

Online learning in Indonesian higher education: New indicators during the COVID-19 pandemic

Fairusy Fitria Haryani¹, Sarwanto¹, Dwi Maryono²

¹Physics Education, Faculty of Teacher Training and Education, Universitas Sebelas Maret, Surakarta, Indonesia

²Informatics Technology Education, Faculty of Teacher Training and Education, Universitas Sebelas Maret, Surakarta, Indonesia

Article Info

Article history:

Received Mar 9, 2022

Revised Apr 8, 2023

Accepted May 5, 2023

Keywords:

COVID-19 pandemic

Effectiveness

Higher education

Lecturer's skill

Online learning

ABSTRACT

The COVID-19 pandemic has increasingly demanded the implementation of online learning in Indonesia. This study aimed to determine the indicators influencing the effectiveness of online learning in Indonesian higher education during the COVID-19 pandemic. The study employed a mixed-methods approach. We conducted an online survey of 201 lecturers teaching courses during the even semester of 2019/2020 and 1,983 students in 18 higher educations then followed up with an online interview with the lecturers, the head of the study program, and the institute of quality assurance of four chosen institutions. The results showed that besides the lecturer's information technology capabilities, the new indicators of online learning effectiveness in higher education during the COVID-19 pandemic were the availability of assessment guidelines, semester learning plan guidelines, academic position, type of lecturer publication, lecturer certification, and workload.

This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



Corresponding Author:

Fairusy Fitria Haryani

Physics Education, Faculty of Teacher Training and Education, Universitas Sebelas Maret

Ir. Sutami St. 36A, Jebres, Surakarta, 57126, Indonesia

Email: fairusy.fita@staff.uns.ac.id

1. INTRODUCTION

The positive case of COVID-19 in Indonesia was announced in March 2020. The number of people infected by this virus continues to increase [1] and thus changes various aspect of life [2]–[6]. Particularly, the government issued various policies to reduce the spread of COVID-19, one of those was social distancing. Due to this policy, learning process must adapt and it changed to implementing online or distance learning [7]–[10].

The implementation of online learning in Indonesia is based on the regulation Const. No. 12 of 2012 article 31, which states that distance learning is a learning process in long-distance through various media of communication. Legally, the government explains further in Minister of Education and Culture Regulation No. 109 of 2013 article 2 that distance learning aims to provide higher education services to the community who cannot attend the learning face-to-face and expand access and simplify the higher education services in the learning process. Distance learning is carried out without face-to-face directly or, commonly is called online learning through several platforms [11]. Moreover, many universities have regulated online or distance learning implementation in their academic policies long before the COVID-19 pandemic. Most of them have developed their online platform, learning management system (LMS). Therefore, online learning is not a novelty in our learning system.

Online learning means any learning delivered electronically via computer-based media [12]. It brings a new atmosphere because students can learn flexibly anywhere and anytime [13]. Online learning does not only allow flexibility in learning, but also increasing learners' experience and achievement [14]. It also helps students have a read-write and visual studying style and integrates the feedback from the teacher into the courses [15]. Based on the definition, online learning relies on the availability and stability of internet networks. Online learning before the COVID-19 pandemic was still being a choice and integrated by offline learning. This most recent condition is different from ordinary online learning because it is the only solution offered and must be implemented in the learning process. The necessity raises various limitations, including network access and the internet bundling [16].

Other than the problems mentioned previously, the availability of LMS or online learning platforms seems crucial in modern education [17]. Other than the problems mentioned previously, the availability of LMS or online learning platforms seems crucial in modern education. While on the other hand, students prefer simpler platform, such as WhatsApp [18], [19]. Even though this phenomenon creates gap in implementing online learning in higher education, the quality of education remains the top priority.

One of the efforts to improve the quality of education is through effective teaching [20]. Effective teaching leads to four indicators: student development and progress, teaching income, reflective teaching, and innovative teaching [21]. Paolini [22] also relates the effectiveness in several statements, that are "prepared instructor," "availability of instructor," "well-organized course," "expectations are clearly expressed by the instructor," and "enthusiastic instructor." Pinto and Anderson [23] stated that effectiveness, especially in blended learning, is measured by student satisfaction.

At the same time, Azizi and Haybatollahi [24] emphasized more influential variables in learning about student assessment. For online learning, the characteristics of effectiveness are successful in delivering learners to achieve the instructional goals, providing an engaging learning experience, involving students actively in the learning process, and providing all facilities supported learning process [25]. This study focuses on the effectiveness based on the assessment standards from the council for the accreditation of educator preparation (CAEP), leading to teaching effectiveness. This study focuses on the effectiveness based on the assessment standards from the CAEP, leading to teaching effectiveness. The components of teaching effectiveness are material substance knowledge, learning plan, learning delivery, learning environment, student assessment, and teacher professionalism.

