The effectiveness of Google Classroom and Blackboard Learn: Students' and teachers' perceptions

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Abstract

The use of online learning platforms has definitely impacted the students and teachers in their educational delivery. This study assessed the effectiveness of Google Classroom and Blackboard Learn as online learning platforms. Using a descriptive survey research, five hundred and thirty-six (536) respondents were involved in the study: Four hundred and sixty-four (464) college students and seventy-two (72) faculty members. The researchers utilized a self-structured seven-point Likert scale questionnaire consisting of thirteen (13) statements on the use of Google Classroom and twenty-two (22) statements on Blackboard Learn. Open-ended questions were provided to determine the expectations on the usage of these two applications and suggestions for improvement. The results showed that Blackboard Learn is more effective when they are implemented to online classes than Google Classroom; whereas most of the faculty members have high perceptions in utilizing to these different platforms (Google Classroom = 5.62; Blackboard Learn = 5.79) than for those students (Google Classroom = 4.88; Blackboard Learn = 5.69). It is found out that students and teachers have different perceptions, whether positively or negatively. The researchers suggested that ICT department should equip both students and teachers with the complete tasks and activities on time without any hindrances or difficulties.

Keywords: Google Classroom; Blackboard Learn; Effectiveness; Online learning platforms; Perceptions.

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Introduction

In today's generation, online learning platforms have emerged and become prevalent in the mode of educational delivery. Learning management systems (LMS) are intended to allow students and teachers to provide educational contents in the support of the effective teaching and learning process. Through the use of modern technologies, the adoption of online or distance learning systems helps to increase the quality of education (Liu et al., 2020). Even before the coronavirus (COVID-19) pandemic, online learning may be considered a mode of learning due to established platforms and modes of delivery (Prasetyo et al., 2021) since most platforms are free and can create a wide reach for different educational institutions.

The educational landscape is rapidly evolving and there is a need to engage students and teachers in providing access to learning technologies. Therefore, it is in the transformation of learning environment wherein students will become more well-informed and the integration to the teaching and learning process will make more technology-focused and adaptive to enhance such skills (Cardullo et al., 2015).

According to Abuhassna et al. (2020), training and evaluating the class instructor, as well as implementing software updates, could result in a positive learning environment for the instructor and for the students. However, many students and professors do not have access to online learning platforms as they do not have sufficient internet connection, as well as not having any gadgets (e.g., laptops, mobile phones) in their virtual class (Balsicas et al., 2021). When some technical issues arise, they have trouble in working out problems that are encountered in online classes like in downloading lessons, in submitting their outputs, or even interacting with their friends and teachers. From the study of Hernandez (2021), some students said that they experience concerns in terms of complexity which could be attributed to the implementation of online courses and the use of devices requiring different learning platforms that are utilized by the different higher education institutions, especially in the Philippines. Furthermore, students and teachers still struggle to make their online learning as successful because they could not catch up with the lessons required for the said experience. Numerous online learning platforms have been available since the technological era such as Blackboard Learn, Google Classroom, Moodle, Open edX, and Coursera (Liu et al., 2020; Mishra et al., 2020); thus, these tools make it difficult for different educational institutions to choose what should be needed to the interest of students and teachers (Piotrowski, 2010).

Google Classroom, as defined by Zhang (2016), is a Learning Management System (LMS) catered by Google to teachers, which allows to communicate with students, ask questions, and make assignments; thus, it is like a virtual extension of a traditional classroom for their learning and collaboration. This online learning platform is part of Google Workspace which is available in different schools for free.

Meanwhile, Blackboard Learn, as described by Patterson (2013), is an enterprise-level LMS which aims users to create content-based web pages for a secure online environment and to complete different trainings and courses virtually. This offers great document management and can be highly customized to form a successful online teaching-learning process.

It is essential that teachers and students should be encouraged to use different online platforms such as Google Classroom and Blackboard Learn to enhance collaboration and communication in the improvement of quality teaching and learning in the higher education (Heggart & Yoo, 2018; Kinash et al., 2012). However, the effectiveness between these two applications depends on the features and the support that students and teachers utilize.

