Perception of Muslim Students on Learning Management System

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Abstract

Learning Management System (LMS) is essential for knowledge acquisition and learning management in the digital era. Users are regarded as significant stakeholders who impact the system's longevity, and their attitudes regarding the system are considered. This study compares student satisfaction levels across Moodle and Google Classroom learning platforms. This study employs a quantitative approach. A survey questionnaire was specially designed to collect data from the sample. The sample of 322 students was divided into two groups: 161 using Google Classroom and 161 using Moodle. The PIECES framework was used to quantify satisfaction. STATA's Z-test was used to examine the data in this study (mean-comparison test). According to the data, there was a difference in satisfaction with Moodle versus Google Classroom. Only one of the six criteria used to measure satisfaction shows that using Moodle with Google Classroom leads to the same level of satisfaction.

Keywords: *E-Learning, Google Classroom, Moodle, Satisfaction*

Introduction

Education is a critical investment for both individual and national development. The world of education presents various learning approaches in the hopes that they would perform well and efficiently in all processes.[1] Traditional learning approaches are gradually being phased out in favor of using the internet or other technologies for convenience and efficiency.[2] The LMS is one of the technological advances in online learning.

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[1] Munawaroh, "The Influence of Teaching Methods and Learning Environment to the Student's Learning Achievement of Craft and Entrepreneurship Subjects at Vocational High School," *International Journal of Environmental and Science Education* 12, no. 4 (2017): 665–78.

[2] Syeda Farjana Shetu et al., "Impactful E-Learning Framework: A New Hybrid Form of Education," *Current Research in Behavioral Sciences* 2, no. April (2021): 100038, https://doi.org/10.1016/j.crbeha.2021.100038.

In a virtual learning environment, LMS is a set of technologies that serve as a medium of interaction between teachers and students. [3] Most educational institutions run their own LMS and offer their students a choice of intelligent learning systems.[4] LMS is vital in offering instructional facilities and enhancing learning efficiency in today's digital world. [5] The LMS creates and develops both commercial and free versions. LMS includes Blackboard, Canvas, e-College, Moodle, and Sakai.[6] Moodle, Coursework, ATutor, and Interact are just a few of the free LMS available. Moodle, according to Ndegeya, is a popular LMS worldwide.[7] Martin Dougiamas created Moodle, which stands for Modular Object-Oriented Dynamic Learning Environment.[8] In addition to Moodle, Google Classroom is a free LMS alternative that allows teachers to employ a blended learning approach and can be viewed by anyone with a Google account.[9]

Student satisfaction is defined as the gap between what students experience and their expectations. Sweeney and Ingram describe satisfaction as accomplishment and enjoyment in the learning environment.[10] According to Wu et al., satisfaction is the sum of a student's behavioral beliefs and attitudes as a result of aggregating all of the benefits that a student receives from the blended system.[11] Student satisfaction also can be defined as a value based on one's experiences while attending school.[12] Technology and autonomous learning

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[3] Esther M. Ajijola et al., "Perception of Learning Management System Among Distance Learners in South-West, Nigeria," *Journal of Digital Learning and Education* 1, no. 2 (2021): 72–84, https://doi.org/10.52562/jdle.v1i2.214.

[4] Hasan Tinmaz and Jin Hwa Lee, "An Analysis of Users' Preferences on Learning Management Systems: A Case on German versus Spanish Students," *Smart Learning Environments* 7, no. 1 (2020), https://doi.org/10.1186/s40561-020-00141-8.

[5] Darren Turnbull, Ritesh Chugh, and Jo Luck, "Learning Management Systems: A Review of the Research Methodology Literature in Australia and China," *International Journal of Research and Method in Education* 44, no. 2 (2021): 164–78, https://doi.org/10.1080/1743727X.2020.1737002.

[6] Danielle Borboa et al., "Perceptions and Use of Learning Management System Tools and Other Technologies in Higher Education: A Preliminary Analysis," *Journal of Learning in Higher Education* 10, no. 2 (2017): 17–23.

[7] Ramadhan M. Ndegeya, "Comparison of Learning Management Systems Case : Shene Solutions" (Bachelor's Thesis, Rovaniemi, Lapland University of Applied Sciences, 2019), http://www.theseus.fi/handle/10024/213860.