First, material substance knowledge relates to how teacher understands the curriculum, subject substance, and the developmental needs of students. Second, learning plan relates to the based on the standards of education, curriculum, effective strategy, resources, and data to satisfy the needs of students. Then, effective learning delivery involves students studying by using various strategies to satisfy the needs of students. The assessment analyzes the data system to determine student academic development, guide delivery methods, and give timely feedback. Meanwhile, learning environment emphasizes how teachers adopt resources and steps to create conducive conditions to study. Last, professionalism leads to teacher commitment to professional ethics, responsibility, and effective communication in improving student learning. Based on the elaborations, it can be concluded that teaching effectiveness is measured by both teachers and students.

The main problem of this research is kinds of indicators form the effectiveness of online learning in higher education in Indonesia during the COVID-19 pandemic. Through the indicators classified as impacts on the effectiveness of online learning, institutions or teachers can anticipate and manage their online learning process. Moreover, they gain the way to improve the quality to achieve the instructional goals.

2. RESEARCH METHOD

The mixed-method approach was applied in this study. The mixed-method is about integrating quantitative and qualitative research to develop and strengthen the research's conclusions [26]. This approach also follows the goal determined. This study was conducted from August to November 2020. The sampling was 201 lecturers teaching courses during 2019/2020 even semester, and 1,983 students enrolled in the courses in 18 higher educations and then followed up by online and offline interviews to the lecturers, the head of the study program, and the institute of quality control in four higher educations.

The higher education involved in this study was from various Indonesia regions (Java, Sumatera, Kalimantan, Nusa Tenggara), both public and private. There were seven private higher educations and 11 public higher educations. Based on the status of public higher education, two of them were legal status, six were work units, and three were public service agencies. There were eight from Java, six were from Sumatera, two were from Kalimantan, and two were from Nusa Tenggara. It is expected that the data in this study can represent higher education from all regions and types in Indonesia.

There were two types of variables used in this study. The dependent variable in this study was the effectiveness of online learning consisting of six components, namely material substance knowledge (dim-1), learning plan (dim-2), learning delivery (dim-3), learning environment (dim-4), assessment (dim-5), and professionalism (dim-6) as seen in Figure 1. Although the data type was scale, it was converted into ordinal with high, medium, and low criteria. The independent variables analyzed were 17 variables as written in Table 1. There were four variables scaled from 17 variables, four variables were scaled, 11 variables were nominal, and two were ordinal.

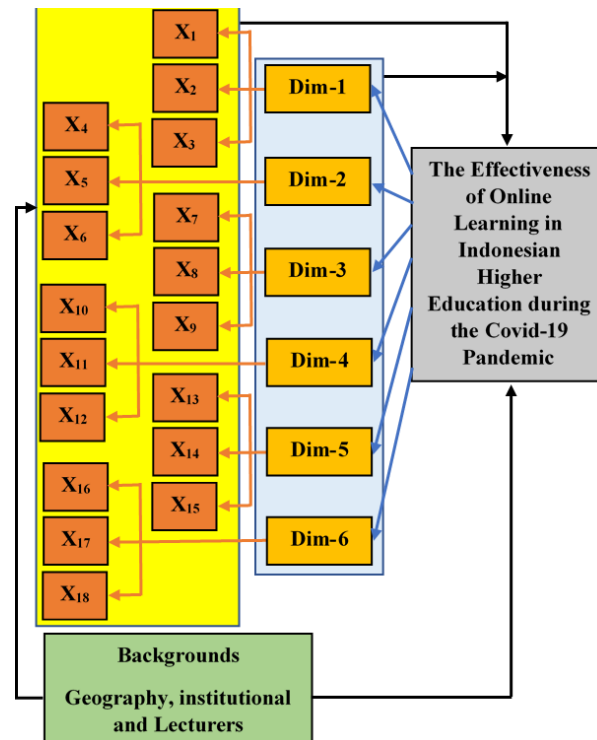


Figure 1. Analysis design of relationship among research variables

Table 1. Internal consistency reliability of biology test

Variable name	Description	Data type	Range
X ₁	Experiences in teaching the courses (in years)	Scale	1-30
X ₂	Last or most recent degree	Nominal	S2, S3
X ₃	Academic positions	Ordinal	Instructor, Assistant Professor - Lower, Assistant Professor - Upper, Associate Professor, Professor
X ₄	Publication in 3 recent years	Nominal	None, Local, National, International
X ₅	Teaching training	Nominal	None, Teaching certificate, Pekerti AA certificate
X ₆	Semester learning plan (RPS) Guideline from institution	Nominal	None, Available, Available and used
X ₇	Learning plan socialization from institution	Nominal	None, Available but not attending, Attending the socialization
X ₈	Online learning system training from institution	Nominal	None, Available but not attending, Attending the training
X ₉	Lecturer ages	Scale	25 – 70
X ₁₀	ICT skill	Ordinal	1, 2, 3, 4, 5
X ₁₁	Frequently used online learning platform	Nominal	Video conference, LMS, social media
X ₁₂	Regulations about online learning from institution	Nominal	None, Processing, Available
X ₁₃	Assessment guidelines from institution	Nominal	None, Available, Available and used
X ₁₄	How long has been a lecturer	Scale	1 – 40
X ₁₅	Lecturer’s workload Feb-July 2020	Scale	1 – 24
X ₁₆	Lecturer certification	nominal	Never, processing, already passed
X ₁₇	Lecturer status	nominal	Civil servants and non-civil servants

