International Journal of Evaluation and Research in Education (IJERE)
Vol. 11, No. 1, March 2022, pp. 152~160
ISSN: 2252-8822, DOI: 10.11591/ijere.v11i1.22115

Evaluation of structural and measurement models of student satisfaction in online learning

Herwin Herwin[1], Fathurrohman Fathurrohman[1], Wuri Wuryandani[1], Shakila Che Dahalan[2], Suparlan Suparlan[1], Firmansyah Firmansyah[1], Kurniawati Kurniawati[1]
[1]Department of Elementary School Education, Faculty of Education, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
[2]Department of History, Faculty of Human Science, Universiti Pendidikan Sultan Idris, Perak, Malaysia

Article Info

Article history:

Received May 8, 2021
Revised Dec 9, 2021
Accepted Dec 23, 2021

Keywords:

Admin service
Learning management system
Lecturer performance
Online learning
Student satisfaction

ABSTRACT

This study aimed to evaluate structural models and measurement models of student satisfaction in online learning. This was a quantitative study using a survey research design. Structural model testing was done by examining the relationship between several variables. The variables in question were the learning management system (LMS), admin services, the performance of facilitator lecturers and student satisfaction in learning. The sample used in this study were 149 students. Data analysis was performed using the multivariate Structural Equation Modeling (SEM) technique. The findings of this study indicated that the facilitator lecturer performance is the variable that has the greatest effect in increasing student satisfaction in online learning. Admin service is another variable that has a positive effect on student satisfaction, both direct and indirect effects. The LMS variable does not show a direct effect on student satisfaction, but the LMS has an indirect effect on student satisfaction through the variable facilitator lecturer performance and admin services.

Corresponding Author:

Herwin Herwin
Department of Elementary School Education, Faculty of Education, Universitas Negeri Yogyakarta
Colombo Street No. 1, Karangmalang, Yogyakarta, 55281, Indonesia
Email: herwin89@uny.ac.id

1. INTRODUCTION

The pandemic situation has an impact in various fields, one of which is in the field of education [1]. The Indonesian government gives direction that in 2021 learning activities will continue to be held from home. The existence of a pandemic has an impact on learning, which is usually done face-to-face, now has to turn online [2]. This of course has an impact on the implementation of learning which will continue to depend on online digital technology. The change in implementation to distance learning is a challenge for both lecturers and students [3]. Currently, the frequency of online learning has increased very significantly in the field of education [4]. Apart from pandemic demands that must implement distance learning, online learning is also considered more flexible to be applied by lecturers and students. Furthermore, online learning is considered very suitable to be applied in higher education because it is more oriented towards adult education [5].

Basically, online learning has been familiar to both lecturers and students for a long time [6]–[8]. Even before the COVID-19 pandemic, online learning was often applied and became the focus of studies in higher education [9]–[12]. The thing that makes the difference is only in the aspect of intensity. Since the COVID-19 pandemic, online learning has tended to be the main choice without any combination with conventional face-to-face learning in the classroom. This situation certainly requires adjustments from various aspects, both student, lecturers and other aspects related to the success of the learning process.

One of the government education programs affected by the pandemic is the teacher professional education program (PPG). This program is an Indonesian government to produce professional teachers in their fields [13]. This program is a higher education after undergraduate education program that prepares students to have jobs with specific skill requirements to become teachers. The teacher professional education program is an activity to implement educational abilities through teacher professional activities. This program is also accompanied by systematic guidance and supervision over a period of one year. The focus of this activity demands the development of teacher competencies including pedagogical, personal, professional, and social so that the graduates produced can become quality teachers [14].

Basically, before the COVID-19 pandemic, learning activities in the teacher professional education program had been carried out through hybrid learning [15]. However, at that time there was still a combination of face-to-face offline meetings for certain activities such as teaching practice. This program is one of the government's priority programs and is implemented annually to obtain qualified teachers. 2020 is the first year this program is implemented through full online learning. Since being fully implemented online, this program has received various notes and input from various parties for further improvements, for example related to issues of resource readiness, online support facilities, and the readiness of lecturers and students to take part in online activities.

To achieve the expected goals in the implementation of the teacher professional education program, a learning process that runs optimally is required. In response to this, the government has prepared various facilities, starting from the learning management system (LMS), a systematic program curriculum, facilitating lecturers who are experts in their fields and administrators who are tasked with assisting the program implementation technically. Various attempts have been made by the government to support the success of this program, but there are also obstacles and student complaints regarding implementation in the field. Some of the things that have been complained about are the difficulty of taking full online lectures, the preparation of schedules that are considered very busy, the burden of tasks that are felt to be quite a lot during online learning and complaints of external factors such as internet connection problems which often trigger obstruction of the learning process online [16].