[8] Effandi Zakaria and Md Yusoff Daud, "The Role Of Technology: Moodle As A Teaching Tool In A Graduate Mathematics Education Course," *Asian Journal of Management Sciences and Education* 2, no. 4 (2013): 46–52.

[9] Cherry Mathew Philipose and Sheeja Rajagopal, "Google Classroom as a Learning Management System (LMS) for Teaching English," *Fortell*, no. 38 (2019): 81–90.

[10] Jill Sweeney and D. Ingram, "A Comparison of Traditional and Web-Based Tutorials in Marketing Education: An Exploratory Study," *Journal of Marketing Education* 23, no. 1 (2001): 55–62.

[11] Jen Her Wu, Robert D. Tennyson, and Tzyh Lih Hsia, "A Study of Student Satisfaction in a Blended E-Learning System Environment," *Computers and Education* 55, no. 1 (2010): 155–64, https://doi.org/10.1016/j.compedu.2009.12.012.

[12] Marcia B. Baxter Magolda, "What 'Doesn't' Matter in College?," ed. Alexander W. Astin, *Educational Researcher* 22, no. 8 (1993): 32–34, https://doi.org/10.2307/1176821.

models have an impact on student learning satisfaction.[13] Various factors influence student satisfaction in online learning, and Doris and Trey highlight several factors that influence student satisfaction, including the instructor, technology, and engagement.[14] Students who use the Moodle LMS shortly before the exam are substantially less satisfied than students who use the Moodle LMS every day, according to Horvat, Dobrota, and Krsmanovic.[15]

Research on the characteristics that determine student satisfaction in online learning settings is critical as a mapping resource for lecturers in developing an effective online learning environment that positively impacts student satisfaction, which in turn influences student learning achievement.[16] Several previous studies showed student satisfaction using the LMS. Lorenzo and Moore in Barnes found that respondents, timely, personalized services, high-quality learning results, academic and administrative support services, and learner engagement and cooperation are all factors that contribute to student satisfaction.[17] Students taught using online resources and in an online learning environment scored higher on accomplishment tests than students taught in a face-to-face setting.[18] Umek et al. discovered a link between the Moodle e-learning platform and student performance and Moodle and student satisfaction.[19]

This study focuses on Muslim student satisfaction with Moodle and Google Classroom as learning tools. Moodle provides an excellent platform for resources and communication tools, including a discussion forum, file exchange, e-mail notification, notification dashboard, progress review, course and module page search, and an optimized architecture compared to other e-learning systems.[20] In contrast, Google Classroom is user-friendly and can be utilized for any subject, grade, level, or student group, as well as for

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[13] Judy Drennan, Jessica Kennedy, and Anne Pisarski, "Factors Affecting Student Attitudes Toward Flexible Online Learning in Management Education," *The Journal of Educational Research* 98, no. 6 (2010): 331–38, https://doi.org/10.3200/JOER.98.6.331-338.

[14] Doris U. Bolliger and Trey Martindale, "Key Factors for Determining Student Satisfaction in Online Courses," *International Journal on E-Learning* 3, no. 1 (January 1, 2004): 61–68.

[15] Ana Horvat et al., "Student Perception of Moodle Learning Management System: A Satisfaction and Significance Analysis," *Interactive Learning Environments* 23, no. 4 (July 4, 2015): 515–27, https://doi.org/10.1080/10494820.2013.788033.

[16] Vivien Hollis and Helen Madill, "Online Learning: The Potential for Occupational Therapy Education," *Occupational Therapy International* 13, no. 2 (January 1, 2006): 61–78, https://doi.org/10.1002/oti.209.

[17] Cynthia Barnes, "An Analysis of Student Perceptions of the Quality and Course Satisfaction of Online Courses," *Journal of Higher Education Theory and Practice* 17, no. 6 (2017): 2017.

[18] Muntajeeb Ali Baig, "A Critical Study Of Effectiveness Of Online Learning On Students Achievement," *I-Manager's Journal of Educational Technology* 7, no. 4 (2011): 28–34, https://doi.org/10.26634/jet.7.4.1391.

[19] Lan Umek et al., "Analysis of Selected Aspects of Students Performance and Satisfaction in a Moodle-Based e-Learning System Environment," *Eurasia Journal of Mathematics, Science and Technology Education* 11, no. 6 (2015): 1495–1505, https://doi.org/10.12973/eurasia.2015.1408a.

