



## Feature Assessment of LMS by Senior High School Teachers and Student: A Basis for LMS Improvement

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CC-BY-NC-4.0 ©2022 by author (<https://creativecommons.org/licenses/by-nc/4.0/>).

**Abstract.** In this paper, three learning management systems (LMS), namely Google Classroom, Moodle, and Schoology, were evaluated and assessed based on how diverse school users regarded them. According to the findings of the study, teachers and their students were competent and satisfied enough to use the various LMSs during their asynchronous learning sessions. Teachers and students concur that their LMSs are very effective, user-friendly, simple to utilize, and provide accurate results. Teachers concurred that they can readily personalize their LMS by designing and assigning activities, assignments, and assessments, uploading learning resources, and setting suggested due dates. Finally, the opinions and suggestions of respondents regarding the improvement and integration of new features into various LMS were discussed. Despite various problems, the fundamental finding of this study is that using an LMS to organize, record, evaluate, and monitor students' performance makes duties easier for teachers and distant learners.

**Keywords:** Learning Management System, E-Learning, Distance Learning, Feature Assessment, Distance Education

## INTRODUCTION

Electronic learning (e-learning) is one of the most significant recent advancements in the information systems industry. These e-learning systems presented a unique challenge for both

schools and industry (Wang, 2003). E-learning is delivered by several organizations and educational institutions using learning platforms like an e-Learning Management System [7]. This system plays an important role in enhancing and facilitating teaching and learning (Turnbull,

Chugh, Luck. 2021.

Moreover, an e-LMS solution facilitates delivery and management of all learning offerings, including online, virtual classroom, and instructor-led courses. It automates the learning course and easily delivers training, manages learners, and keeps track of their progress and performance across training activities, which reduces administrative overhead (Bravo, et al. 2021). This also means that in the new concept, learners are encouraged to take an active role in their own learning. Within this context, learning management system can be a support system throughout the teaching and learning process of teachers and learners. Fortunately, learning management systems (LMS) are developed to improve learner engagement and execute remote learning efforts. Universities, schools, and other institutions can offer online or hybrid classes using an LMS. Many of these platforms include advanced features to manage and facilitate to produce collaboration among learners (Bouchrika, 2020)]. In this regard, the learning management system is designed with the general common functions, however, depending on the characteristics of each type of end users, it would be better if those are improved corresponding with what users really yearn for (Nhu-Ty Nguyen, 2021).

In accordance with the study of (Nor Azura Adzharuddin & Lee Hwei Ling, 2013), it shows that LMS is an essential part in the teaching learning process provided with proper training and guidance for students and teachers. A study also shows the relationship between LMS usage and academic achievement of students which shows that the individual virtual competency is an important moderator in this relationship (Dahlstrom, et al. 2014). According to Wang and Haggerty (2011), virtual competence was elaborated as the skills, ability, motivation, and knowledge to effectively contribute to a virtual environment. Therefore, with great individual virtual competencies or virtual skills will contribute greatly with their academic performance thus proper training and seminars are vital part in using an LMS.

In our current situation where a deadly virus, known as COVID-19, strikes the world, it affected and changed the way we live, hence the term New Normal. This cost a lot in our education system where schools and universities cannot undergo face-to-face now. According to DepEd Sec. Leonor Briones, "education must continue" that's why education was push through

with the aid of distance learning utilizing modern technological devices. It was last school year 2020-2021 where distance learning started, moving the start of school year from June to October. DepEd categorize distance learning into three types of modalities; Online Distance Learning (ODL), Modular Distance Learning (MDL), and TV/Radio Based Instruction.

Undoubtedly with the increased use of online modalities and physical school infrastructure is not available for learners during this time of pandemic, it is necessary to assess the effectiveness of learning management system which is suitable for their educational needs. As a result, the researchers agreed to conduct research which aims to assess the different LMS that we have chosen and to further evaluate and assess their different features base from the response of the selected Senior High School teachers and students.

This study focuses to assess and evaluate the features of various LMS used by Senior High School students and teachers which will be conducted this year. LMS included in this study are Google Classroom, Schoology, and Moodle. Moreover, this aims to profoundly sight what needs to be improved and developed in the Learning Management System. By studying their responses, the researchers will be able to gain knowledge about what exact improvements their current LMS needs, thus it is critically important to carry out this research.

Furthermore, the study aims to answer the following questions: (1) To determine teachers' current perception of the LMS they are using in terms of: (a) efficiency; (b) accuracy; (c) customization; (2) To determine students' current perception of the LMS they are using in terms of: (a) efficiency; (b) accuracy; (3) To determine the aspects of the LMS they are presently using need to be improved based on the respondents' feedback.

