The Survey on Students' Satisfaction Degree towards Online Learning during Covid-19 Pandemic Condition

Taufik

STKIP Muhammadiyah Barru, Indonesia

Fiptar Abdi Alam

STKIP Muhammadiyah Barru, Indonesia

Abstract

The present study aimed at describing the satisfaction level of the university students in online learning at STKIP Muhammadiyah Barru during the Covid-19 pandemic situation. The research participants were 30 students of the Guidance and Counseling study program in the first semester on the academic year of 2021/2022. To collect data, researchers distributed questionnaire items to participants via Google forms, then analyzed the data qualitatively. The result of students' responses to the questionnaire showed that in overall, 14 students (46.7%) of Guidance and Counseling Study Program at STKIP Muhammadiyah Barru were satisfied with the implementation of online learning organized by the campus, 10 other students (33.3%) stated that they were very satisfied, although there were also a small number namely 6 students (20%) expressed dissatisfaction. The satisfaction of the majority of students were found in the lecturers' role factor as a facilitator, and the good communication interaction factor to lecturers and to classmates. Students' dissatisfaction was generally found in the learning effectiveness factor, where students stated that they were bored with the independent assignments given by lecturers via online.

Keywords

covid-19 pandemic, online learning, satisfaction level, university students

Corresponding author:

Taufik, STKIP Muhammadiyah Barru, Barru, Indonesia

Email: upikunm@yahoo.com

INTRODUCTION

Since the end of 2019, the world had been rocked by an outbreak of the corona virus disease (covid-19), where this virus firstly appeared in Wuhan city, China. Almost all countries in the world were affected by this pandemic. World Health Organization (WHO) has officially declared this situation as a pandemic. The number of coronavirus cases in the world continued to increase in July 2020, reaching 13,224,909 cases found in 215 countries, with a death rate of 574,903 cases (BBC, 2020; He, Deng, & Li, 2020; Singhal, 2020; WHO, 2020). In Indonesia, the number of cases reached 76,981 with a death rate of 2,535 cases in July 2020 (Gugus, 2020; Sasmita, Ikhwan, Suyanto, & Chongsuvivatwong, 2020).

The spread of the coronavirus outbreak was so fast that every country had to act quickly to break the chain of its spread. Policies have been made by the Indonesian government to reduce the spread of covid-19, such as implementing health protocols. In addition, all activities caused crowds were avoided to prevent the spread of this virus outbreak. This caused everyone to reduce activities or activities outside the home. Work, worship, and study were done at home.

In high education level, lectures had to be carried out at home so that there was no direct interaction between fellow students and between students and lecturers. It was the government policy so that learning activities were carried out at home. The government, in this case the Ministry of Education and Culture (Kemendikbud, 2020), had issued a circular regarding the implementation of online learning as an effort to prevent the spread of covid-19.

According to the Minister of Education and Culture of the Republic of Indonesia, learning in higher education must be carried out online (Syakriah & Bappenas, 2020). Universities have the potential to adopt distance learning more easily than secondary and primary education (Kemendikbud, 2020). However, are all university students able to do online lectures? Many students find difficulties to do online learning, especially those who live in areas that are not yet covered by the internet network, or those who do not have adequate facilities.

This phenomenon was found in students of STKIP Muhammadiyah Barru located in Barru city. Although the campus has facilities and infrastructure that make it possible to conduct online lectures by utilizing internet-based technology, but individually, not all students have the same internet access capabilities. Departing from this phenomenon, the researchers conducted an in-depth investigation to find out how satisfied the students were with this online learning. Has the online learning met their expectations? There are many factors that should be considered during this online learning period, ranging from facilities, lecturers, and students.

LITERATURE REVIEW

According to Singh and Thurman (2019) and Mayer (2019) over the past few years, the world of education has undergone various changes and has gone through various challenges. Starting from the traditional classroom model, the digital era

adaptation, distance classes, and democratization for those who have limited facilities and access to education. In line, Nashruddin and Tanasy (2021) stated in their research, at the beginning of 2020, the world of education was again tested by the outbreak of the Covid 19 virus around the world. The traditional model class seemed to have evaporated and had to be abandoned in order to suppress the spread of this virus. In the field of education, all countries in the world are forced to adapt a learning model known as "Study from Home".