Based on the phenomenon found, it is realized that there are still many obstacles during learning activities in the full online teacher professional education program. But on the other hand, this is the best choice given the pandemic situation which requires everyone to adhere to health protocols by maintaining a distance which is implemented with learning from home. The important thing now is to maximize online learning services so that learning objectives can be achieved properly. Therefore, it is necessary to study program services from various aspects ranging from aspects of the LMS, the performance of facilitator lecturers and admin services during program implementation. This is very important so that this program has a positive impact on user satisfaction or in this case are students. In addition, this study is important for all parties, including government, university institutions, and other related parties, in order to obtain an overview of student satisfaction models during online learning. This study aimed to evaluate structural models and measurement models of student satisfaction in online learning.

2. RESEARCH METHOD

This research was a quantitative study using a survey research design. Structural model testing is done by examining the relationship between several variables. The variables in question are the LMS, admin services, the performance of facilitator lecturers and student satisfaction in learning. Table 1 shows the distribution of indicators in each measured variable.

Table 1. Distribution of indicators in each measured variable

Variables	Codes	Indicators	Codes
Learning management system	LMS	Module	LMS_1
		Web meeting	LMS_2
		Discussion forum	LMS_3
Facilitator lecturer performance	FLP	The clarity of the delivery of the material	FLP_1
		Feedback	FLP_2
		Learning assessment	FLP_3
Admin service	AS	Delivering activity information	AS_1
		Ease of communication	AS_2
		Provision of lecture needs	AS_3
Student satisfaction	SS	Conformity with expectations	SS_1
		Feeling happy	SS_2
		Believe in results	SS_3

The sample of this study were 149 students. The sample selection was carried out using a simple random technique. The data was collected through a questionnaire designed in the form of a survey. Data analysis was performed using the multivariate Structural Equation Modeling (SEM) technique with the help of the LISREL8.80 program.

This study evaluates the measurement model and structural model simultaneously. The measurement model is used to test latent variables with their indicators, while structural models are used to describe the relationship between latent variables or the relationship between exogenous variables and endogenous variables. To determine the significance of the influence between variables using the criterion critical ratio or t-value>1.9 at α 0.05 [17], [18]. In this study, the amount of influence between the variables considers the direct effect, indirect effect and the total between the two. To obtain a model fit, the criteria used are as shown in Table 2 [19], [20].

Table 2. Goodness of fit model criteria

Goodness of fit index	Cut off value
p-value	> 0.05
RMSEA	< 0.08
GFI	≥ 0.9
AGFI	≥ 0.9
Chi-square (x^2)	Expected low (x^2 < 2df)

3. RESULTS AND DISCUSSION

This study evaluated structural models and measurement models that have been developed based on theoretical considerations. This study focuses on four latent variables, namely learning management system, facilitator lecturer performance, admin service and student satisfaction. The first objective is related to the evaluation of a structural model. This is done to test the effect of the latent variables tested in this study. To determine the significance of the influence between the latent variables using the t-value with the criteria 1.9 as the cut of value. The results of the t value test are presented in Figure 1.

Figure 1 shows that there is one path which is not significant. This path is a direct effect between the learning management system on the student satisfaction variable. This is because the path coefficient (t-value) between the two variables is only 0.58. This coefficient is smaller than the cut off value criteria used (1.9). The other five pathways show a significant effect with a path coefficient of more than 1.9. This situation requires evaluation of previously developed path models. The evaluation in question is eliminating insignificant pathways then re-testing. The second test results are shown in Figure 2.

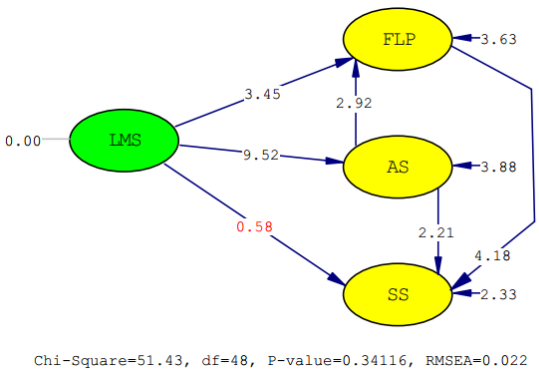

Figure 1. Path test results

Figure 2 shows the results of the second path test. This test is carried out after eliminating the direct effect between the learning management system on the student satisfaction variable. After this model has been modified, all paths have been significant based on the cut of value criteria used so that the five existing paths can be used further. The next thing to explain is the testing of the measurement model together with the structural model that has been formed. At this stage, a model is presented that shows the complete latent variables with operational variables. The results of testing the measurement model and the structural model of student satisfaction in online learning are presented in Figure 3.