[20] Priyavahani Subramanian et al., "A Study of Comparison between Moodle and Blackboard Based on Case Studies for Better LMS," *Journal of Information Systems Research and Innovation (JISRI)* 6, no. 1 (2014): 26–33.

students and teachers who are not digitally savvy because it requires little maintenance, upkeep, or training to get started. Google Classroom is also great for a mixed learning setting, where all students are in one area, and the lecturer may directly teach and communicate with them in person while students submit work online. Moodle and Google Classroom are two more LMS widely used in Indonesian universities, particularly since the Covid-19 outbreak hit the country.

E-Learning must be reviewed in order to improve its performance. The framework PIECES (Performance, Information, Economic, Control, and Service) will be utilized to evaluate this study, and it will be used to create the questionnaire. Numerous studies have been conducted on student satisfaction with LMS use. However, research on Muslim student satisfaction with LMS use, particularly with PIECES, is still extremely rare found and carried out by universities. Additionally, because most educators employ conventional approaches based on classical learning models, this research is distinct from most other studies. This study aims to ascertain Muslim students' satisfaction with LMSs, particularly Moodle and Google Classroom.

UIN Mataram is one of the newest universities to incorporate the usage of a learning management system into the learning process. According to the results of a questionnaire circulated to gather initial data on the most generally used LMS at UIN Mataram, Google Classroom and Moodle were the most widely utilized and in demand by the lecturer for running their classes. LMS has been actively employed just since the COVID-19 Pandemic. Thus, students and lecturers perceive using the LMS as a novel experience. As a result, this study was done to determine the difference in student satisfaction between the two most extensively used learning management systems at UIN Mataram. The research findings are supposed to provide an overview of existing universities, particularly those that have recently introduced the LMS system in the learning process and are interested in student satisfaction with the LMS.

In comparison, the findings of this research can eventually be utilized to offer ways for producing learning media for lecturers and policymakers at institutions. Additionally, this research is expected to significantly impact the field of education by providing information for behavioral research to attain effective learning. This study can also determine the success or failure of an LMS.

Methods

This quantitative study compares the satisfaction of users of the Moodle LMS with Google Classroom from a Muslim student perspective. Data was gathered by sending questionnaires to students who used Moodle and Google Classroom as their learning management systems. Because the precise number of Google Classroom and Moodle users is unknown, the probability sampling approach is used to determine the distribution of the sample. The Lemeshow formula was used to figure out how many samples there were in total. The Lemeshow formula can calculate the number of samples for an unknown population. The total number of respondents in this survey was 322. LMS Google Classroom users account for 161 respondents, whereas LMS Moodle users account for 161 respondents. This study used the PIECES Framework, a set of questions with quantitative methods that can be used in management education. The PIECES framework quantifies satisfaction and comprises performance, information and data, economics, control and security, service, and efficiency.[21] The Z-test (mean-comparison test) in STATA was used to analyze the data in this study. Z-test analysis and PIECES framework were used for this study because both could classify institutional challenges, opportunities, and information system goals. This study investigates the differences in student satisfaction with the LMS Moodle and Google Classroom in order to test the following hypothesis:

a. H_1: Moodle LMS and Google Classroom users have different satisfaction levels with performance characteristics.

b. H_2: There are differences in student satisfaction with the Information and Data dimensions of Moodle and Goggle Classroom LMS users

c. H_3: There is a difference in student satisfaction in the Economics dimension of Moodle and Google Classroom LMS users

d. H_4: There is a difference in student satisfaction in the dimensions of Control and Security for Moodle LMS users and Google Classroom

e. H_5: There is a difference in student satisfaction with the Efficiency dimension of Moodle LMS users and Google Classroom

f. H_6: There is a difference in student satisfaction in the service dimensions of Moodle LMS users and Google Classroom

g. H_7: There is a difference in student satisfaction using Moodle LMS and GC.

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[21] Yolanda Rizkyta Sari and Evy Nurmiati, "Analisis Kepuasan Pengguna Google Classroom Menggunakan Pieces Framework (Studi Kasus: Program Studi Sistem Informasi UIN Jakarta)," *InfoTekJar : Jurnal Nasional Informatika dan Teknologi Jaringan* 5, no. 2 (February 18, 2021): 308–13, https://doi.org/10.30743/infotekjar.v5i2.3349.