The data collection techniques were online surveys, online interviews (3 higher educations), and offline interviews (1 higher education). There were five instruments used in the online survey: the lecturers teaching an online course, the enrolled students, the peer lecturers, the head of study programs, and the rectors. The online survey was conducted only once in this research, and the data were used for quantitative data analysis. Before using the instruments, we tested the reliability and validity instruments. The data from the survey were managed, processed, and then analyzed. The data management consisted of editing, coding, scoring, and tabulating. After the data were well-managed, we processed the data using SPSS software, including validity test, reliability test, and analyzing requirements (normality and homogeneity test). The analysis used in this study was modelling the correlation between dependent (effectiveness of online learning) and independent variables by ordinal regression and decision tree model.

For the qualitative data, online and offline interviews were conducted. The qualitative data is confirmatory from the analyzed quantitative data before. There were three higher educations involved in the online interview (from Sumatera and Java), while one higher education in Nusa Tenggara were interviewed offline.

In ordinal regression, the dependent variable is ordinal and the independent variables are covariate or factor. Because the data types of independent variables were scale, nominal, and ordinal, as seen in Table 1, there are 13 factor variables and four covariate variables. The ordinal regression chosen was the cumulative logit function assuming proportional odds, and the steps are parallel lines test, simultaneous test, the goodness of fit test, model determination coefficient, partial test, and model formation.

2.1. Parallel lines test

Parallel lines test is the requirement to do cumulative logit. In this test, H_0 was expected to be accepted. The null hypothesis H_0 was the same slope coefficient for all response variables. While the alternative view H_1 was that the slope coefficients were not the same for all response variables.

2.2. Simultaneous test

A simultaneous test is carried out to determine whether the model with the determined independent variable is better than without the independent variable. H_0 was expected to be rejected ($p\text{-value} < \alpha$). In this test, H_0 was said that $\beta_i = \beta_1 = \dots = \beta_k = 0$ and H_1 was stated that there was at least one $\beta_i \neq 0$, where i is 1, 2, ..., or k .

2.3. Goodness of fit test

The goodness of fit test is carried out to determine whether the used model is appropriate. H_0 was expected to be accepted ($p\text{-value} > \alpha$). H_0 was written that the model was appropriate, while H_1 was expressed that the model was not appropriate.

2.4. Model determination coefficient

The coefficient in an ordinal regression model is shown by Mc Fadden, Cox, and Snell, and Nagelkerke R square score. It describes the estimation of prospect result or examining of hypotheses based on correlated data. The minimum value is 0 and the maximum is 1, which can be also stated in percentage. The maximum score of three models is chosen to become the final value of the coefficient of determination.

2.5. Partial test

A partial test is carried out to see how significantly the independent variables affect the dependent variable. The significance of each independent variable is calculated. The significant effect of independent variables on the dependent variable are those that have $p\text{-value}$ less than α . p is probability score and the significance value is symbolized as α .

2.6. Model forming

The ordinal regression proceeded by SPSS presents the inverse direction at the output location in the parameter estimates. Therefore, when writing the model, the direction of the coefficients must be reversed. If the dependent variable has a k category, so the model formed is as in (1).

$$\begin{aligned} \text{Logit } [P(Y \leq 1|x)] &= \alpha_1 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n \\ \text{Logit } [P(Y \leq 2|x)] &= \alpha_2 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n \\ \text{Logit } [P(Y \leq k - 1|x)] &= \alpha_{k-1} + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n \end{aligned} \quad (1)$$

Meanwhile, in the decision tree model, we used the classification technique to predict the effectiveness of online learning by using an ordinal scale, as seen in Table 2. If the score is more than 85.3, the category is high. It states that the dependent variables are very high in determining the effectiveness of online learning.

Table 2. Dependent variables

Category	Requirements	Range
3 (high)	$Y > (\text{Mean} + \text{Standard Deviation})$	85.3 – 100
2 (medium)	$(\text{Mean} - \text{Standard Deviation}) \leq Y \leq (\text{Mean} + \text{Standard Deviation})$	72.2 – 85.2
1 (low)	$Y < (\text{Mean} + \text{Standard Deviation})$	0 – 72.1