The study assessed the effectiveness of Google Classroom and Blackboard Learn as online learning platforms. The researchers compared faculty members' and students' perceptions based on their online teaching-learning experiences. More specifically, it answers the following research questions: 1) What is the level of effectiveness of Google Classroom and Blackboard Learn for students and faculty members? 2) What are the qualitative expectations of Google Classroom and Blackboard Learn for students and faculty members? 3) What are the suggestions for improvement in using Google Classroom and Blackboard Learn?

Methodology

This study is a descriptive survey, mixed method research which aimed to investigate the effectiveness of Google Classroom and Blackboard Learn as online learning platforms. By using the random sampling, a total of five hundred and thirty-six (536) respondents from St. Dominic College of Asia in Cavite were involved in the study: Four hundred and sixty-four (464) college students and seventy-two (72) faculty members.

The researcher-made questionnaire consisted of thirteen (13) statements for Google Classroom and twenty-two (22) statements for the Blackboard Learn. The response options consisted of a seven (7)-point Likert scale (1 = strongly disagree to 7 = strongly agree) to determine how these were made effective in the implementation of online learning. The researchers also provided open-ended questions regarding the qualitative expectations on the usage of Google Classroom and Blackboard Learn and suggestions for improvement during online classes. Said questionnaire was validated by the educational technology faculty of the College.

This online questionnaire was created through Microsoft Forms and was distributed through the Blackboard Learn App within May to July 2021. It was also e-mailed to faculty members. Both groups of participants (students and faculty members) were asked to answer and complete the questionnaire to evaluate the effectiveness of Google Classroom and Blackboard Learn in incorporating into the online class.

The data was compiled through a Microsoft Excel spreadsheet and was interpreted with the use of a weighted mean regarding the level of effectiveness of Google Classroom and Blackboard Learn in their classes. Results of the responses are determined in table forms.

Qualitative responses were also classified into seven (7) aspects according to the respondents' suggestions: Usability, Availability, Organization, Up-to-datedness, Accessibility, Development, and Punctuality. Positive and negative expectations of the utilization between two applications were also coded to form an analysis.

Results and Discussion

Level of Effectiveness of Google Classroom and Blackboard Learn

Table 1
Level of effectiveness in using Google Classroom

Item	Statement	Student	VI	Faculty	VI
1	Google Classroom supports better teaching-learning process.	5.02	MA	5.69	A
2	The format helps me to stay organized through discussions and assignments.	5.14	MA	5.81	A
3	I can collaborate with my classmates through Google Classroom / I can assist my students in collaborating through Google Classroom.	4.78	MA	5.75	A
4	Google Classroom helps me to communicate more efficiently.	4.65	MA	5.55	A
5	Google Classroom builds relationship towards teachers and students.	4.70	MA	5.44	MA
6	Feedback is instant and stable in keeping me engaged in the learning process.	4.85	MA	5.60	A
7	I confidently ask questions when I need to clarify something about a topic through Google Classroom.	4.68	MA	5.69	A
8	Google Classroom enables us to facilitate online discussions.	5.04	MA	5.74	A
9	It increases cooperation between others.	4.63	MA	5.42	MA
10	This tool serves as a guide to enhance my skills and creativity in the online environment.	4.84	MA	5.57	A
11	Google Classroom ensures that all materials provided by the teacher are informative and helpful; assists teachers provide materials that are informative and well-informed to the students.	5.01	MA	5.58	A
12	It helps me grow more knowledge and skills in the lessons; teachers monitor student progress in the lessons.	4.84	MA	5.60	A
13	Google Classroom is a convenient tool to use in our online classes.	5.22	MA	5.68	A

Legend: 6.50-7.00 – Strongly Agree (SA); 5.50-6.49 – Agree (A); 4.50-5.49 – Moderately Agree (MA); 3.50-4.49 – Neutral (N); 2.50-3.49 – Moderately Disagree (MD); 1.50-2.49 – Disagree (D); 1.00-1.49 – Strongly Disagree (SD)