Technological innovation seems to be a hero in this pandemic situation. Humans should be grateful for the digital educational technology and communication providers that allow learners and educators to still be able to meet through various existing teleconferencing applications such as Zoom, Google meet, Skype, and so on. In addition, digital media such as Facebook, Youtube, WhatsApp, Telegram, have also taken over traditional classes from elementary to high education level.

The research results show that the learning climate and performance expectations have a significant effect on learning satisfaction (Efriana, 2021; Nambiar, 2020). Reinforced by the theory put forward by Yan, Zhang, Yang, and Ning (2008) that learners' satisfaction as a customer of educational services is one of the determining factors for the success of educators' competence. The research findings provide insight into the factors that are significant antecedents for planning and implementing elearning systems to increase students' learning satisfaction. Correspondingly, Heng and Sol (2021) concluded based on their research findings that there are three factors that influence students' satisfaction in online learning, namely the teachers or instructors, technical problems, and interactions that take place in learning.

Learning management systems or e-learning as it is known today as online learning has been around for more than ten years. During that time, e-learning was seen as a radical idea whose effectiveness had not been sufficiently proven. The application of e-learning has become something that is considered mainstream in the world of education (Koh & Kan, 2021; Turnbull, Chugh, & Luck, 2021). However, according to Oguguo et al. (2021) e-learning is offered as a privileged service by most universities in the world.

In the world of e-learning, the closest thing to a social network is a community of practice. Communities of practice are characterized by domains of common interest where each member interacts together, learns together, and develops shared resources in the community. The community was characterized by discussions supported by a learning management system. The community was a specific group of students, such as a student class on campus guided by a course lecturer (Nadeak, Naibaho, Sunarto, Tyas, & Sormin, 2021; Wei & Chou, 2020).

Electronic Learning or e-Learning is a form of education that utilizes information and communication technology to access the online teaching and learning process (Alqudah et al., 2020). Electronic learning is very dependent on the use of information technology devices that are supported by the internet network. This internet-based online learning allows students to access material and interact with lecturers and other

fellow students while studying through various internet-based applications.

Several studies have shown that e-learning is equivalent to traditional learning in terms of acquiring knowledge and improving skills (Nashruddin, Alam, & Tanasy, 2020; Raza, Qazi, Khan, & Salam, 2021). Besides that, Ma and Lee (2021) reported that blended learning that integrates e-learning with traditional methods can run effectively and it is well received by learners and instructors. This is of course also in line with the expectations of the government and educators, especially at the university level.

Satisfaction is a person's feeling response to the their expectation and the reality they experience. According to Suharno and Retnoningsih (2012), the term 'satisfaction' with the root word 'satisfy' means a feeling of pleasure and relief in a person because they find their heart's desires have been fulfilled. In the present study, students' satisfaction is what the researchers are concerned about to survey.

Students' satisfaction is a condition in which the expectations, desires, and needs of those students are met (Sopiatin, 2010). Other experts argued that students' satisfaction is a student's positive attitude towards the services of higher education institutions because there is a match between the expectations of the service compared to the reality they receive (Ros-Morente, Mora, Nadal, Belled, & Berenguer, 2018). Besides that, Rahardjo and Pertiwi (2020) concluded in their research that the level of students' satisfaction in lessons is a very important component for students to acquire knowledge or skills. In addition, the teaching quality of lecturers has a positive and significant influence on students' satisfaction. In the other hand, students' learning satisfaction is believed to be able to increase their learning motivation.

This research is in line with the experts' opinions and the findings of previous researchers related to students' expectations towards learning. However, the researchers focus more on the satisfaction of the Guidance and Counseling study program students towards learning with the online system at STKIP Muhammadiyah Barru. Since March 2020, at STKIP Muhammadiyah Barru, the traditional lectures has switched into the online system (e-learning). This is in accordance with the government's appeal during a pandemic, namely the learning system from elementary to tertiary levels shifts from the conventional or face-to-face system to online distance learning system. This system also applies to STKIP Muhammadiyah Barru.