3. RESULTS AND DISCUSSION

The data results of the lecturer's ICT skills, the selected online platform during online learning, online learning system training, and lesson plan guidelines are shown in Figure 2(a), Figure 2(b), Figure 2(c), and Figure 2(d), respectively. Only 1 of 201 lecturers claimed to have ICT skills on a scale of 2 out of 5. The data also show that the average ICT skills of lecturers are 4 out of 5 and more than 50% are in the master category. The online platforms that the lecturers chose the most were learning management system (LMS) by 93 people, followed by 80 people choosing video conference (vi-con), 24 people choosing social media (soc-med), and the rest choosing YouTube. Here, the LMS used included but not limited to LMS developed by institutions and google classrooms. Further, the interviews confirmed several higher education policies regarding the online platform used. Of the four higher institutions interviewed, two of them recommended using the LMS developed by the institution, and the other two used Google Classroom. Most of the LMS developed by institutions was Moodle. For vi-con, lecturers chose to use Google Meet or Zoom meeting. Soc-med was also used as a learning platform because most students had social media accounts and actively used them.

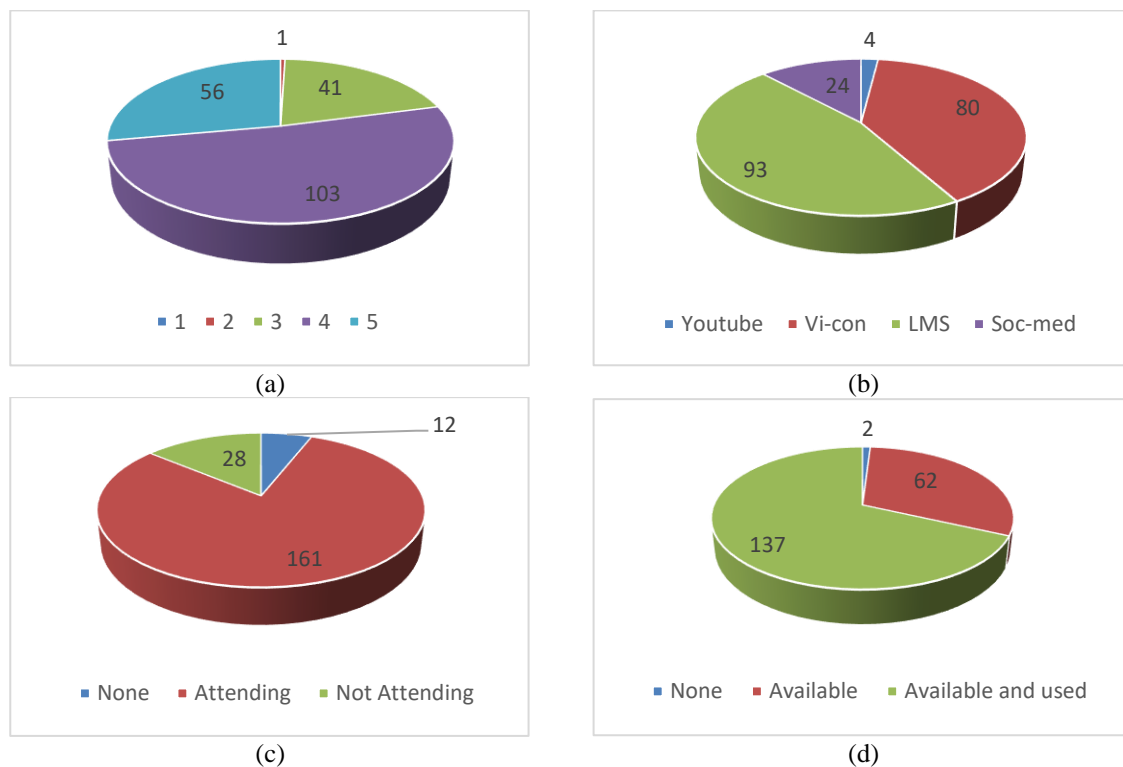


Figure 2. The data results of (a) the lecturer's ICT skills, (b) the selected online platform during online learning, (c) online learning system training, and (d) lesson plan guidelines

Many higher educations have carried out online learning training to support the implementation of online learning. As shown in Figure 2(c), 188 out of 201 lecturers stated that higher education provided the training, but 28 did not attend it. Only 6% stated that there was no training in their higher education. The data from the online interview also stated that the four higher educations had conducted the online learning training. As previously described, several higher educations had responded to the regulation on distance learning (Const. No 12 of 2012 and Ministry of Education, Culture, and Higher Education Regulation No. 109 of 2013) by both LMS development and online learning training.

Besides the training, almost all higher educations had semester learning plan guidelines, especially for online learning, as shown in Figure 2(d). Only 2 out of 201 stated that their institution did not have guidelines. The online learning guidelines also described that higher education prepared well for the online learning system. From 201 lecturers, 25 of them served as instructors, 66 as Assistant Professor - lower, 61 as Assistant Professor - upper, 42 as Associate Professor, 7 as Professor. Meanwhile the lecturers' age ranges from 20 to 67 years old. Based on Figure 2, the following is presented data analysis of the research results about the indicator forming the condition for the effectiveness of online learning. There are 17 factors (independent variables) analyzed to determine whether they affect online learning effectiveness using an ordinal regression test.