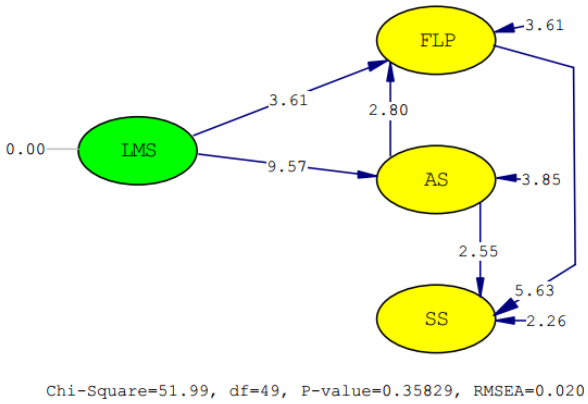

Figure 2. Second path test results

Figure 3 reveals the measurement model and structural model of student satisfaction in online learning. In these results, information is obtained that all loading factors are at medium to high levels [21]. This coefficient shows the magnitude of the correlation between the indicators and their latent constructs. In the case of the model presented, it can be explained that all indicators have sufficiently strong validation to explain the latent constructs [22]–[24]. Another result that can be explained in Figure 3 is proof of the goodness of fit model. Based on the analysis results obtained Chi-square of 51.9 with a df of 49, the p-value shows a coefficient of 0.35 and RMSEA of 0.02. In addition, GFI and AGFI have obtained more than 0.9. All of these results indicate that the model that has been formed is fit. This shows that the hypothesized model is able or feasible to explain the observed data well [25].

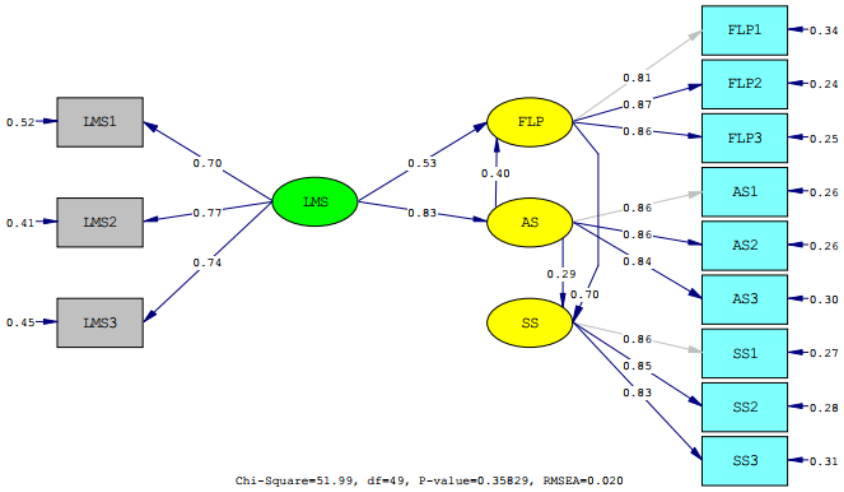

Figure 3. The results of testing the measurement model and structural model

The next thing that becomes the unit of analysis in this study is the effect between latent variables in the structural model that is formed. The effects analyzed were direct effects, indirect effects and total effects between latent variables. More detailed information regarding this matter is presented in Table 3. The table shows information regarding the effects between variables. Based on the information, it can be explained that the variable facilitator lecturer performance has the highest effect on student satisfaction in online learning. After that, admin services also have an effect on student satisfaction, both a direct effect and an indirect effect. Furthermore, it was found that admin services have a significant effect on the performance of the facilitator lecturers. Another thing that is the finding of the study results is that LMS does not have a direct effect on student satisfaction, but LMS has an effect that should be considered based on the indirect effect through the performance of the facilitator lecturers and admin services.

Table 3. The effect between latent variables

Latent variable	Effect		
	Total effect	Direct ffect	Indirect effect
LMS – FLP	0.86	0.53	0.33
LMS – AS	0.83	0.83	-
LMS – SS	0.61	-	0.61
AS - FLP	0.40	0.40	-
FLP - SS	0.70	0.70	-
AS - SS	0.57	0.29	0.28

Empirically the findings of this study indicate that lecturer performance is the highest predictor of increasing student satisfaction in online learning. This is relevant to previous findings which state that lecturer performance has a high correlation with student satisfaction in higher education [26]. The success of the learning program is very much dependent on the role of the lecturer, instructor or teacher in planning, implementing and evaluating properly [27], [28]. Good lecturer pedagogic actions greatly determine the level of student satisfaction in learning. Ideally, the lecturer must be responsible for every material he teaches, convey objectives effectively, meet all student needs and manage the class efficiently [29]. In learning activities, pedagogy is the most important factor to consider for the achievement of goals. In student perceptions, a good lecturer pedagogic competence must include readiness in delivering lessons well, lecturers must regulate active class conditions, apply media and technology in the classroom, provide feedback that can develop student competencies and carry out objective evaluation of learning [30].