RESEARCH METHOD

The method used in this study is a descriptive method with a qualitative approach. The participants involved in this study were students of the Guidance and Counseling study program at STKIP Muhammadiyah Barru in the 1st semester of the 2021/2022 academic year. The total respondents were 30 people from 61 the 1st semester students. In this qualitative research, the amount of data from respondents is considered to have met and has reached the saturation point.

Students' satisfaction indicators are measured based on spring 1999 Student Satisfaction Survey by Swan (2006). These sources are combined with the satisfaction indicators proposed by Eom and Ashill (2016) which consists of several indicators.

These indicators include self-regulation in learning, motivation, instructor, dialogue or interaction, and learning design.

Data was collected by distributing questionnaires to respondents via Google Form. The survey mostly consists of multiple choice questions. Data was obtained from respondents who participated in filling out the questionnaire on the Google Form. The questionnaire was the main instrument of this research. Respondents were also given the opportunity to add open-ended comments to the survey to find out their responses and to see their activities in the courses they took.

The all data were analyzed in four stages, namely data collection, data reduction, data presentation, and the last step was drawing conclusions and verification. The overall data obtained was reduced to focus the researchers in drawing conclusions according to the objectives of the study previously determined. The percentage of data obtained from the Google Form Chart. After that, data analysis and presentation were carried out to describe student satisfaction during online learning.

FINDINGS AND DISCUSSION

This study aims to see the level of students' satisfaction in the online learning process. The following are indicators used as the basis for students' satisfaction in online learning, presented in the table below. Those indikators are method applied, technology used, punctuality, lecturers ask and correct students' works, giving motivation, responsive and flexible communication, freedom to express opinions, effective communication in student interactions, students' collaboration in groups, and students' activities level during online learning.

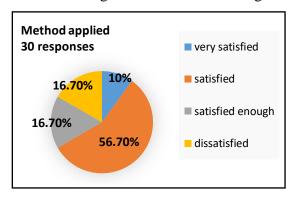
Table. Indicators of students' satisfaction towards online learning

Items		Indicators
Method and technology in	1.	Method applied in online learning
learning	2.	Technology used
_	3.	Punctuality of learning
Lecturer	1.	Lecturers ask and correct students' works
	2.	Lecturers give learning motivation
Interaction with lecturers	1.	Responsive and flexible communication
	2.	Freedom to express opinions
Interaction with classmates	1.	Effective communication in student
		interactions
	2.	Students' collaboration in groups
Students' activities		Students' activities level during online
		learning

The table summarizes various aspects of satisfaction towards online learning experienced by students during the covid-19 pandemic. These indicators were described in more detail in the form of statements in the Google Form questionnaire filled out by students as respondents. The average percentage result from the Google Form questionnaire shows that the majority of students are satisfied with the learning carried out by lecturers through the online system. The following is a presentation of data summarized from Google Forms that shows the level of students' satisfaction. The data is arranged according to the indicators in the table above.

Method and Technology in Learning

Students' satisfaction related to the method applied and the technology used in online learning is illustrated in the diagram in figure 1 below.



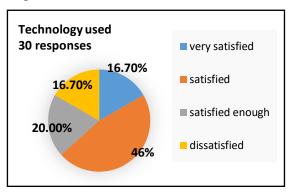


Figure 1. Students' satisfaction towards the method applied and the technology used

From the picture, it can be seen that most of the students (56.7%) stated that they were satisfied with the online learning method, 10% of students said they were very satisfied, 16.7% of students stated satisfied enough, while 16.7% of students stated dissatisfied. On the factor of the technology used in online learning, 16.7% of students stated that they were very satisfied, 46% of students were satisfied, 20% of students were satisfied enough, and only 20% of students stated that they were dissatisfied. From the observation, it was known that the types of technology platform that the lecturer used were Moodle for Learning Management System, Zoom meeting, WhatsApp, Google Classroom, Google Meet, dan Email.