3.1. Parallel lines test

The Chi-square score is 57.466, with a p -value is 0.045 or more significant than α . Thus, the null hypothesis H_0 in the parallel lines test is rejected so that it does not meet the initial assumption to perform the logit cumulation model. Therefore, the variable reduction is made by selecting the variables that are less significant to the model in particular parameter estimation, namely X_1 (experiences in teaching the courses (in years)), X_9 (lecturer ages), X_{11} (frequently used online learning platform), X_{14} (how long has been a lecturer), and X_{15} (Lecturer workload February to July 2020).

3.2. Simultaneous test

The Chi-square score is 250.395 with a p -value is 0.00 or less than α . Thus, the null hypothesis H_0 in the simultaneous test is accepted. Hence, it can be concluded that the model with the independent variable is better than without it.

3.3. Goodness of fit test

Based on the goodness of fit test, the Chi-square score of the Pearson test is 336.173 with a p -value is 0.821 or more significant than α . Meanwhile, the Chi-square score of deviance is 247.622 with a p -value is 1.000 or more significant than α . Therefore, the test decision is H_0 rejected and the regression model is appropriate.

3.4. Model determination coefficient

The pseudo-R-square score of Cox and Snell method is 0.394. If it is compared to Nagelkerke method, that gets 0.476, the score is lower. Meanwhile, the score of McFadden method is the lowest around 0.285. Thus, the Nagelkerke method gives the highest score, which means that the independent variables can explain the dependent variable by 47.6%.

3.5. Partial test

After computing the significance of each independent variable, there are variables that have and do not have a significant effect on the dependent variable. Those variables which have a significant effect are X_3 (academic position), X_6 (learning plan guidelines from the institution), X_8 (online learning system training), X_{10} (ICT skills of the lecturer) and X_{16} (lecturer certification). Meanwhile, the variables that do not have a significant effect are X_2 (last most recent degree), X_4 (publication in 3 recent years), X_5 (teacher training), X_7 (learning plan socialization from the institution), X_{12} (regulations about online learning from the institution), X_{13} (assessment guidelines from the institution), and X_{17} (lecturer status).

3.6. Model forming

Based on the test, there are three main results. First, the resulting ordinal regression model reduces two independent variables, namely X_9 (the lecturer ages) and X_{11} (the frequently used online learning platform). Moreover, the model obtained shows that the independent variable in this model can explain the dependent variable by 47.6%, while other variables outside of this discussion determine the remaining 52.4%. Finally, the variables that have a direct effect significantly are the level of X_3 (academic positions), X_6 (learning plan guidelines from the institution), X_8 (online learning system training), X_{10} (ICT skills), and X_{16} (lecturer certification).

From the decision tree model performed, the independent variables that can be used to determine the category of the effectiveness of online learning include X_3 (academic position), X_4 (publications), X_{10} (ICT skills), X_6 (online learning training), X_{13} (assessment guidelines), X_{15} (lecturer's workload), X_{16} (lecturer certification) and X_{17} (lecturer status). The model's effectiveness predicts the data correctly about 73.6%. It means that it turns out to predict the data correctly by 73.6% among the datasets given for the test.

Compared to other variables, ICT skills become the primary independent variable in determining the effectiveness of online. There are five score choices in ICT skill from the survey, namely 1, 2, 3, 4, 5. If the ICT skills score is less than 5, the effectiveness does not meet category A. ICT skills, especially for lecturers with the assistant Professor - Lower in an academic position, will cause the effectiveness of online learning to be in category C. When ICT skills score is more than 3, it needs to be supported by assessment guidelines that the lecturer has followed to get a minimum effectiveness score of B. Another interesting finding is that lecturers with ICT skill scores of more than 3, have already used the assessment guidelines from the institution and the learning plan guidelines, but have not passed certification, can achieve effectiveness in category A. In addition, the lecturer's workload, which has less than 14 credits, results in the highest effectiveness.

The ICT skills must be possessed in the teaching environment because it is related to pedagogical skills [27]. As we know, using ICT in teaching and learning is central to developing 21st-century skills [28] and can improve the quality of teaching [29]. Based on the profile, most lecturers in Indonesia use ICT in their learning. The other effectiveness variables are academic position, publications, lecturer's workload, certification, lesson plan, and assessment guidelines. The academic position is closely related to publication [30]. The publication is about scientific performance, so the higher the academic position, the more the number of publications [30], [31]. The number of publications is one of the indicators of research productivity.

Meanwhile, the productivity of research is not only related to the quality of teaching, but also to the quality of research which leads to a positive impact on the quality of teaching [32]. However, the publication data were only based on the questionnaire in this research, not the database system. Besides, the teaching was conducted in the online system. Further analysis should be carried out for better results. The publication index was slightly increased after certification, and a new compensation scheme was implemented. Since 2008, lecturers who have passed the certification have got an extra salary as compensation [33]. However, the study about the effect of certification on the quality of teaching is limited.