Table 1 determines the level of effectiveness of respondents in using Google Classroom. Based on the table, majority of the students "moderately agree" to all of the statements and cited that Google Classroom is a convenient tool to use in their online classes (item 13, Mean = 5.22), which was seen as their highest mean rating; while the statement "*It increases cooperation between others*" got a low rating for them (Mean = 4.63). Meanwhile, majority of the faculty members ranked the item 2 ("*The format helps me to stay organized through discussions and assignments*") as the highest perception among all of the statements (Mean = 5.81), followed by item 3 "I can assist my students in collaborating through Google Classroom" (Mean = 5.75). It is also revealed that the participants only "moderately agree" in items 5 and 9 as indicated that Google Classroom builds relationship towards teachers and students (Mean = 5.44) and that this application increases cooperation between others (Mean = 5.42).

As shown on the findings, students and teachers have a moderate to high level of effectiveness in using Google Classroom as an online learning tool. This can be attributed to the study of Sudarsana et al. (2019) that using Google Classroom helps them to enhance collaboration and to make more environmentally friendly in the teaching and learning process. With that, this platform also enables students and teachers to organize the available class materials into specific folders and integrate them to other Google Workspace applications such as Meet, Docs, and Slides.

Table 2
Level of effectiveness in using Blackboard Learn

Item	Statement	Student	VI	Faculty	VI
1	Allows interaction between students and faculty.	5.13	MA	5.60	A
2	Enables students to be updated to the lessons; Enables teachers to post lesson contents.	5.52	A	6.10	A
3	Enables students to be updated to the grades; Enables teachers to grade students about their output.	5.23	MA	6.07	A
4	Enables students to be updated to the announcements; Enables teachers to post announcements in the discussion board.	5.46	MA	6.15	A
5	Enables students and teachers to adapt to course changes.	5.38	MA	6.02	A
6	It is a good platform to take / make assessments like quizzes and performance tasks.	5.43	MA	5.63	A
7	Is user-friendly.	5.38	MA	5.81	A
8	Ensures that all documents provided are available.	5.38	MA	5.78	A
9	Ensures that all documents provided are useful for their learning.	5.48	MA	5.96	A
10	I can receive immediate feedbacks from my professors; I can get feedbacks from my students.	4.78	MA	5.71	A
11	It is easy to download / upload lecture materials.	5.45	MA	5.74	A
12	Assisting in collaborating students with one another makes it easier with Blackboard App.	4.74	MA	5.64	A
13	The graphic user interface of Blackboard App is appealing and easy to navigate.	5.23	MA	5.65	A
14	I can quickly submit my assignments on or before the deadline; I can quickly notify my students about the deadline of assignments.	5.45	MA	5.88	A
15	The accessibility of this application is high.	5.24	MA	5.79	A
16	It is compatible with my laptop or mobile application.	5.44	MA	5.88	A
17	I know my grades in a confidential way.	5.47	MA	5.86	A
18	I can easily contact my professors whenever I have concerns and vice-versa.	4.77	MA	5.60	A
19	I can utilize my time efficiently using Blackboard.	5.23	MA	5.81	A
20	Using Blackboard App for online learning helped me to become more independent and organized.	5.24	MA	5.75	A
21	Using Blackboard App helped me to be more motivated to learn more.	4.92	MA	5.36	MA
22	I find the use of Blackboard app useful to my future career / profession.	4.85	MA	5.51	A

Legend: 6.50-7.00 – Strongly Agree (SA); 5.50-6.49 – Agree (A); 4.50-5.49 – Moderately Agree (MA); 3.50-4.49 – Neutral (N); 2.50-3.49 – Moderately Disagree (MD); 1.50-2.49 – Disagree (D); 1.00-1.49 – Strongly Disagree (SD)

Table 2 identifies the level of effectiveness of respondents in using Blackboard Learn. It shows that majority of the students "agree" in enabling them to be updated to the lessons (item 2, Mean = 5.52). Meanwhile, respondents "moderately agree" to all of the statements, citing that in item 8, Blackboard Learn ensures that all documents provided by the professors are available (Mean = 5.48), which was regarded as the second highest mean rating. It is also seen that the item 18 "I can easily contact my professors whenever I have concerns and vice-versa" received a low rating for students (Mean = 4.77).