Students' satisfaction related to the punctuality in online learning is illustrated in the diagram in figure 2.

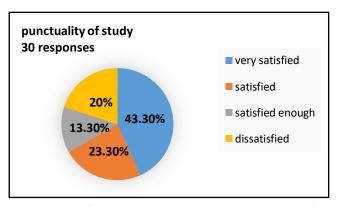
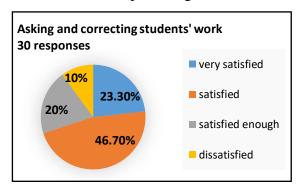


Figure 2. Students' satisfaction towards the punctuality of online learning

Figure 2 explains that related to the punctuality of learning, 43,3% of students stated that they were very satisfied, 23.3% of students stated that they were satisfied, 13% of students stated that they were satisfied enough, and 20% of students stated that they were dissatisfied. In fact, almost all lecturers carried out teaching according to the predetermined day and schedule, although there were some lecturers who moved the schedule, some lecturers started lectures not on time, and some ended the class prematurely.

2. Lecturer

The survey results show that lecturers are active in asking questions, correcting student work, and providing motivation.



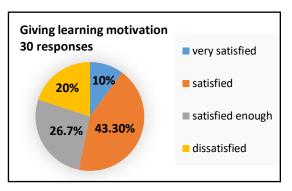


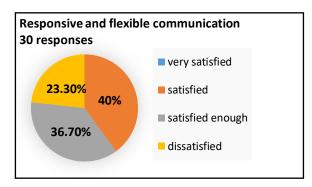
Figure 3. Students' satisfaction related to lecturers who ask questions, correct students' work, and motivate students

From figure 3, it is known that lecturers are actively ask and correct the students' works. Regarding this point, 23.3% of students felt very satisfied, 46.7% of students felt satisfied, 20% of students felt satisfied enough, and 10% of students felt dissatisfied, towards their lecturers. Those dissatisfied students gave reasons for their dissatisfaction because only some lecturers corrected students' work through the learning management system platform.

For the learning motivation factor given by lecturers to students, 10% of students felt very satisfied, 43.3% of students felt satisfied, 26.7% of students felt satisfied enough, and 20% of students felt dissatisfied. Students stated that lecturers often advised them about time management and enthusiasm for learning. This shows students' satisfaction towards the learning motivation given by the lecturer.

3. Interaction with lecturers

Responsive and flexible communication, and the freedom to convey ideas either through personal or group messages, are indicators of student interaction with lecturers. The data is presented in figure 4.



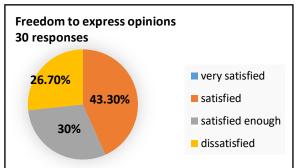
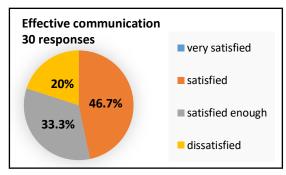


Figure 4. Communication and expression of opinion

Most students were satisfied with responsive and flexible communication with their lecturers with the satisfaction level achieved 40% and the freedom to convey opinions achieved 43,3%. However, 23,3% of students stated dissatisfaction regarding with communication, and 26.7% of students felt dissatisfied with the freedom to convey opinions. Students stated that when they communicated with lecturers, there were lecturers who responded well and some did not respond well. Other students said that they sometimes wanted to convey an idea to the lecturers but they were hesitant or awkward to convey it because there were some lecturers who did not respond when students asked questions.

4. Interaction with classmates

This section covers the effective communication and the cooperation in groups. The data obtained is shown in figure 5.



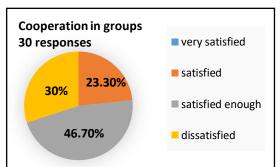


Figure 5. Students' satisfaction towards the effective communication and the cooperation in groups

The picture above shows the level of students' satisfaction with communication between classmates through class groups, and the level of students' satisfaction regarding collaboration in groups when learning online. Most respondents claimed to be active in class groups because they felt more comfortable communicating and asking questions with fellow students rather than directly asking the lecturers. Smooth communication among students makes it easy for students to take online lectures. The majority of respondents use the WhatApp Group as their medium of communication because it is considered effective and efficient in communicating even without meeting face to face.