Classroom climate management by lecturers greatly affects students' attitudes and their motivation to learn. The ability of lecturers to communicate with students in learning is very important to support a conducive learning climate [31]. This is very important to understand because to create a good learning atmosphere, teaching knowledge is not enough but requires certain skills by each lecturer [32]. Positive classroom management practices from lecturers create an atmosphere that motivates students to respond positively to learning, support each other, love their own learning environment, and are willing to collaborate positively with both lecturers and other students [33]. To support the current situation, lecturers as instructional designers must be professional and have the awareness to improve technological capabilities that are integrated in teaching and learning. This is very much needed for the maximum implementation of online learning [34]. Several relevant findings support the findings of this study that lecturer performance greatly contributes to increasing student satisfaction in learning activities. This needs to get serious emphasis because this is the strongest predictor for achieving a good level of satisfaction in students.

Another variable that has an influence on student satisfaction is admin service. This variable has both direct and indirect effects. This shows that admin service is one of the factors that must be considered in the implementation of online learning. The findings of this study are relevant to previous findings which state that service quality has a significant influence on behavioral intentions and experience value [35]. With behavioral intentions and good experience values, eating will encourage one's satisfaction in a service.

To ensure the quality of online learning, administrators must take an active role in planning, managing online programs and motivating participants [36]. Areas in planning, implementation, and control are very important things considered by administrators for the success of distance education programs [37]. Furthermore, an administrator is in charge of providing and managing administrative and technical support for lecturers and students [36]. If viewed based on the main target of learning is students, an admin must be able to communicate with students that they always provide assistance in online learning experiences, show students how to use resources and facilities to meet their learning needs [38], and support students in developing their learning skills [39].

Decades ago many researchers have stated that administrator support is very important to ensure the quality of online learning [40]–[42]. In fact, one of the findings suggests that without strong administrative support the online learning program is doomed to fail [43]. Based on previous studies and the findings of this study, it can be explained that admin service is a very important component in online learning. This is due to the role of administrators who are expected to plan, manage administrative and technical learning. In addition, administrators are also expected to assist lecturers in carrying out lectures effectively and motivate students to stay enthusiastic about attending lectures. Therefore, in online learning programs, admin services need serious attention by program leaders as policy makers.

In addition to the variable facilitator lecturer performance and admin services, another variable evaluated in this study is the LMS variable. After empirically proven in this study, it is found that the LMS directly does not have an effect on student satisfaction. However, when viewed from the indirect effect, the LMS provides good support for student satisfaction in online learning. This effect is given indirectly through the intermediary variable facilitator lecturer performance and admin services. Recently, LMS has become a

very important tool in supporting the implementation of learning activities. Almost all lecturers have been depending on LMS to carry out their learning. This is useful for increasing understanding and adopting other technological and pedagogical innovations [44].

LMS is one of the technological innovations in the management of learning activities. This is useful and needed in facilitating online learning without thinking about time and space constraints [45]. As an innovation in distance learning, LMS is used to disseminate knowledge, assessment of student competencies, record student achievement, support for online social communities, communication tools, and important for security systems in online learning [46]. Lecturers and students can share activities and information through LMS facilities [47], [48]. The application of an LMS makes learning very flexible and collaborative [49], [50]. Like face-to-face activities, an LMS can also plan, implement and evaluate learning [51]. In addition, with LMS facilities, time and space limitations can be overcome through virtual contact [52], [53].

Based on some of these descriptions, it can be explained that LMS is one of the factors that has an important role in the implementation of online learning. In general, universities, program administrators, instructors, students and all related components must work together in improving the quality of online learning so that it can be carried out more effectively in the future [54]. The findings of this study explain that a good LMS will support and improve admin services and lecturer performance in learning, so that student satisfaction will also indirectly increase.