Most faculty members "agree" to all of the statements, including that this application enables them to post announcements in the discussion board (item 4, Mean = 6.15), which was regarded as the most perceived reason for using Blackboard Learn. On the other hand, it can be noticed that the participants "moderately agree" that in item 21, using Blackboard App helped them to be more motivated to learn more (Mean = 5.36), which only got a low rating for that statement.

It is revealed that both students and teachers have a moderate to high level of effectiveness in utilizing Blackboard Learn. It is essential that Blackboard Learn allows students and teachers to save time for learning and to enhance communication in using this digital platform that will make it easier for them in an online course (González-Durán et al., 2020; Jaiswal, 2020). This implies that Blackboard Learn helps them to participate in an online course and be updated and collaborative on the materials as provided on the application.

Table 3
Summary of the level of effectiveness on Google Classroom and Blackboard Learn

	Google Classroom		Blackboard Learn	
	Mean	**Interpretation**	**Mean**	**Interpretation**
Student	4.88	Moderately Agree	5.24	Moderately Agree
Faculty	5.62	Agree	5.79	Agree

Table 3 summarizes the level of effectiveness on the use of Google Classroom and Blackboard Learn. The result shows that Blackboard Learn is more effective in online classes than Google Classroom; whereas most of the faculty members have high perceptions in utilizing these different platforms (Google Classroom = 5.62; Blackboard Learn = 5.79) than for those of students in utilizing these different platforms (Google Classroom = 4.88; Blackboard Learn = 5.69).

This shows that despite of their differences in the utilization of these learning platforms, it can be noted that most participants identified them as part of their experiential and influential learning environments (Almusharraf & Khahro, 2020). In a study on the effect of mobile learning on learner autonomy by Alzieni (2020), these platforms help students and teachers to make digital content and develop problem-solving skills and also provide new opportunities for communication and collaboration among them. Therefore, it can be implied that Google Classroom and Blackboard Learn are efficient platforms for online learning as these are designed to conduct virtual classroom activities in an easiest way.

Expectations on the Use of Google Classroom and Blackboard Learn

Different expectations were obtained by the student and faculty respondents on the use of Google Classroom and Blackboard Learn. Some responses on the utilization of two online learning tools brought by the participants were mentioned in Table 4.

Table 4
Participants' qualitative expectations on the use of Google Classroom and Blackboard Learn

Participants	Expectations	Responses
Student	Positive	• *Files are easily downloadable and organized* (Google Classroom). • *We will not have a hard time on checking activities, quizzes, and exams to be accomplished* (Blackboard Learn).
	Negative	• *Notifications are delayed even after announcements coming from professors* (Google Classroom). • *Teachers also complain about the limitation of number of files that can be uploaded* (Blackboard Learn).
Faculty	Positive	• *It has a larger storage and allows easier encoding of questions / tests* (Google Classroom). • *I can deliver my online quizzes with direct feedback* (Blackboard Learn).
	Negative	• *Google Classroom is not an effective application, so it is much better to use Blackboard Collab or any other applications that will not allow students to cheat online* (Google Classroom). • *I have not mastered the Blackboard Learn App yet* (Blackboard Learn).

Based on the table, most students were positive in using to Google Classroom and Blackboard Learn. They noted that in Google Classroom, the files or documents uploaded in these applications can be downloadable and organized, while in Blackboard Learn, checking activities, quizzes, and examinations will be much easier to be accomplished. While for majority of the faculty members, Google Classroom could provide a larger storage which allow for easier encoding of questions and tests and also with Blackboard Learn, they can deliver their online quizzes with direct feedback.

However, there are some students who found online platforms difficult to use such as in Google Classroom, they cited the delayed notifications and announcements and in Blackboard Learn the limitations of the number of files to be distributed. Some faculty members also said that Google Classroom is not an effective application, so they suggested to switch to Blackboard Collab or any other applications that will not allow students to cheat online even during examinations, while several of them have not mastered the Blackboard Learn application.