5. Students' activities

The results of the survey related to students' activities in online learning show that the majority of students stated that their activities were running normally as usual, and some students said that their activity level had been low. Most students admitted that the level of lecture activity was the same as usual, only in a different way, namely face-to-face learning previous, and online learning at present. The results of the survey on students' satisfaction with activities during online learning are shown in figure 6.

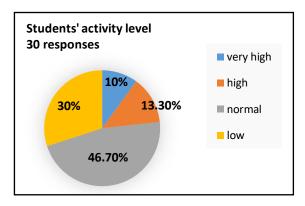


Figure 6. Students' activity level during online lecture

However, they hope that lectures can be conducted offline because it is easier for them to understand the explanations received directly in class than through online which sometimes they experience network disturbances. Network disturbances often cause the lecturers' explanation to be not clearly accepted by students.

In overall, from all factors surveyed on the online learning for guidance and counseling study program students in the first semester at STKIP Muhammadiyah Barru, the researchers found that 14 students (46.7%) were satisfied, 10 students (33.3%) were very satisfied, and only 6 students (20%) stated that they were dissatisfied towards the online learning system. Regarding the overall perceived online learning question, the majority of respondents stated that it was not as expected. This is reflected in figure 7 below.

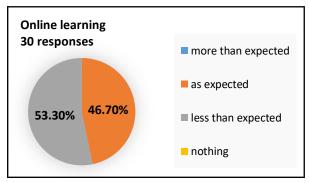


Figure 7. Overall Online Learning

From the survey on the feelings of the first semester students of guidance and counseling study program at STKIP Muhammadiyah Barru towards online learning,

only 14 students (46.7%) stated that it was as they expected, and 16 students (53.3%) stated that it was less than they expected. Students assess totally that the satisfaction in online learning that they feel is still less than expected. The main factor being the reason is the network. Network barriers often cause problems for students in learning. This is especially for those who live outside the city or in rural areas where the internet network coverage is not very adequate. Online learning was less than expected due to other factors such as poorly understood subject materials and delays in filling out the attendance list due to too many links being accessed.

Although some students are satisfied with the learning materials lecturers deliver, but social restrictions with limited facilities cause students to feel that the results of online learning do not accordance that they expected. The limited facilities here mean that there are still many students who do not have laptops or computer equipment to use in learning and to complete lecture assignments.

Regarding the learning method, students stated that some lecturers were not clear in explaining the materials, and lecturers tended to give independent assignments to complete. The learning environment factors and the characteristics of each student certainly make not all students able to consider this online class effective. This is in line with research conducted by Mayer (2019) and Nambiar (2020) that all the literature on e-learning indicates that not all students will be successful in online learning.

For the lecturer factor, from the results of the questionnaire, almost all students said that they were satisfied with their lecturers. However, there were some students who stated that they were not too satisfied because only a few lecturers gave feedback on their assignments. In addition, some students also liked when lecturers motivated them both at the beginning and at the end of the lecture to encourage them to study.

For the factor of interaction between lecturers and students, the data shows that students feel satisfied related to responsive and flexible communication, and the freedom to convey opinions. However, almost half of the respondents stated that they were not very satisfied because they felt awkward to ask directly to the lecturer so they preferred to ask friends through study groups.

For student interaction with classmates in terms of cooperation in study groups, the majority of students admitted that they were active in class groups because they felt more comfortable communicating and asking friends rather than directly to the lecturer. Smooth communication among students makes it easy for students to take online lectures. The majority of students use WhatsApp Group as their communication medium.

Researchers also asked students' responses to online learning as a whole, and their individual learning activities. The data showed that their overall perceived learning was still less than their expectations. For individual activities in online learning, students said that their activities were the same as usual. The difference is only in the process and meeting place for lectures, which is every day lecture activities are carried out online. It was found that students hoped that offline lectures could be started as soon as possible because the internet network problem really hindered them in learning. Many

students live in areas that are still not well within the reach of the internet network.