Discussion

This study investigates student satisfaction using Moodle and Google Classroom as learning management systems. According to the findings, students who use the LMS Moodle and Google Classroom have varying satisfaction levels. Google Classroom, in comparison to Moodle, provides more functionality and an easier-to-use interface because Moodle requires extensive preparation before being used in the learning process.

Google Classroom is a productivity tool for teachers and students in online learning that is part of the online Google Apps for Education (GAFE) series. It has a unique appearance and functionalities.[22] According to Nur Alim et al., the Google Classroom application is beneficial in implementing online learning. However, it cannot be separated from numerous barriers arising from its users, such as signal interference and others.[23]

Moodle, a learning management system, is another option for using online learning programs in addition to Google Classroom. Moodle, like Google Classroom, includes learning features and a convenient way to track learning events. The features of Moodle's utility and ease of use significantly impact student behavior in Macau.[24] This Moodle-based LMS has increased student learning activities despite being an online LMS. [25]

In this study, 322 students who utilized the Moodle and Google Classroom learning management systems were handed questionnaires. The gender-based characteristics of respondents are as follows:

Table 1. Characteristics of respondents based on gender

Gender	Total	Percentage
Man	179	56%
Woman	143	44%
Total	**322**	**100%**

Based on the results of filling out the questionnaire, it was discovered that 44 percent of respondents were female students, while 56 percent were male students.

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[22] I. Ketut Sudarsana et al., "The Use of Google Classroom in the Learning Process," *Journal of Physics: Conference Series* 1175, no. 1 (March 2019): 012165, https://doi.org/10.1088/1742-6596/1175/1/012165.

[23] Nur Alim et al., "The Effectiveness of Google Classroom as an Instructional Media: A Case of State Islamic Institute of Kendari, Indonesia," *Humanities and Social Sciences Reviews* 7, no. 2 (2019): 240–46, https://doi.org/10.18510/hssr.2019.7227.

[24] Teo, T, M Zhou, A C W Fan, and F Huang. "Factors That Influence University Students' Intention to Use Moodle: A Study in Macau." Educational Technology Research and development, 67(3): 749-766, 2019. https://doi.org/10.1007/s11423-019-09650-x.

[25] N. H.S. Simanullang and J. Rajagukguk, "Learning Management System (LMS) Based on Moodle to Improve Students Learning Activity," *Journal of Physics: Conference Series* 1462, no. 1 (2020), https://doi.org/10.1088/1742-6596/1462/1/012067.

Table 2. Characteristics of respondents based on grade/semester

Grade	Total	Percentage
Grade 1	69	21%
Grade 3	72	22%
Grade 5	99	32%
Grade 7	82	25%
Total	**322**	**100%**

The respondents are divided into groups based on their academic level (semester). Grade 1 students account for 21% of the total, grade 3 students for 22%, grade 5 students for 32%, and grade 7 students for 25%.

According to data analysis, the average satisfaction of Google Classroom users is higher than that of the Moodle LMS. Google Classroom is easier to use and understand, with fewer features and a more straightforward design than Moodle LMS.

In this study, data analysis was carried out on each user satisfaction indicator to determine the difference in satisfaction on each dimension of student satisfaction using Google Classroom LMS and Moodle LMS users. The results of testing with the z test in this study are as follows:

Dimensions Performance Google Classroom Vs. LMS Moodle

The hypothesis on this dimension is:

Ho: There is no difference in student satisfaction in the Performance dimensions of Moodle LMS users and Google Classroom.

Ha: There are differences in student satisfaction with the dimensions of performance of Moodle users and Google Classroom.

Based on the z test conducted on 322 respondents using Google Classroom and LMS Moodle, it was obtained.