According to Leo et al. (2020), teachers and students should adapt to the latest educational technologies and tools, which would help them to a more pleasant procedure in the learning and teaching process. However, they may find it difficult to have regular interactions and disseminate assignments especially when taking tests that have to be strictly monitored and reviewed by the faculty members. Cheating may not be controlled since it is easier for students to access numerous websites from the Internet and to secretly chat with their classmates in giving answers without the teachers' knowledge. Technological platforms have undeniably changed the process of teaching and learning, so it depends on the usage for both students and teachers when they take it positively or negatively.

Suggestions for Improvement in using Google Classroom and Blackboard Learn

Table 5
Suggestions for improvement in the use of online learning platforms

Category	Responses	Suggestions
Usability	86	S: *Stick to just one platform such as in Google Classroom instead of Blackboard Learn, so in that way you can help students and parents to save money.* F: *Blackboard Learn is good, and we can use it with Zoom for live online discussion.*
Availability	47	S: *Always indicate the score for the quiz/exam so that the students would know the questions that he/she cannot understand or answered wrong. It should be immediate too.* F: *Provide additional features such as monitoring exams of students in Blackboard, and breakout rooms and polling in Google Classroom.*
Organization	37	S: *Organize the files on Blackboard and Google Classroom to avoid confusion in opening activities, quizzes, and lectures.* F: *More storage capacity should be provided to accommodate the files being uploaded in Blackboard; it is convenient to check the student's lacking requirements in Blackboard.*
Up-to-datedness	35	S: *It is better if the other professors make an announcement in the Blackboard Learn about what they had discussed in Google Meet because sometimes students struggle with lagging internet connection.* F: *Continue the follow-up checking of activities posted in the Blackboard Learn and Google Classroom.*
Accessibility	32	S: *Blackboard Learn should improve its interface to be more user-friendly for both students and mentors because we know that not all people can adapt easily in the digital world because of economic issues and the generation gap.* F: *All students who are officially enrolled should be included in the Blackboard Learn once class has started.*
Development	30	S: *Add some features and ample feedback as soon as the due date of assignments or exams so we could see it right away.* F: *Have assistance from ICT department especially on how to create graphics and games for the 21st century learners.*
Punctuality	12	S: *Professors should be on time and also have considerations even in a small way.* F: *The use of Google Classroom's number of hours must be increased in online class.*

Table 5 reveals the suggestions from the students and faculty members for the improvement in online learning platforms (Google Classroom and Blackboard Learn). Seven (7) aspects were classified based on the suggestions of the participants: Usability, Availability, Organization, Up-to-datedness, Accessibility, Development, and Punctuality. Two hundred and seventy-nine (279) comments were collected in the data.

In terms of usability, most of the students said that teachers should stick to just one learning platform so that they can save money. On the other hand, while majority of the teachers were positive about this application, they suggested pairing with another learning platform (e.g., Zoom) for their online discussions.

In terms of availability, some students suggested having immediate score in a quiz or exam so that they would know what questions they need to improve. Meanwhile, several faculty members suggested providing some additional features like monitoring of exams of students in Blackboard Learn and creating breakout rooms and polling in Google Classroom.

In organization, some students recommended that creating files on Blackboard and Google Classroom must be organized to avoid confusion in opening activities, quizzes, and lectures. For some faculty members, they said that more storage capacity should be done to accommodate the files being uploaded particularly in the Blackboard Learn and for convenience in checking the student's requirements.

As indicated in the up-to-datedness, several students complained that it is better if the other professors announce in the Blackboard Learn about their previous discussions in Google Meet because sometimes students struggle with lagging internet connection, while few teachers can still continue their checking of activities that are posted in the Blackboard Learn and in Google Classroom.

In terms of accessibility, few students noted that Blackboard Learn should improve its interface to be more user-friendly. They also pointed that not all people can adapt easily in the digital world due to economic issues and the generation gap. On the other hand, some teachers proposed that the enrollment in the Blackboard Learn should be updated and finalized once class has already started.

As indicated in the development, some students recommended that the online learning platforms should add some feedback so that they can read right away the suggestions or comments from the teachers. While several teachers suggested that the ICT assistance will be used in making more creative graphics and games for the 21st century learners. In terms of punctuality, few students mentioned that professors should be on time and make considerations for their online classes even in a small way. Several teachers also noted that the use of Google Classroom's number of hours must be increased for online discussions and activities.