After a year of doing online lectures, students tend to be bored in learning. This learning saturation is also increasingly felt when students realize that progress in learning and mastery of the material they are targeting is far from expectations. They feel there is no progress if learning continues to be done online. This can be another factor in the ineffectiveness of online lectures for a certain period of time. This opinion is in line with that stated by Pant and Srivastava (2019), and Tohirin (2009), that learning saturation results in students not being able to receive lessons and even not being able to contain the essence of the learning.

CONCLUSION

Based on the findings of this research, the researchers conclude that the most students of the Guidance and Counseling Study Program at STKIP Muhammadiyah Barru are satisfied with the implementation of online learning organized by the campus, and only a small part of them who are very satisfied and dissatisfied. The level of students' satisfaction is mostly towards the role of the lecturer as a facilitator, and to good communication to lecturers and to classmates. On the other hand, students' dissatisfaction is generally in the effectiveness of learning, namely students feel bored with the independent assignments given by their lecturers.

REFERENCES

- Alqudah, N. M., Jammal, H. M., Saleh, O., Khader, Y., Obeidat, N., & Alqudah, J. (2020). Perception and experience of academic Jordanian ophthalmologists with E-Learning for undergraduate course during the COVID-19 pandemic. *Annals of Medicine and Surgery*, 59, 44-47.
- BBC. (2020). Coronavirus: Window of opportunity to act, World Health Organization says. 2021, from https://www.bbc.com/news/world-asia-china-51368873
- Efriana, L. (2021). Problems of online learning during covid-19 pandemic in EFL classroom and the solution. *JELITA*, 38-47.
- Eom, S. B., & Ashill, N. (2016). The determinants of students' perceived learning outcomes and satisfaction in University. *Journal of Innovative Education*, 14(2).
- Gugus. (2020). Percepatan Penanganan COVID-19. Situasi virus corona Covid19.go.id. Gov Repub Indonesia. 2020, from https://www.covid19.go.id/situasi-virus-corona/
- He, F., Deng, Y., & Li, W. (2020). Coronavirus disease 2019: What we know? *Journal of medical virology*, 92(7), 719-725.
- Heng, K., & Sol, K. (2021). Online learning during COVID-19: Key challenges and suggestions to enhance effectiveness. *Cambodian Journal of Educational Research*, 1(1), 3-16.

- Kemendikbud. (2020). Ministry of Health of the Republic of Indonesia. Novel coronavirus (covid-19) situation on 2 Maret 2020. from https://covid19.kemkes.go.id/situasi-infeksi-emerging/info-corona-virus/situasi-terkini-perkembangan-covid-19-17-maret-2020/#.XnC5aXIzbIU
- Koh, J. H. L., & Kan, R. Y. P. (2021). Students' use of learning management systems and desired e-learning experiences: Are they ready for next generation digital learning environments? *Higher Education Research & Development*, 40(5), 995-1010.
- Ma, L., & Lee, C. S. (2021). Evaluating the effectiveness of blended learning using the ARCS model. *Journal of Computer Assisted Learning*, *37*(5), 1397-1408.
- Mayer, R. E. (2019). Thirty years of research on online learning. *Applied Cognitive Psychology*, 33(2), 152-159. doi: https://doi.org/10.1002/acp.3482
- Nadeak, B., Naibaho, L., Sunarto, S., Tyas, E. H., & Sormin, E. (2021). Learning Management in Suburban Schools During the Midst of COVID-19. *Psychology and Education Journal*, 58(2), 1131-1139.
- Nambiar, D. (2020). The impact of online learning during COVID-19: students' and teachers' perspective. *The International Journal of Indian Psychology*, 8(2), 783-793. doi: 10.25215/0802.094
- Nashruddin, N., Alam, F. A., & Tanasy, N. (2020). Perceptions of teacher and students on the Use of e-mail as a medium in distance learning. *Berumpun: International Journal of Social, Politics, and Humanities, 3*(2), 182-194. doi: https://doi.org/10.33019/berumpun.v3i2.40
- Nashruddin, N., & Tanasy, N. (2021). School Policies on the Use of Android Devices in Students Learning Activities during the Covid-19 Pandemic Condition. *Lembaran Ilmu Kependidikan*, 50(1), 66-73.
- Oguguo, B. C., Nannim, F. A., Agah, J. J., Ugwuanyi, C. S., Ene, C. U., & Nzeadibe, A. C. (2021). Effect of learning management system on Student's performance in educational measurement and evaluation. *Education and Information Technologies*, 26(2), 1471-1483.
- Pant, N., & Srivastava, S. K. (2019). The impact of spiritual intelligence, gender and educational background on mental health among college students. *Journal of religion and health*, 58(1), 87-108.
- Rahardjo, A., & Pertiwi, S. (2020). Learning Motivation and Students' Achievement in Learning English. *JELITA*, *1*(2), 56-64.
- Raza, S. A., Qazi, W., Khan, K. A., & Salam, J. (2021). Social isolation and acceptance of the learning management system (LMS) in the time of COVID-19 pandemic: an expansion of the UTAUT model. *Journal of Educational Computing Research*, 59(2), 183-208.