Table 3. The output of z-test dimension of performance (Source: STATA 17)

Variable	Obs	Mean	Std. Err	Std. Dev	[95% Conf.	Interval]
GC	161	11.78261	.078811	1	11.62814	11.93708
Moodle	161	10.10559	.078811	1	10.95112	11.26006
diff		.6770186	.1114556		.4585696	.8954677
diff	= mean (GC) – mean (Moodle)				z =	6.0743
Ho: diff	= 0					

Ha: diff < 0	Ha: diff ! = 0	Ha: diff > 0
Pr(Z < z) = 1.000	Pr(|Z| > |z|) = 0.0000	Pr(Z > z) = 0.0000

The performance of an LMS is critical in its application. The performance of the LMS used in online learning significantly impacts the learning process's success.[26] The Z-score obtained is 6.0743, which has a score of more than the z table with a significance level of 0.05, which is 1.96. That means that the z-score is in the Ha acceptance area, or there are differences in the performance of Google Classroom and LMS Moodle. Google Classroom is a learning application with an easy-to-understand interface for its users. It is also owned by Moodle LMS, which has an intuitive and integrated interface. In addition, Moodle LMS provides themes that can be customized according to the user's access. However, in Moodle, a configuration must be done to build an e-learning system so that users must understand more about the system in this Moodle.

Dimensions of Information and Data Google Classroom Vs. Moodle LMS

The hypothesis on this dimension is:

Ho: There is no difference in student satisfaction in the information and data dimensions of Moodle LMS users and Google Classroom

Ha: There are differences in student satisfaction in the information and data dimensions of Moodle LMS users and Google Classroom

Table 4. The output of z-test dimension of information (Source: STATA 17)

Variable	Obs	Mean	Std. Err	Std. Dev	[95% Conf.	Interval]
GC	161	12.01242	.078811	1	11.85796	12.16689
Moodle	161	11.87578	.078811	1	11.72131	12.03024
diff		.136646	.1114556		-.0818031	.355095
diff	= mean (GC) – mean (Moodle)				z =	1.2260
Ho: diff	= 0					
Ha: diff < 0		Ha: diff ! = 0			Ha: diff > 0	
Pr(Z < z) = 0.8899		Pr(|Z| > |z|) = 0.2202			Pr(Z > z) = 0.1101	

In addition to performance, the information displayed on the LMS's system should be informative and straightforward to understand. Throughout the deployment of online learning, students would be bewildered by the LMS's imprecise information. Students must quickly understand an internet-based learning system as they migrate from traditional

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[26] Alhaji Modu Mustapha, Madya Noraffandy B. Yahaya, and Megat Aman Zahiri B. Megat Zakaria, "Performance of Learning Management System Moodle Design in a Nigerian Higher Education Institution," *EasyChair Preprint*, no. 3267 (April 27, 2020): 1–10.

classrooms to online learning. As a result, the information provided by the system must be short and informative.[27]

According to the findings of the z test, the z score was 1.22, which is less than 1.96, indicating that the z score is within the Ho acceptable range. Alternatively, from the standpoint of users (students) of Google Classroom and Moodle, there is no difference in the dimensions of information and data.

The information menu on Google Classroom and LMS Moodle is quite informative. Google Classroom offers access to other Google menus such as Google Forms, Google Drive, and Google Docs. All data uploaded to Google Classroom will be automatically saved in the user's Google Drive. The Moodle LMS system is built according to the needs of its users. Users can configure themselves through the teacher. The information provided by the LMS is also quite informative and is stored in a neat folder. In Google Classroom and LMS Moodle, the list of tasks, schedules, and calendars are neatly arranged so that users (students) know neat and precise information.

Dimensions of Economics Google Classroom Vs. Moodle LMS

The hypothesis on this dimension is:

Ho: There is no difference in student satisfaction in the Economic dimension of Moodle LMS users and Google Classroom

Ha: There is a difference in student satisfaction in the Economic dimension of Moodle LMS users and Google Classroom

Table 5. The output of the z-test dimension of economics (Source: STATA 17)

Variable	Obs	Mean	Std. Err	Std. Dev	[95% Conf.	Interval]
GC	161	5.372671	.078811	1	5.218204	5.527136
Moodle	161	5.049689	.078811	1	4.895223	5.204156
diff		.3229814	.1114556		.1045323	.5414304
diff	= mean (GC) – mean (Moodle)				z =	2.8978
Ho: diff	= 0					
Ha: diff < 0		Ha: diff != 0			Ha: diff > 0	
Pr(Z < z) = 0.9981		Pr(|Z| > |z|) = 0.0038			Pr(Z > z) = 0.0019	

Z score of 2.8978 or more than 1.96 states that there are differences in user satisfaction on the economics dimension of Google Classroom vs. LMS Moodle users. Google Classroom is a free application provided by Google to facilitate the learning