4. CONCLUSION

The structural model of student satisfaction in online learning is formed from various effects between variables, both direct and indirect effects. This study concluded that the facilitator lecturer performance is the variable that has the greatest effect in increasing student satisfaction in online learning. Furthermore, admin service is another variable that has a positive effect on student satisfaction, both direct and indirect effects. Furthermore, the LMS variable does not show a direct effect on student satisfaction, but the LMS has an indirect effect on student satisfaction through the variable facilitator lecturer performance and admin services. Evaluation of the measurement model shows that all loading factors between the observed variables have significantly measured the latent variables and the model formed has met the goodness of fit model. The findings of this study suggest that to ensure student satisfaction in online learning, lecturer performance is the main priority to be maintained and improved. In addition, the role of admin services and LMS also needs serious attention so that students can be well served in learning.

ACKNOWLEDGEMENTS

Authors would like to thank the Chancellor of Universitas Negeri Yogyakarta. Authors also thank the Teacher Professional Education Program (PPG) for facilitating us in collecting research data.

REFERENCES

[1] M. K. Hossain and B. Wood, "Enhancing student engagement in online learning environments Post-Covid-19: A case of higher education," *Fostering Communication and Learning With Underutilized Technologies in Higher Education*, pp. 137–149, 2021, doi: 10.4018/978-1-7998-4846-2.ch010.

[2] A. Yudiawan, B. Sunarso, Suharmoko, F. Sari, and Ahmadi, "Successful online learning factors in COVID-19 era: Study of Islamic higher education in West Papua, Indonesia," *International Journal of Evaluation and Research in Education*, vol. 10, no. 1, pp. 193–201, 2021, doi: 10.11591/ijere.v10i1.21036.

[3] L. D. S. Lapitan, C. E. Tiangco, D. A. G. Sumalinog, N. S. Sabarillo, and J. M. Diaz, "An effective blended online teaching and learning strategy during the COVID-19 pandemic," *Education for Chemical Engineers*, pp. 1–41, 2021, doi: 10.1016/j.ece.2021.01.012.

[4] S. Juan, "Promoting engagement of nursing students in online learning: Use of the student-generated question in a nursing leadership course," *Nurse Education Today*, vol. 97, pp. 1–5, 2021, doi: 10.1016/j.nedt.2020.104710.

[5] D. M. Billings, E. R. Faan, and J. A. Halstead, *Teaching in nursing: A guide for faculty*. Elsevier Health Sciences, 2019.

[6] S. J. Blackmon and C. Major, "Student experiences in online courses. a qualitative research synthesis," *Quarterly Review of Distance Education*, vol. 13, no. 2, pp. 77–85, 2012.

[7] S. Lage-Cal, M. B. Folgueras-Díaz, M. Alonso-Hidalgo, D. García-Menéndez, and F. J. Fernández-García, "Investigation of the effectiveness of online learning tools for energy performance certificates preparation," in *6th International Conference on Energy and Environment Research*, 2020, pp. 609–614, doi: 10.1016/j.egyr.2019.09.034.

[8] S. Vanslambrouck, C. Zhu, K. Lombaerts, B. Philipsen, and J. Tondeur, "Students' motivation and subjective task value of participating in online and blended learning environments," *The Internet and Higher Education*, vol. 36, pp. 33–40, 2018, doi: 10.1016/j.iheduc.2017.09.002.

[9] J. R. Buelow, T. Barry, and L. E. Rich, "Supporting learning engagement with online students," *Online Learning*, vol. 22, no. 4, pp. 313–340, 2018, doi: 10.24059/olj.v22i4.1384.

[10] M. S. A. El-Seoud, I. A. T. F. Taj-Eddin, N. Seddiek, M. M. El-Khouly, and A. Nossei, "E-Learning and students' motivation: A Research study on the effect of e-learning on higher education," *International Journal of Emerging Technologies in Learning*, vol. 9, no. 4, pp. 20–26, 2014, doi: 10.3991/ijet.v9i4.3465.