The results of the study are corollary to what Baquiran and Plata (2022) mentioned that with the sudden shift to online delivery of such courses, the school has to realign and rearrange its learning objectives especially when using to online platforms such as Google Classroom and Blackboard Learn. Educators who interact with students through online can make them more organized to the lessons and activities.

However, it can also be noted that some students need more assistance in the different applications as these require multitasking which could affect their learning and prevent them from excelling into their virtual classrooms. The use of features on those two different applications were limited, as implied on the ideas of both students and teachers. Though both platforms are viewed as useful, additional features should be considered such as the increase of storage capacity of the LMS. In addition, more creative presentations in the form of graphs and videos should also be done. These improvements could help both students and faculty to be more productive and creative.

Conclusion and Recommendations

The levels of effectiveness on the use of Google Classroom and Blackboard Learn applications were determined by students and faculty members. These online learning platforms give them a chance to be exposed in enhancing their technological and communication skills. Other learning skills, consequently, improve the dynamics of the teaching-learning engagement.

Although both teachers and students have moderate to high perceptions in using Google Classroom and Blackboard Learn as online learning platforms, it is seen that the teachers perceived them as "more effective" than those students. Both students and teachers have different perceptions, whether positively or negatively. The effectiveness of Google Classroom and Blackboard Learn as online learning platforms depend on its features which can impact the student and faculty engagement.

The usability of features is one of the aspects that should be considered when they are implemented to this kind of learning. This should be in assistance with the ICT department to equip both students and teachers to complete tasks and activities on time without any barriers. More storage capacity should be maximized to the participants when uploading files or documents in the online classes. In addition, creative graphics and activities must be emphasized throughout the online learning experience.

Choosing a platform for students and teachers is challenging since it involves different features to create and customize the courses for a better teaching and learning engagement. However, despite this, both online platforms (Google Classroom and Blackboard Learn) can be effective in implementing into the virtual classes due to their unique capabilities.

References

Abuhassna, H., Al-Rahmi, W. H., Yahya, N., Zakaria, M. A. Z. M., Kosnin, A. B. M., & Darwish, M. (2020). Development of a new model on utilizing online learning platforms to improve students' academic achievements and satisfaction. *International Journal of Educational Technology in Higher Education, 17*, 38. https://doi.org/10.1186/s41239-020-00216-z

Alhadreti, O. (2021). Assessing academics' perceptions of Blackboard usability using SUS and CSUQ: A case study during the COVID-19 pandemic. *International Journal of Human-Computer Interaction, 37*(11), 1003-1015. https://doi.org/10.1080/10447318.2020.1861766

Almusharraf, N. M., & Khahro, S. H. (2020). Students' satisfaction with online learning experiences during the COVID-19 pandemic. *International Journal of Emerging Technologies in Learning, 15*(21), 246-267. https://doi.org/10.3991/ijet.v15i21.15647

Alzieni, H. (2020). The effect of mobile learning on learner autonomy in the United Arab Emirates. In P. Vinogradova & J. K. Shin (Eds.), *Contemporary foundations for teaching English as an additional language* (pp. 240-245). Routledge.

Balsicas, N. W., Padohinog, E. C., Hala, P. A. R., & Bulauan, F. B. (2021). E-learning in COVID-19 pandemic: Preparedness, expectations, and concerns of private school students. *Universal Journal of Educational Research, 9*(3), 675-682. https://doi.org/10.13189/ujer.2021.090327

Baquiran, R. S., & Plata, K. C. (2022). Experience of a medical school in the Philippines on the sudden shift to online learning amidst COVID-19. *Acta Medica Philippina, 56*(14), 42-50. https://doi.org/10.47895/amp.vi0.3265

Cardullo, V. M., Wilson, N. S., & Zygouris-Coe, V. I. (2015). Enhanced student engagement through active learning and emerging technologies. In J. Keengwe (Ed.), *Handbook of research on educational technology integration and active learning* (pp. 1-18). IGI Global.