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[27] Bisma Rero Alfaritsi and Cut Maisyarah Karyati, "Strategic Plan on Information System Management Learning System Using Information Economy Method," *International Research Journal of Advanced Engineering and Science (IRJAES)* 6, no. 1 (2021): 180–83.

process. Google Classroom can be created even though there are many classes. In its application, Google Classroom is considered cheaper and consumes less data than the Moodle LMS. In addition, Moodle LMS is a free application but limited storage space and limited users. There is a paid Moodle LMS package for schools interested in using the Moodle LMS with more storage space so it can accommodate many classes.

The usage of cost-effective apps is also critical in online learning activities. Several factors must be considered when deciding on the best learning media. There will have an impact on the learning process's effectiveness and efficiency. The media used does not have to be expensive; on the contrary, inexpensive, simple, and easily accessible media provides more effective and efficient learning.[28]

Dimensions of Control and Security Google Classroom Vs. Moodle LMS

Control and security in using online-based apps are required to secure sensitive content and enable safe data processing. Most web-based apps already include a security program, but not all of these security measures are what users desire.[29] The hypothesis on this dimension is:

Ho: There is no difference in student satisfaction in the dimensions of control and security for Moodle LMS users and Google Classroom.

Ha: There is a difference in student satisfaction in the dimensions of control and security for Moodle LMS users and Google Classroom.

Table 6. The output of the z-test dimension of control and security (Source: STATA 17)

Variable	Obs	Mean	Std. Err	Std. Dev	[95% Conf.	Interval]
GC	161	5.925466	.078811	1	5.770999	6.079933
Moodle	161	5.950311	.078811	1	5.795844	6.104777
diff		-.0248447	.1114556		-.2432938	.1936043
diff	= mean (GC) – mean (Moodle)				z =	0.2229
Ho: diff	= 0					
Ha: diff < 0		Ha: diff ! = 0			Ha: diff > 0	
Pr(Z < z) = 0.4118		Pr(|Z| > |z|) = 0.8236			Pr(Z > z) = 0.5882	

The test results show differences in the dimensions of control and security for Google Classroom and LMS Moodle users. In Google Classroom, users can quickly create

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[28] Nur Rohman, Heru Ismaya, and Rika Agustiani, "Penerapan Pembelajaran Online Group Whatsapp Dalam Masa Pandemi Covid-19 Sebagai Metode Untuk Mencapai Hasil Belajar Siswa," *JEMS: Jurnal Edukasi Matematika Dan Sains* 9, no. 2 (September 20, 2021): 393–408, https://doi.org/10.25273/jems.v9i2.10675.

[29] Rian Andrian and Ahmad Fauzi, "Security Scanner For Web Applications Case Study: Learning Management System," *Jurnal Online Informatika* 4, no. 2 (February 14, 2020): 63–68, https://doi.org/10.15575/join.v4i2.394.

an account and join classes that tutors have created. All users can enjoy google classroom services if they have a Google account. Google account security is also quite good by linking the user's phone number to the account. Unlike the Moodle LMS, which requires configuration or administrators to use it. The administrator is tasked with creating an account for each user who will use the Moodle LMS feature. Moodle LMS also has the advantage of an unlimited number of users because the configuration can be done independently by the institution. That is different from Google Classroom, which is limited to 1000 users, including a maximum of 20 teachers.

Dimensions of Efficiency Google Classroom Vs. Moodle LMS

One of the consequences of accrediting standards in implementing online courses is using an LMS. Because the system must be structured so that learning can be carried out successfully and efficiently, the effectiveness of employing LMS in implementing online learning must be carefully addressed. One of the consequences of accrediting standards in implementing online courses is using an LMS. Because the system must be structured so that learning can be carried out successfully and efficiently, the effectiveness of employing LMS in implementing online learning must be carefully addressed.[30] The hypothesis on this dimension is:

Ho: There is no difference in student satisfaction with the efficiency dimension of Moodle LMS users and Google Classroom

Ha: There is a difference in student satisfaction with the efficiency dimension of Moodle LMS users and Google Classroom

Table 7. The output of the z-test dimension of efficiency (Source: STATA 17)

