculty of Mathematics and Natural Sciences, UNG. Students expressed very satisfied with 7.5% very satisfied, 46.5% satisfied responses, 37.6% quite satisfied, 7.2% dissatisfied and 1.2% very dissatisfied. E learning teaching is a teaching strategy that is one of the main options applied to situations that are not normal, such as during a pandemic. Research Omer (2015) teaching E learning that was applied to previous abnormal situations also showed a positive response shown by students in a post-conflict / war country. E learning reduces the effects of isolation or quarantine caused by various factors such as pandemics and conflicts. The empirical findings of this study require the promotion of the use and improvement of the experience of teaching E learning on campus in abnormal circumstances such as conflict (Mohammed Omer et al, 2015).

Through E learning, it helps students of the Faculty of Mathematics and Natural Sciences, UNG, especially in learning independently. Students must be more active in searching for various concepts that are learned not only from the teacher, which has been the main thing in campus teaching in normal situations. The results of research by Tubaishat & Lansari (2011) found that there was a high level of acceptance in adopting e-learning in educational institutions. High percentage of students who think that E-learning can contribute positively to student learning experiences; E-Learning can help students to build confidence in learning and become independent learners compared to previous learning that relied on face-to-face learning. Students are required to learn with less social interaction either with peers or with instructors

(Tubaishat & Lansari, 2011)(Jethro, Grace, Adewuni, 2012).

CONCLUSION:

From the results of the survey and interview it was concluded that most of the teaching at the Faculty of Mathematics and Natural Sciences UNG during the Covid-19 emergency response was carried out through E learning. Various E learning teaching strategies have been implemented during the Covid-19 pandemic, including through virtual face-to-face (video conferencing), teaching using LMS such as google classroom, Edmodo and the SIAT UNG application, and social media assisted teaching. Various obstacles were encountered in the implementation of teaching E learning, especially the availability of an internet access network, internet access quotas for students teaching E learning and the introduction of the E learning platform to students and teachers. The general conclusion that the implementation of E learning teaching by Mathematics and Natural Sciences faculty students during the Covid 19 emergency response generally received a positive response with ratings above 90% expressed satisfaction.

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