[11] T. D. Hobson and K. K. Puruhito, "Going the distance: Online course performance and motivation of distance learning students," *Online Learning*, vol. 22, no. 4, pp. 129–140, 2018, doi: 10.24059/olj.v22i4.1516.
[12] A. Kumi-Yeboah, "Designing a cross-cultural collaborative online learning frameworkfor online instructors," *Online Learning*, vol. 22, no. 4, pp. 181–201, 2018, doi: 10.24059/olj.v22i4.1520.
[13] S. Haq, M. Giatman, and A. Inra, "Evaluation of teacher professional education program (PPG) teaching graduates edge area, front area, and left side area of Indonesia (SM-3T) of Universitas Negeri Padang," *International Journal of Educational Dynamics*, vol. 1, no. 2, pp. 301–307, 2019, doi: 10.24036/ijeds.v1i2.157.
[14] F. Fauzan and B. Bahrissalim, "Curriculum analysis teacher professional education program (PPG) of Islamic education in Indonesia," *TARBIYA: Journal of Education in Muslim Society*, vol. 4, no. 2, pp. 148–161, 2017, doi: 10.15408/tjems.v4i2.6400.
[15] I. L. P. Utami, "The online learning of teacher profession education program (PPG) for in-service English Teachers: Challenges and accelerated learning factors," *Jurnal Pendidikan Indonesia*, vol. 7, no. 2, pp. 145–153, 2018, doi: 10.23887/jpi-undiksha.v7i2.15650.
[16] Herwin, C. S. A. Jabar, A. Senen, and W. Wuryandani, "The evaluation of learning services during the COVID-19 Pandemic," *Universal Journal of Educational Research*, vol. 8, no. 11B, pp. 5926–5933, 2020, doi: 10.13189/ujer.2020.082227.
[17] D. Andriani, D. Purwana, and D. Susita, "Analysis of factors that effect lecturer productivity producing international scientific article in Private University: Motivation as a moderating variable," *International Journal of Human Capital Management*, vol. 4, no. 1, pp. 87–107, 2020, doi: 10.21009/IJHCM.04.01.08.
[18] I. Jaén, J. A. Moriano, and F. Liñán, "Personal values and entrepreneurial intention: an empirical study," in *Personal values and entrepreneurial intention: an empirical study*, Edward Elgar Publishing, 2013, pp. 15–31.
[19] P. Tungkunanan, "Learning model of undergraduate students: Confirmatory factor analysis," *International Journal of Instruction*, vol. 13, no. 3, pp. 665–678, 2020, doi: 10.29333/iji.2020.13345a.
[20] Herwin and R. Nurhayati, "Measuring students' curiosity character using confirmatory factor analysis," *European Journal of Educational Research*, vol. 10, no. 2, pp. 773–783, 2021, doi: 10.12973/eu-jer.10.2.773.
[21] D. Shi and A. Maydeu-Olivares, "The effect of estimation methods on SEM fit indices," *Educational and Psychological Measurement*, vol. 80, no. 3, pp. 421–445, 2020, doi: 10.1177/0013164419885164.
[22] S. Mulaik, "Another look at a cancer research model. Theory and indeterminacy in the BMC model," in *Annual meeting of the Society for Multivariate Experimental Psychology*, 2010.
[23] P. Prudon, "Confirmatory factor analysis as a tool in research using questionnaires: A critique," *Comprehensive Psychology*, vol. 4, no. 10, pp. 1–19, 2015.
[24] B. Williams, A. Onsman, and T. Brown, "Exploratory factor analysis: A five-step guide for novices," *Australasian Journal of Paramedicine*, vol. 8, no. 3, pp. 1–13, 2010.
[25] D. Shi, T. Lee, and A. Maydeu-Olivares, "Understanding the model size effect on SEM fit indices," *Educational and Psychological Measurement*, vol. 79, no. 2, pp. 310–334, 2019, doi: 10.1177/0013164418783530.
[26] M. Skordoulis, D. Drosos, and M. Mandalenaki, "An analysis of students' satisfaction using a multicriteria method," in *Proceedings of 2nd International Conference on Lifelong Education and Leadership for All-ICLEL*, 2016, pp. 21–23.
[27] W. Wuryandani and H. Herwin, "The effect of the think–pair–share model on learning outcomes of Civics in elementary school students," *Cypriot Journal of Educational Sciences*, vol. 16, no. 2, pp. 627–640, 2021, doi: 10.18844/cjes.v16i2.5640.
[28] S. A. Tjabolo and Herwin, "The Influence of Teacher Certification on the Performance of Elementary School Teachers in Gorontalo Province, Indonesia," *International Journal of Instruction*, vol. 13, no. 4, pp. 347–360, 2020, doi: 10.29333/iji.2020.13422a.
[29] A. W. Rahman, "Students'perception toward good lecturer pedagogical competence," *English and Literature Journal*, vol. 3, no. 2, pp. 141–155, 2016.
[30] D. A. Duc, P. N. Thach, B. H. Phuong, C. C. Dung, L. H. Van, and P. T. H. Diep, "Adynamic fuzzy multiple criteria decision-making approach for lecturer performance evaluation," *Journal of Management Information and Decision Sciences*, vol. 22, no. 3, pp. 250–261, 2019.
[31] A. Hassan, A. Ghaffar, and E. M. D. Dinglasan, "A cross-country analysis of students' evaluation of university teaching: Relationship between faculty behavior, student satisfaction and teaching quality," *NUML Journal of Critical Inquiry*, vol. 16, no. 1, 2018.
[32] T. Wubbels and M. Brekelmans, "Two decades of research on teacher–student relationships in class," *International Journal of Educational Research*, vol. 43, no. 1–2, pp. 6–24, 2005, doi: 10.1016/j.ijer.2006.03.003.
[33] P. M. Cuarto and S. A. Arenillo, "Classroom climate among teacher education mathematics students," *Asia Pacific Journal of Multidisciplinary Research*, vol. 3, no. 4, pp. 78–85, 2015.
[34] C. Ives and P. Walsh, "Perspectives of Canadian Distance Educators on the move to online learning," *Canadian Journal of Higher Education*, vol. 51, no. 1, pp. 28–40, 2021, doi: 10.47678/cjhe.vi0.188971.
[35] Y. Wei-Ku, "The effects of service contact, experience value, and service quality in the 2018 Penghu 'Chrysanthemum Island Bicycle Trip' on behavioral intentions," *International Journal of Organizational Innovation*, vol. 12, no. 1, pp. 60–92, 2019.
[36] Y. Yang, "Roles of administrators in Ensuring the quality of online programs," *Knowledge Management & E-Learning: An International Journal*, vol. 2, no. 4, pp. 363–369, Dec. 2010, doi: 10.34105/j.kmel.2010.02.026.
[37] B. K. McKenzie, B. C. Ozkan, and K. Layton, "Distance leadership practices -what works in higher education," in *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education*, 2005, pp. 926–931.
[38] A. Babcock, T. Lehan, and H. D. Hussey, "Mind the gaps: An online learning center's needs assessment," *Learning Assistance Review (TLAR)*, vol. 24, no. 1, pp. 27–58, 2019.
[39] J. M. Paiz, "Expanding the writing center: A theoretical and practical toolkit for starting an online writing lab," *The Electronic Journal for English as a Second Language*, vol. 21, no. 4, pp. 1–18, 2018.
[40] B. K. McKenzie, N. Mims, E. Bennett, and M. Waugh, "Needs, concerns and practices of online instructors," *Online Journal of Distance Learning Administration*, vol. 3, no. 3, 2000.
[41] D. E. Husmann and M. T. Miller, "Improving distance education: Perceptions of program administrators," *Online Journal of Distance Learning Administration*, vol. 4, no. 3, 2001.
[42] K. L. Giannoni and D. V Tesone, "What academic administrators should know to attract senior level faculty members to online learning environments?" *Online Journal of Distance Learning Administration*, vol. 6, no. 1, 2003.
[43] Z. L. Berge, L. Y. Muilenburg, and J. V Haneghan, "Barriers to distance education and training," *Quarterly Review of Distance Education*, vol. 3, no. 4, pp. 409–419, 2002.
[44] J. Rhode, S. Richter, P. Gowen, T. Miller, and C. Wills, "Understanding faculty use of the learning management system," *Online Learning*, vol. 21, no. 3, pp. 68–86, 2017.