Variable	Obs	Mean	Std. Err	Std. Dev	[95% Conf.	Interval]
GC	161	5.900621	.078811	1	5.746154	6.055088
Moodle	161	5.658385	.078811	1	5.503918	5.812852
diff		.242236	.1114556		.023787	.4606851
diff	= mean (GC) – mean (Moodle)				z =	2.1734
Ho: diff	= 0					
Ha: diff < 0		Ha: diff ! = 0			Ha: diff > 0	
Pr(Z < z) = 0.9851		Pr(|Z| > |z|) = 0.0298			Pr(Z > z) = 0.0149	

Z score of 2.1734 on the efficiency dimension is in the acceptance area of Ha. It can be concluded that there is a difference in satisfaction with the efficiency dimension

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[30] Allison Hutchison, "Technological Efficiency in The Learning Management System: A Wicked Problem with Sustainability for Online Writing Instruction," *Computers and Composition* 54 (December 1, 2019): 102510, https://doi.org/10.1016/j.compcom.2019.102510.

between Google Classroom and Moodle LMS. In its use, the Moodle LMS administrator can create a learning system as needed. In addition, the curriculum can also be adjusted in its use. However, using Google Classroom cannot design their curriculum. With the use of Moodle LMS, grades can be transferred automatically. In contrast to Google classroom, grades transfer is done manually.

Dimensions of Service Google Classroom Vs. Moodle LMS

Adopting a web-based learning management system is considered efficient and well-integrated. A web-based LMS delivers services that bring educators, administrators, and students together in a safe, robust, and integrated system, establishing a decent learning environment.[31] The hypothesis on this dimension is:

Ho: There is no difference in student satisfaction in the service dimensions of Moodle LMS users and Google Classroom.

Ha: There is a difference in student satisfaction in the service dimensions of Moodle LMS users and Google Classroom.

Table 8. The output of the z-test dimension of service (Source: STATA 17)

Variable	Obs	Mean	Std. Err	Std. Dev	[95% Conf.	Interval]
GC	161	6.074534	.078811	1	5.920067	6.229001
Moodle	161	5.732919	.078811	1	5.578452	5.887386
diff		.3416149	.1114556		.1231659	.560064
diff	= mean (GC) – mean (Moodle)				z =	3.0650
Ho: diff	= 0					
Ha: diff < 0		Ha: diff ! = 0			Ha: diff > 0	
Pr(Z < z) = 0.9989		Pr(|Z| > |z|) = 0.0022			Pr(Z > z) = 0.0011	

In the service dimension, the z score is also in the Ha acceptance area. In other words, there are differences in satisfaction with the service dimensions provided by Google Classroom and LMS Moodle. Google Classroom provides services that are connected to features connected by Google that can help users. However, the service of providing grade books on Google Classroom is not yet synced in all districts, so manual synchronization is required. Unlike Moodle, Moodle offers several free and paid integrations, such as a virtual programming lab, turning tech, Turnitin, and others. Nevertheless, in terms of value

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[31] Jaime Medina and Abraham Dávila, "Quality of Service Evaluation of a Learning Management System Using ISO/IEC 25011: A Prioritization Strategy" (2020 8th International Conference in Software Engineering Research and Innovation (CONISOFT), Chetumal, Mexico: IEEE, 2020), 180–86, https://doi.org/10.1109/CONISOFT50191.2020.00034.

integration, Moodle provides automatic assessment services because all tasks are integrated.

Google Classroom User Satisfaction Vs. Moodle LMS

The hypothesis on this dimension is:

Ho: There is no difference in student satisfaction using Moodle LMS and Google Classroom

Ha: There is a difference in student satisfaction using Moodle LMS and Google Classroom

Table 9. The output of z-test Satisfaction in using LMS (Source: STATA 17)

Variable	Obs	Mean	Std. Err	Std. Dev	[95% Conf.	Interval]
GC	161	47.06832	.078811	1	46.91386	47.22279
Moodle	161	45.37267	.078811	1	45.2182	45.52714
diff		1.695652	.1114556		1.477203	1.914101
diff	= mean (GC) – mean (Moodle)				z =	15.2137
Ho: diff	= 0					

Ha: diff < 0	Ha: diff ! = 0	Ha: diff > 0
Pr(Z < z) = 1.0000	Pr(|Z| > |z|) = 0.0000	Pr(Z > z) = 0.0000