E-learning management systems track and monitor learners' activity. This system automates the learning and training processes and serves as a common structure and base for various e-learning applications. With a smart learning management system, organizations can improve learning programs and learners can plan their future steps. All LMSs have the same specs and functionalities, yet they work differently. Some of these systems can monitor and control learning operations, while others operate as competency devices to help students select courses depending on their training needs. These

systems can be tailored to customer demands. Others are basic and merely involve writing tools, while others have simulated classrooms and instructional activities. Others don't include videos (Shariat, et all. 2014).

The LMS should be as intelligent as possible given the ubiquitous learning environment paradigm, so students spend as little time and energy as possible learning operating system functionalities. It should keep track of and analyze each user's study habits and learning preferences and style. It must respect individual preferences and needs. It should let students use their own ideas and creativity to construct their own curriculum. Students should be able to communicate freely with each other and their teachers to master the learning dynamic and improve their learning outcomes. To reduce user irritation and maintain student motivation, the system must provide timely and effective help (Lui, et all. 2011).

*Learning Management System (LMS).* According to a study, Learning Management Systems (LMS) are reinforcement learning process through online classroom environments. It supports an inclusive learning environment for academic progress with interceding structures that promote online collaborative-groupings, professional training, discussions, and communication among other LMS users (Bradley, 2021). In another study, LMS empowers teachers to streamline teaching methods and class management and enables students to learn in a fun and effective way (Adefuin, 2019). It was also defined as a virtual environment that aims to simulate face-to-face learning environments with the use of Information Technology (De Oliveira, Cunha, and Nakayama, 2016).

Furthermore, Nasser, Cherif, and Romanowski (2011) stated that LMS usage provides online learners with consistent information regarding their performance and its usage allows online learners to become independent. Moreover, Lonn and Teasley (2009) stated that LMS are web-based systems that enable teachers and students to share materials, to submit and return assignments and to communicate online. Therefore, LMS is an innovative tool which can help create, adopt, administer, distribute, and manage all the activities related to e-learning training and can act as a complement to classroom learning.

According to Dahlstrom (2014), Learning Management Systems (LMS) have

become common place in most higher education institutions. More students than ever are experiencing this digital learning environment. Explores that student reported positive dispositions toward information technology (64%), positive attitudes toward information technology (71%), and high levels of information technology usage (70%). This information is further supported in the finding that most students prefer courses that are a blend of online and face-to-face work. This research shows that students are embracing the new culture of academic Learning Management System.

Furthermore, a Learning Management System (LMS) can support or hinder active engagement, meaningful connections between segments of the course, easy communication, and formative feedback by making it easier or more difficult for faculty to communicate course requirements, provide open-ended feedback, and place course elements that are used together contiguous to one another (Rubin, Fernandes, Avgerinou, & Moore, 2010).

The availability of course materials that LMS provides positively impacts the ability for students to learn in and outside of the classroom. The learning skills of students has improved in courses where LMS are available (Nair & Patil 2012). This improvement in learning can be attributed to the learning environment that LMS provides and the access to course material and instant results that allows students to pursue knowledge in a more efficient manner (Ebardo & Valderama 2009). Additionally, the communication that LMS provides between students and instructors allows for feedback and comments on work completed help to promote healthier academic goals in students course work.

The impact of LMS goes beyond reducing the cost of educational investments to enhancing student learning. LMS has made it possible and easier for the students to access all administrative functionalities that is available at the school; submit assignments online and in return receive feedback. (Clarke-Okah, 2009).

*Assessment of LMS.* Several studies have been conducted to determine the capabilities of various LMS. Each research assessed a variety of aspects that these LMS were capable of. A recent study conducted to verify the effectiveness of a Moodle in an elementary school showed that it can be used as a network-based learning online solution providing promising results in the academic performance of the students

(Rachmadtullah, Subandowo, Humaira, Aliyyah, Samsudin, & Nurtanto, 2020).

Meanwhile, two LMS was put into test about their effectivity in an experimental study which latter showed that teachers can either use Edmodo and Schoology in teaching which improves student's speaking performance (Yuniarti, Mulyadi, & Ifadah, 2019). Likewise, the efficiency of Schoology in teaching writing was compared to Picture Series in another study. It was discovered that there is a considerable difference between the two, implying that Schoology is more effective as a result of the findings (Masyhudianti, Sutomo, & Suparno, 2018).

A different study found that Google Classroom had no substantial influence on teaching due to some user concerns (Azhar, & Iqbal, 2018), contradicting a study that found it useful as an active learning tool that might increase the teaching and learning process (Shaharanee, Jamil, & Rodzi, 2016). Alternatively, another study from the same year revealed how effective Moodle is in improving students' academic achievement, with over 61 percent of those who completed the online exam receiving extremely good marks, proving the platform's reliability (Marikar, & Jayarathne, 2016).