The performance of lecturer also relates to the workload. To make a better performance, lecturer's workload should be managed properly [34]. Moreover, higher workload only will exacerbate lecturer's productivity [35]. In other words, lecturers' workload significantly influences to their job satisfaction [36]. Based on the Const. No. 14 of 2005, the lecturer's workload includes teaching, research, and community service. Through the online interview, each higher education makes limitation for lecturer's workload in their regulation for supporting the lecturer performance.

Based on the results, assessment guidelines can help lecturers improve online learning effectiveness because the assessment system or procedure during online learning is different from face-to-face learning. Challenges and affordances exist in assessing student learning in online environments [37]. One of the ways to encourage a learning process to be more effectively is by improved activities according to learning objectives and context [38]. A valid assessment ensures the effectiveness and achievement of learning outcomes more thoroughly [39]. It is not much different, there is a strong positive correlation between lesson plan and quality of teaching [40]. Therefore, the existence of learning plan and assessment guidelines affects online learning effectiveness.

4. CONCLUSION

The COVID-19 pandemic has never been predicted before. However, the impact is comprehensive in all sectors, including education, which leads to the implementation of online learning. Although the learning system changes, the implementation of learning still has to prioritize the quality of learning, that is, through practical learning. This study's effectiveness in online learning consists of six components: material substance knowledge, learning plan, learning delivery, learning environment, assessment, and professionalism. This study focuses on kinds of indicators that form the effectiveness of online learning in higher education in Indonesia during the COVID-19 pandemic. There were 17 independent variables analyzed and then formulated as indicators. Based on the data analysis performed, the indicators that give a positive impact on the effectiveness of online learning in higher education in Indonesia during the COVID-19 pandemic are ICT skills, academic position, assessment guidelines, semester learning plan guidelines, types of lecturer publication, lecturer certification and workload.

ACKNOWLEDGEMENTS

Authors would like to thank the funding assistance for this research from Research, Development and Books Agency of Policy Research Center, Ministry of Education and Culture (6848/H2/PG/2020).