Based on the data processing results, the z-value was 15,2137, which is less than z table Z/2 (0.025) = 1.96, so it can be concluded that there are differences in student satisfaction in using LMS Moodle and Google Classroom. According to the study's findings, Google Classroom users are more satisfied than Moodle users since Google Classroom is easier to use and has fewer features than Moodle. However, this contrasts with the findings of the research, which found that students at one of Jakarta's public universities were more satisfied with Moodle than Google Classroom.[32]

According to the findings of this study, there are disparities in Muslim students' satisfaction with the LMS Google Classroom and Moodle. Google Classroom has a higher level of satisfaction. The same thing was discovered in the Kendari State Islamic Institute study. Students are pleased with Google Classroom as a teaching and learning medium. Because Google Classroom's beauty leads to high satisfaction, Google Classroom opted to incorporate the Google Classroom application into its teaching and learning process. According to the findings of this study, there are disparities in Muslim students' satisfaction with the LMS Google Classroom and Moodle. Google Classroom has a higher level of satisfaction. The same thing was discovered in the Kendari State Islamic Institute

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[32] Gunawan Wiradharma, "Google Classroom or Moodle?: University Student Satisfaction in Distance Learning Communication During Covid-19 Pandemic," *Jurnal Komunikasi Dan Bisnis* 8, no. 2 (2020): 85–99, https://doi.org/10.46806/jkb.v8i2.674.

study. Students are pleased with Google Classroom as a teaching and learning medium. Because Google Classroom's beauty leads to high satisfaction, Google Classroom opted to incorporate the Google Classroom application into its teaching and learning process.[33]

Students were satisfied with the two LMS based on the six criteria employed, which were adapted from PIECES. These findings are consistent with Aris, Apol, and Hanim's research, which found that service quality, information quality, and system quality from e-learning (Moodle) as learning tools at ITS Surabaya influence student satisfaction as users.[34]

Although the study's findings show that Muslim students are content with Moodle and Google Classroom, there are variances in satisfaction across various aspects, including information, efficiency, service, economics, control, and security. This distinction is possible since it is only on the performance dimension that Moodle and Google Classroom delivers the same happiness to Muslim students as users. Only on the performance dimension do students in Google Classroom and Moodle report the same level of satisfaction. The findings of this survey are consistent with those of a study conducted at UIN Jakarta's Information Systems major, which used PIECES to assess Muslim students' satisfaction with Google Classroom. The average result for each domain, according to the conclusions of the survey in that research, is 4,188 (satisfied), 4,194 (satisfied), 4,013 (satisfied), 4,074 (satisfied), 4,457 (extremely satisfied), and 4.3 (satisfied) (Very Satisfied). It obtains a total satisfaction score of 4.204 across all domains (Very Satisfied).[35]

Conclusion

Based on the facts, it can be stated that Google Classroom users are happier than Moodle. The average respondent found a difference in satisfaction in utilizing the LMS Moodle with Google Classroom on five criteria: information and data, economics, control and security, services, and efficiency. Only the performance component shows no difference between Moodle and Google Classroom regarding satisfaction. This study

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[33] Nur Alim et al., "Usability and Satisfaction of Google Classroom as an Instructional Teaching and Learning Medium: The Students' Perspective," *World Transactions on Engineering and Technology Education* 19, no. 1 (2021): 16–20.

[34] Aris Kusumawati, Apol Pribadi, and Hanim Maria Astuti, "Analisis Kualitas Sistem Informasi Terhadap Peningkatan Produktivitas Dan Pengetahuan Mahasiswa Sebagai PenggunaMedia Pembelajaran Berbasis E-Learning (Studi Kasus: Jurusan Sistem Informasi ITS Surabaya)," *Jurnal Teknik Pomits*, 2013, 1–8.

[35] Sari and Nurmiati, "Analisis Kepuasan Pengguna Google Classroom Menggunakan Pieces Framework (Studi Kasus."

contributes to students' perspectives by assessing their satisfaction with the learning media they must use in college. This research contributes to the university providing data on student perceptions, which can be used to improve the university's previous learning management system. Students would be better able to support their learning if the LMS was designed more easily accessible with various new and appealing features. The researchers recommend making it more user-friendly and accessible for them to use as a learning platform.

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