González-Durán, M., Hernández-Sánchez, T., Cuevas-Rodríguez, J., & López-Lambraño, Á. (2020). The use of Blackboard Ultra for synchronous and asynchronous online communication: Case study at the autonomous university of Baja California. In L. G. Chova, A. L. Martínez, & I. C. Torres (Eds.), *ICERI2020 Proceedings* (pp. 7698-7705). http://dx.doi.org/10.21125/iceri.2020.1669

Heggart, K., & Yoo, J. (2018). Getting the most from Google Classroom: A pedagogical framework for tertiary educators. *Australian Journal of Teacher Education, 43*(3), 140-153.

Hernandez, R. M. (2021). Employing technology acceptance model (TAM): An analysis on students' reception on online learning platforms during Covid-19 pandemic. In *2021 IEEE International Conference on Automatic Control and Intelligent Systems (I2CACIS)* (pp. 58-63). IEEE. https://doi.org/10.1109/I2CACIS52118.2021.9495865

Jaiswal, P. (2020). Integrating educational technologies to augment learners' academic achievements. *International Journal of Emerging Technologies in Learning, 15*(2), 145-159. https://doi.org/10.3991/ijet.v15i02.11809

Kinash, S., Brand, J., & Mathew, T. (2012). Challenging mobile learning discourse through research: Student perceptions of Blackboard Mobile Learn and iPads. *Australasian Journal of Educational Technology, 28*(4), 639-655. https://doi.org/10.14742/ajet.832

Leo, S., Alsharari, N. M., Abbas, J., & Alshurideh, M. T. (2021). From offline to online learning: A qualitative study of challenges and opportunities as a response to the COVID-19 pandemic in the UAE higher education context. In M. T. Alshurideh, A. E., Hassanien, & R. Masa'deh (Eds.), *The effect of coronavirus disease (COVID-19) on business intelligence* (pp. 203-217). Springer. https://doi.org/10.1007/978-3-030-67151-8_12

Liu, Z., Lomovtseva, N., & Korobeynikova, E. (2020). Online learning platforms: Reconstructing modern higher education. *International Journal of Emerging Technologies in Learning, 15* (13), 4-21. https://doi.org/10.3991/ijet.v15i13.14645

Mishra, L., Gupta, T., & Shree, A. (2020). Online teaching-learning in higher education during lockdown period of COVID-19 pandemic. *International Journal of Educational Research Open, 1*, 100012. https://doi.org/10.1016/j.ijedro.2020.100012

Patterson, T. (2013). *Blackboard learn administration*. Packt Publishing Ltd.

Piotrowski, M. (2010). What is an e-learning platform? In Y. Kats (Ed.), *Learning management system technologies and software solutions for online teaching: Tools and applications* (pp. 20-36). IGI Global.

Prasetyo, Y. T., Ong, A. K. S., Concepcion, G. K. F., Navata, F. M. B., Robles, R. A. V., Tomagos, I. J. T., Young, M. N., Diaz, J. F. T., Nadlifatin, R., & Redi, A. A. N. P. (2021). Determining factors affecting acceptance of e-learning platforms during the COVID-19 pandemic: Integrating extended technology acceptance model and DeLone & McLean IS success model. *Sustainability, 13*(15), 8365. https://doi.org/10.3390/su13158365

Rohman, M., Baskoro, F., & Endahcahyaningrum, L. (2020). The effectiveness and efficiency of Google Classroom as an alternative online learning media to overcome physical distancing in lectures due to the Covid-19 pandemic: Student perspectives. In *2020 Third International Conference on Vocational Education and Electrical Engineering (ICVEE)* (pp. 1-6). IEEE. https://doi.org/10.1109/ICVEE50212.2020.9243258

Sudarsana, I. K., Putra, I. B. M. A., Astawa, I. N. T., & Yogantara, I. W. L. (2019). The use of Google classroom in the learning process. *Journal of Physics: Conference Series, 1175*, 012165. https://doi.org/10.1088/1742-6596/1175/1/012165

Zhang, M. (2016). *Teaching with Google Classroom*. Packt Publishing Ltd.