In terms of feature integration, a different study that looked at the usefulness of Moodle found that while it was sufficient on its own, it lacked interactions such as instructor-student and student-student contact that are present in a traditional classroom setting (Cavus, Uzunboyly, & Ibrahim, 2006). Moreover, Lewis, MacEntee, DeLaCruz, Englander, Jeffrey, Takach, and Woodall, (2005) claim that LMS allow students to work in small or big groups. They can collaborate synchronously and asynchronously, share documents, chat, and email. This is a big system benefit. Students can collaborate virtually. Everything is online.

*LMS Improvement and Development.* Learning management system (LMS) is considered as an essential means of acquiring knowledge (Nguyen, 2021) and backbone for online learning and the management in learning processes, classrooms, tests, and assignments in the digital era (Alduraywish, Patsavellas, & Salonitis, 2021). Moreover, the system is

designed with the general common purposes, however, depending on the characteristics of each type of end users, it would be better if those are improved corresponding with what users really desire for. As users could be seen as the key stakeholders who impact the system's survival, their attitudes toward system are put in high consideration (Nguyen, 2021).

In addition to this, previous studies have focused on identifying various learning features of LMS that can influence students' learning outcomes. However, the results of previous studies were controversial with inconsistent learning outcomes of the students. One possible reason can be due to the lack of thorough understanding on students' learning preferences, needs and diverse backgrounds (Tinmaz and Lee, 2020). In relation to quality standards in an LMS, the importance of identifying those that comply with minimum requirements arises. These requirements can be expressed in terms of reliability, scalability, security, sustainability, and adoption of international standards of quality. (De Oliveira et.al, 2016). Regarding the standards of LMS, it is necessary that an institution should consider.

Therefore, there is a need for analyzing and understanding user's preferences, specifically teachers and students' feedback, to further achieve the development of higher quality experiences within learning management systems. Since they have different learning needs, this factor can be considered in the development or improvement of features of the LMS.

*Conceptual Framework.* To collect data and evaluate the features of Learning Management Systems used in schools. Due of the pandemic, learning management systems are vital in today's classroom. Teachers can use this program to upload learning materials, video courses, and resources, assign exercises and assignments, and conduct reliable assessments and interventions from their homes. Lessons, activities, assignments, and assessments can be accessible at any time by students using the teacher's LMS. Though there are several LMS to choose from, educators are still in charge of educating students. These LMS help teachers bridge the gap in education in these times of crises.

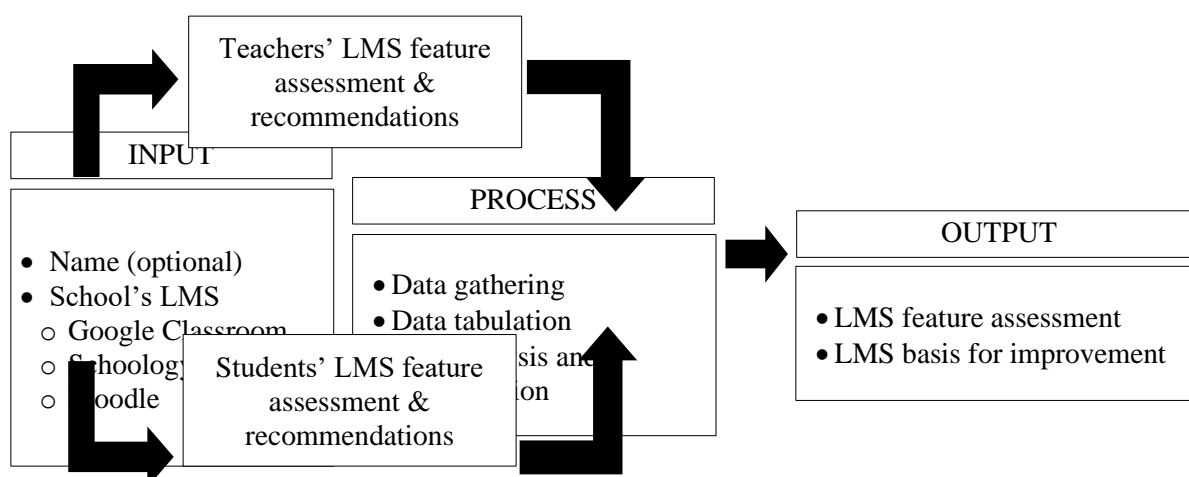


Figure. 1. Paradigm of the study

Figure 1 shows the conceptual framework of the study wherein researchers used the IPO (Input, Process, Output) model. By using this model, the researchers can show the relationship in each process involved from selecting and gathering data to analyzing, interpreting, and drawing conclusions.