[45] I. U. Khan, Z. Hameed, Y. Yu, and S. U. Khan, "Assessing the determinants of flow experience in the adoption of learning management systems: the moderating role of perceived institutional support," *Behaviour & Information Technology*, vol. 36, no. 11, pp. 1162–1176, 2017, doi: 10.1080/0144929X.2017.1362475.
[46] D. Turnbull, R. Chugh, and J. Luck, "Learning Management Systems: An Overview," in *Encyclopedia of Education and Information Technologies*, A. Tatnall, Ed. Cham: Springer, 2019, pp. 1–7.
[47] K. A. Al-Busaidi and H. Al-Shihi, "Instructors' acceptance of learning management systems: A theoretical framework," *Communications of the IBIMA*, pp. 1–10, 2010.
[48] S. Lonn, S. D. Teasley, and A. E. Krumm, "Who needs to do what where?: Using learning management systems on residential vs. commuter campuses," *Computers & Education*, vol. 56, no. 3, pp. 642–649, 2011, doi: 10.1016/j.compedu.2010.10.006.
[49] K. Mershad and P. Wakim, "A learning management system enhanced with internet of things applications," *Journal of Education and Learning*, vol. 7, no. 3, pp. 23–40, 2018, doi: 10.5539/jel.v7n3p23.
[50] N. W. Lee, W. N. F. W. Shamsuddin, L. C. Wei, M. N. A. M. Anuardi, C. S. Heng, and A. N. Abdullah, "Using online multiple choice questions with multiple attempts: A case for self-directed learning among tertiary students," *International Journal of Evaluation and Research in Education*, vol. 10, no. 2, pp. 553–568, 2021, doi: 10.11591/ijere.v10i2.21008.
[51] N. A. Alias and A. M. Zainuddin, "Innovation for better teaching and learning: Adopting the learning management system," *Malaysian online journal of instructional technolog*, vol. 2, no. 2, pp. 27–40, 2005.
[52] N. A. Adzharuddin and L. H. Ling, "Learning management system (LMS) among university students: Does it work?" *International Journal of e-Education, e-Business, e-Management and e-Learning*, vol. 3, no. 3, pp. 248–252, 2013.
[53] D. D. Prior, J. Mazanov, D. Meacheam, G. Heaslip, and J. Hanson, "Attitude, digital literacy and self efficacy: Flow-on effects for online learning behavior," *The Internet and Higher Education*, vol. 29, pp. 91–97, 2016, doi: 10.1016/j.iheduc.2016.01.001.
[54] H. Şenol, F. Y. Lesinger, and M. Çağlar, "Evaluation of Online Education Delivered by the Universities During Pandemic COVID-19: A Case of North Cyprus," *TOJET: The Turkish Online Journal of Educational Technology*, vol. 20, no. 2, pp. 51–61, 2021.