- Ros-Morente, A., Mora, C. A., Nadal, C. T., Belled, A. B., & Berenguer, N. J. (2018). An examination of the relationship between emotional intelligence, positive affect and character strengths and virtues. *Anales de Psicología/Annals of Psychology*, 34(1), 63-67.
- Sasmita, N. R., Ikhwan, M., Suyanto, S., & Chongsuvivatwong, V. (2020). Optimal control on a mathematical model to pattern the progression of coronavirus disease 2019 (COVID-19) in Indonesia. *Global Health Research and Policy*, *5*(1), 1-12.
- Singh, V., & Thurman, A. (2019). How many ways can we define online learning? A systematic literature review of definitions of online learning (1988-2018). *American Journal of Distance Education*, 33(4), 289-306. doi: https://doi.org/10.1080/08923647.2019.1663082
- Singhal, T. (2020). A review of coronavirus disease-2019 (COVID-19). *The Indian journal of pediatrics*, 87(4), 281-286.
- Sopiatin, P. (2010). *Manajemen Belajar Berbasis Kepuasan Siswa*. Bogor: Ghalia Indonesia.
- Suharno, & Retnoningsih, A. (2012). *Kamus Besar Bahasa Indonesia*. Semarang: CV. Widya Karya.
- Swan, K. (2006). Virtual interaction: Design factors affecting student satisfaction and perceived learning in asynchronous online courses. New York: Routledge.
- Syakriah, A., & Bappenas. (2020). UI modeling shows grim projection of COVID-19 spread in Indonesia National The Jakarta Post: Jakarta Post. 2020, from https://www.thejakartapost.com/news/2020/03/31/bappenas-ui-modeling-shows-grim-projection-of-covid-19-spread-in-indonesia.html
- Tohirin. (2009). *Psikologi Pembelajaran Agama Islam*. Jakarta: PT. Raja Grafindo Persada.
- Turnbull, D., Chugh, R., & Luck, J. (2021). Learning management systems: A review of the research methodology literature in Australia and China. *International Journal of Research & Method in Education*, 44(2), 164-178.
- Wei, H. C., & Chou, C. (2020). Online learning performance and satisfaction: do perceptions and readiness matter? *Distance Education*, 41(1), 48-69. doi: https://doi.org/10.1080/01587919.2020.1724768
- WHO. (2020). World Health Organization. Coronavirus disease 2019 (COVID-19): situation report 42: World Health Organization. Retrieved April, 2020, from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200302-sitrep-42-covid-19.pdf?sfvrsn=224c1add
- Yan, L., Zhang, Y., Yang, L., & Ning, H. (2008). The Internet of things: from RFID to the next-generation pervasive networked systems. New York: Crc Press.