REFERENCES

- [1] H. Asefi and A. Safaie, "The Role of Chest CT Scan in Diagnosis of COVID-19," *Advance Journal Emergency Medicine*, vol. 4, no. 2s, 2020. [Online]. Available: <https://fem.tums.ac.ir/index.php/fem/article/view/451/305>.
- [2] E. Supriatna, "Socio-Economic Impacts of the COVID-19 Pandemic: The Case of Bandung City," *Journal of Governance*, vol. 5, no. 1, pp. 61–70, 2020, doi: 10.31506/jog.v5i1.8041.
- [3] S. K. Venkatachary, J. Prasad, R. Samikannu, L. J. Baptist, A. Alagappan, and R. Ravi, "COVID-19 An Insight into Various Impacts on Health, Society, and Economy," *International Journal of Economics and Financial Issues*, vol. 10, no. 4, pp. 39–46, 2020, doi: 10.32479/ijefi.9925.
- [4] K. Chintalwar and S. Chakole, "COVID-19 Mutation and Impact on Various Organs," *Journal of Pharmaceutical Research International*, vol. 33, no. 37A, pp. 85–91, 2021, doi: 10.9734/jpri/2021/v33i37a31983.
- [5] M. V. Pawar et al., "COVID-19 Epidemic Impact on Various Society Sectors," in *Healthcare Informatics for Fighting COVID-19 and Future Epidemics. EAI/Springer Innovations in Communication and Computing*, Springer, Cham, 2022, pp. 211–232, doi: 10.1007/978-3-030-72752-9_11.
- [6] G. Serafini, B. Parmigiani, A. Amerio, A. Aguglia, L. Sher, and M. Amore, "The psychological impact of COVID-19 on the mental health in the general population," *QJM: An International Journal of Medicine*, vol. 113, no. 8, pp. 531–537, 2020, doi: 10.1093/qjmed/hcaa201.
- [7] M. Milkhatun, A. A. F. Rizal, N. W. W. Asthiningsih, and A. J. Latipah, "Performance Assessment of University Lecturers: A Data Mining Approach," *Khazanah Informatika: Jurnal Ilmu Komputer dan Informatika*, vol. 6, no. 2, pp. 73–81, 2020, doi: 10.23917/khif.v6i2.9069.
- [8] R. Wahid, F. Pribadi, F. Pribadi, B. E. Wakas, and B. E. Wakas, "Digital Activism: Covid-19 Effects in Campus Learning," *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal*, vol. 3, no. 3, pp. 1336–1342, 2020, doi: 10.33258/birle.v3i3.1174.
- [9] B. Nadeak, "The Effectiveness of Distance Learning Using Social Media during the Pandemic Period of COVID-19: A Case in Universitas Kristen Indonesia," *International Journal of Advanced Science and Technology*, vol. 29, no. 7, pp. 1764–1772, 2020, [Online]. Available: <http://sersec.org/journals/index.php/IJAST/article/view/16270>.
- [10] S. Unger and W. Meiran, "Student Attitudes Towards Online Education during the COVID-19 Viral Outbreak of 2020: Distance Learning in a Time of Social Distance," *International Journal of Technology in Education and Science*, vol. 4, no. 4, pp. 256–266, 2020, doi: 10.46328/ijtes.v4i4.107.
- [11] J. Mittelmeier, B. Rienties, J. Rogaten, A. Gunter, and P. Raghuram, "Internationalisation at a Distance and at Home: Academic and social adjustment in a South African distance learning context," *International Journal of Intercultural Relations*, vol. 72, pp. 1–12, 2019, doi: 10.1016/j.ijintrel.2019.06.001.
- [12] I. Yuhanna, A. Alexander, and A. Kachik, "Advantages and Disadvantages of Online Learning," *Journal Educational Verkenning*, vol. 1, no. 2, pp. 13–19, 2020, doi: 10.48173/jev.v1i2.54.
- [13] U. Verawardina et al., "Reviewing online learning facing the COVID-19 outbreak," *Journal of Talent Development and Excellence*, vol. 12, no. 3s, pp. 385–392, 2020.
- [14] S. Peacock, J. Cowan, L. Irvine, and J. Williams, "An Exploration Into the Importance of a Sense of Belonging for Online Learners," *International Review of Research in Open and Distance Learning*, vol. 21, no. 2, pp. 18–35, 2020, doi: 10.19173/irrodl.v20i5.4539.
- [15] H. Kauffman, "A review of predictive factors of student success in and satisfaction with online learning," *Research in Learning Technology*, vol. 23, 2015, doi: 10.3402/rlt.v23.26507.
- [16] R. Lestiyawati, "The Strategies and Problems Faced by Indonesian Teachers in Conducting e-learning during COVID-19 Outbreak," *CLLiENT (Culture, Literature, Linguistics, and English Teaching)*, vol. 2, no. 1, pp. 71–82, 2020, doi: 10.32699/cclient.v2i1.1271.
- [17] Z. Y. Liu, N. Lomovtseva, and E. Korobeynikova, "Online learning platforms: Reconstructing modern higher education," *International Journal of Emerging Technologies in Learning*, vol. 15, no. 13, pp. 9–21, 2020, doi: 10.3991/ijet.v15i13.14645.
- [18] C. B. Mpungose, "Is Moodle or WhatsApp the preferred e-learning platform at a South African university? First-year students' experiences," *Education and Information Technologies*, vol. 25, pp. 927–941, 2020, doi: 10.1007/s10639-019-10005-5.
- [19] D. S. Djamdjuri and Maeleni, "Students' perception on Islamic education toward e-learning classes during covid-19 pandemic," *Atarbiyah: Journal of Islamic Culture and Education*, vol. 6, no. 1, pp. 15–30, 2021, doi: 10.18326/atarbiyah.v6i1.15-29.
- [20] J. Ko and P. Sammons, *Effective Teaching: A Review of Research and Evidence*. CfBT Education Trust, 2013. [Online]. Available: <https://files.eric.ed.gov/fulltext/ED546794.pdf>.
- [21] Y. Chen, "The application of effective teaching theory in higher education," *Eurasia Journal of Mathematics, Science and Technology Education*, vol. 13, no. 12, pp. 8185–8191, 2017, doi: 10.12973/ejmste/80781.
- [22] A. Paolini, "Enhancing Teaching Effectiveness and Student Learning Outcomes," *The Journal of Effective Teaching*, vol. 15, no. 1, pp. 20–33, 2015, [Online]. Available: <https://files.eric.ed.gov/fulltext/EJ1060429.pdf>.
- [23] M. Pinto and W. Anderson, "A Little Knowledge Goes a Long Way: Student Expectation and Satisfaction with Hybrid Learning," *Journal of Instructional Pedagogies*, vol. 10, 2013, [Online]. Available: <https://files.eric.ed.gov/fulltext/EJ1097169.pdf>.
- [24] N. Azizi and M. Haybatollahi, "The Impact of Teachers' Expectation on Assessment of Pupils Learning Achievement," *Journal of Educational Planning and Administration*, vol. 25, no. 4, pp. 337–350, 2011, [Online]. Available: http://www.niepa.ac.in/Pub_Jepa.aspx.
- [25] A. Rohmawati, "Learning Effectiveness," (in Indonesian), *Jurnal Pendidikan Usia Dini*, vol. 9, no. 1, pp. 15–32, 2015, [Online]. Available: <https://journal.unj.ac.id/unj/index.php/jpud/article/view/3491>.
- [26] J. Schoonenboom and R. B. Johnson, "How to Construct a Mixed Methods Research Design," *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie*, vol. 69, pp. 107–131, 2017, doi: 10.1007/s11577-017-0454-1.
- [27] Y. Maryuningsih, T. Hidayat, R. Riandi, and N. Y. Rustaman, "Profile of information and communication technologies (ICT) skills of prospective teachers," *Journal of Physics: Conference Series*, vol. 1521, pp. 1–7, 2020, doi: 10.1088/1742-6596/1521/4/042009.