BIOGRAPHIES OF AUTHORS

Herwin is a lecturer in the Department of Elementary School Education, Faculty of Education, Universitas Negeri Yogyakarta, Colombo Street No.1, Yogyakarta 55281, Indonesia. He is a Doctor of Education in the field of educational research and evaluation. Dr. Herwin's research interests lie in educational evaluation, learning assessment and educational measurement within the scope of primary education. Apart from researching and writing journal articles, he is also active as editor of scientific journals. Currently the author is registered as a member of the Indonesian Scientific Editors Association (HEBII). In 2021 he was recorded as the Indonesian National Journal Accreditation Assessor (ARJUNA). He can be contacted at email: herwin89@uny.ac.id.

Fathurrohman is a Ph.D. Candidate, Department of Primary Education, Graduate School, Universitas Negeri Yogyakarta, Colombo Street No.1, Yogyakarta 55281, Indonesia. He is a lecturer in the Department of Elementary School Education, Faculty of Education, Universitas Negeri Yogyakarta. His research focuses on character education in elementary school. Currently he is heavily involved in primary school teacher professional education projects. He can be contacted at email: fathurrohman@uny.ac.id.

Wuri Wuryandani is a lecturer in the Department of Elementary School Education, Faculty of Education, Universitas Negeri Yogyakarta, Colombo Street No.1, Yogyakarta 55281, Indonesia. She is a doctor in civic education Dr. Wuri Wuryandani is the Coordinator of the Master of Primary Education Study Program, Faculty of Education, Universitas Negeri Yogyakarta. Her research focuses on character education in elementary school. She can be contacted at email: wuri_wuryandani@uny.ac.id.

Shakila Che Dahalan received the Ph.D. degree in history education from the Universiti Kebangsaan Malaysia, Malaysia. She has 10 years of experience as an Academician in History Education. She is currently as Senior Lecturer of the Department of History, Faculty of Human Sciences, Universiti Pendidikan Sultan Idris, Perak, Malaysia. Her current research interest includes history education, 21st century learning, online learning, students' learning and development at various levels and areas of education. Her publication topics including high order thinking skills, historical empathy, and 21st century teaching and learning. She can be contacted at email: shakilacd@fsk.upsi.edu.my.

Suparlan is a Ph.D. Candidate, Department of Education, Graduate School, Universitas Negeri Yogyakarta, Colombo Street No.1, Yogyakarta 55281, Indonesia. He is a lecturer in the Department of Elementary School Education, Faculty of Education, Universitas Negeri Yogyakarta. His research focuses on character education in elementary school. He is the Head of the General Course Unit at Universitas Negeri Yogyakarta. He can be contacted at email: suparlan@uny.ac.id.

Firmansyah is a Ph.D. Candidate, Department of Educational Research and Evaluation, Graduate School, Universitas Negeri Yogyakarta, Colombo Street No.1, Yogyakarta 55281, Indonesia. He is a lecturer in the Department of Elementary School Education, Faculty of Education, Universitas Negeri Yogyakarta. His research focuses on educational evaluation, learning assessment and educational measurement within the scope of primary education. He can be contacted at email: firmansyah@uny.ac.id.

Kurniawati is a Ph.D. Candidate, Department of Educational Research and Evaluation, Graduate School, Universitas Negeri Yogyakarta, Colombo Street No.1, Yogyakarta 55281, Indonesia. She is a lecturer in the Department of Elementary School Education, Faculty of Education, Universitas Negeri Yogyakarta. Her research focuses on educational evaluation, learning assessment and educational measurement within the scope of primary education. He can be contacted at email: kurniawati@uny.ac.id.