- [28] C. Lewin and S. Mcnicol, "Supporting the development of 21st century skills through ICT," in *KEYCIT 2014-Key Competencies in Informatics and ICT*, Universitätsverlag Potsdam, 2015, pp. 181–198.
- [29] S. Sharma, S. Garg, and S. Mittal, "Impact Analysis of ICT Teaching Aids Used for Training and Development of Employees," *Procedia - Social and Behavioral Sciences*, vol. 182, pp. 239–248, 2015, doi: 10.1016/j.sbspro.2015.04.761.
- [30] C. I. Gunawan, "An analysis of lecturers' demographic factors affecting research performance in Indonesia," *International Journal of Research in Business and Social Science*, vol. 9, no. 5, pp. 326–332, 2020, doi: 10.20525/ijrbs.v9i5.759.
- [31] G. Abramo, C. A. D'Angelo, and F. Di Costa, "Research productivity: Are higher academic ranks more productive than lower ones?" *Scientometrics*, vol. 88, pp. 915–928, 2011, doi: 10.1007/s11192-011-0426-6.
- [32] S. Cadez, V. Dimovski, and M. Zaman Groff, "Research, teaching and performance evaluation in academia: the salience of quality," *Studies in Higher Education*, vol. 42, no. 8, pp. 1455–1473, 2017, doi: 10.1080/03075079.2015.1104659.
- [33] Elfindri, S. Rustad, Nizam, and Dahrulsyah, "Lecturer Performances in Indonesia Higher Education System," *IJAEDU-International E-Journal of Advances in Education*, vol. 1, no. 1, pp. 26–36, 2015, doi: 10.18768/ijaedu.09134.
- [34] S. Hosain, "Teaching Workload and Performance: An Empirical Analysis on Some Selected Private Universities of Bangladesh," *SSRN Electronic Journal*, 2018, doi: 10.2139/ssrn.2810640.
- [35] C. Amini-Philips and A. N. Okonmah, "Lecturers' Workload and Productivity in Universities in Delta State," *International Journal of Education, Learning and Development*, vol. 8, no. 3, pp. 111–136, 2020.
- [36] G. I. Osifila and A. Titilayo Abimbola, "Workload and lecturers' job satisfaction in Adekunle Ajasin University, Akungba-Akoko, Ondo State, Nigeria," *Journal of Education and Learning (EduLearn)*, vol. 14, no. 3, pp. 416–423, Aug. 2020, doi: 10.11591/edulearn.v14i3.16140.
- [37] L. R. Kearns, "Student Assessment in Online Learning: Challenges and Effective Practices," *MERLOT Journal of Online Learning and Teaching*, vol. 8, no. 3, pp. 198–208, 2012.
- [38] C. Watkins, E. Carnell, and C. Lodge, *Effective learning in classrooms*. SAGE Publications, 2007. doi: 10.4135/9781446211472.
- [39] B. Khan, "Relationship between assessment and students' learning," *International Journal of Social Sciences & Education*, vol. 2, no. 1, pp. 576–588, 2012.
- [40] J. Dorovolomo, H. P. Phan, and J. Maebuta, "Quality Lesson Planning and Quality Delivery: Do they Relate?" *International Journal of Learning: Annual Review*, vol. 17, no. 3, pp. 447–456, 2010. [Online]. Available: https://cgscholar.com/bookstore/works/quality-lesson-planning-and-quality-delivery?category_id=cgm.

BIOGRAPHIES OF AUTHORS






Fairusy Fitria Haryani    is a teacher educator at Physics Education, Universitas Sebelas Maret (UNS), Indonesia. She was a young lecturer in UNS since 2019 and graduated her studies in physics education at UNS (2014) and physics science at the Institute of Technology Bandung (2017). She is passionate about physics, science, and technology of education, also students' creativity development. She can be contacted at email: fairusy.fita@staff.uns.ac.id.



Sarwanto    is an Assistant Professor and a lecturer at Physics Education, Universitas Sebelas Maret (UNS), Indonesia. He taught at UNS since 1994 and graduated from Science Education, Indonesian Education University (2008). He is passionate about ethnoscience, students' creativity and critical thinking. He can be contacted at email: sarwanto@fkip.uns.ac.id.



Dwi Maryono    is a Ph.D graduate of Educational sciences at Universitas Sebelas Maret and a lecturer at Informatics Education, Universitas Sebelas Maret (UNS), Indonesia. He taught at UNS since 2008 and graduated from IT, Institute of Sepuluh Nopember (2006). He is passionate about Educational Data Mining and Computer Education. He can be contacted at email: dwimaryono@staff.uns.ac.id.