The researchers need inputs or information from the senior high school teachers and learners from different schools, such data are the school's LMS, teachers and students' perception about the features of their current LMS, and their recommendations for their system improvement. In doing so, researchers came up with survey questionnaires that were answered by the selected respondents, process the data gathered by tabulating and analyzing, and lastly is to interpret the data, that is the basis in assessing the LMS and finding what needs to be improved and developed.

## METHOD

This chapter presents the research method used, the respondents, samples and sampling techniques, the research instrument and validation of instrument, data-gathering procedure, and data analysis.

This study applied mixed method with descriptive design in gathering and organizing the data collected. To achieve the research objectives, it is important to consider first who will be the respondents and what are their current LMSs. After gathering enough data about the

respondents, next is designing the survey-questionnaires which are aligned according to the research problems. With the descriptive design approach under quantitative method, researchers will be able to gather and interpret the numerical values collected in assessing the feature of the LMSs in terms of efficiency, accuracy, and customization. While on the other hand, descriptive research design under qualitative will be used to explain the teachers and students' recommendations and suggestions on what to be improved with their current LMSs. The main goal of this research design in the study was to accurately analyze and explain the gathered data and come up with the necessary development in their system.

In this study, the features of the school selected LMS was assessed based on the experience of the users which are the senior high school teachers and students. With their recommendations and suggestions, researchers were able to draw out the improvements and the new features that they wanted to integrate in their system which will make their work more efficient.

The respondents of the study are from various schools whether private, technical, or public that are using either Google Classroom, Schoology, or Moodle as their LMS. Google Classroom was well known to public schools due to its free to use capability using a personal Gmail account. On the other hand, Schoology was widely used to private schools, and Moodle was usually for technical schools.

**Table 1.** Respondents of the Study

LMS	Teachers	SHS Students	Total	Total Number of Respondents
1. Moodle	7	200	207	51
2. Schoology	26	710	736	181
3. Google Classroom	16	267	283	70
Total	49	1177	1226	302

As shown in Table 1, using Slovin's formula, the calculated total number of respondents who were capable to represent the whole 1,226 population in this study was 301 sample. With the used of stratified random sampling, the 301 respondents were divided into three (3) subgroups which are the respondents' current LMS.

#### *Data Gathering Procedure*

After the validation of the instrument, the researchers secured a letter to various administrators to conduct an online survey from the teachers and students in their respective schools. With Slovin's Formula, the researchers believed that this method is the most appropriate in choosing the sample in this study with a 0.05 margin of error and 95% level of confidence. To identify the respondents in each LMS, stratified random sampling was used.

Following the necessary sample and sampling techniques, online survey through Google Forms will be answer by the respondents to evaluate their LMS and come up with recommendations to improve. With the help of a statistician, the data gathered from this study were checked, tallied, and analyzed giving the proper findings and conclusions of the study.

#### *Data Gathering Instruments*

The researchers utilized an online survey questionnaire with a Likert scale model to gather the needed data in this study. The questionnaire comprised the following: demographic profile, teacher's perception in terms of user experience, accuracy, and customization, and student's perception in terms of user experience and accuracy. Lastly, to identify their perception on what needs to be improved on the LMS they are currently using.

#### *Data Analysis*

This study used Likert Scale. Likert Scale is named from an American Social Scientist, Rensis Likert which are widely used in social and educational research. Using this approach, user's perceptions were measured in response to a specific question or statement. Usually, the responses include "strongly agree", "agree", "neutral", "disagree", and "strongly disagree" which have numerical value such as 1=strongly disagree, 2=disagree, and so on. With this, the researchers used a five-point scale in the assessment of the features of the school's LMS with the following ranges for each point.

**Table 2.** Level of Performance

Level of Performance	Verbal Interpretation	Range of Values
5	Strongly Agree	4.50 – 5.00
4	Agree	3.50 – 4.49
3	Neutral	2.50 – 3.49
2	Disagree	1.50 – 2.49
1	Strongly Disagree	1.00 – 1.49

The data gathered through the survey were undergone statistical treatment to have them analyzed and interpreted using frequency counts, percentage, and average mean.

Frequency. The number of times a response was counted to a particular statement or question.

Percentage. Scores were converted into percentage using the formula (1)  $P = \frac{f}{N} \times 100$ , where  $f = \text{frequency}$ , and  $N = \text{number of cases}$ .

Mean. Score will be interpreted to determine the value using a formula, (2)  $x = \frac{\sum X}{N}$ , where  $f = \text{mean}$ ,  $\sum X = \text{the sum of scores}$ , and  $\sum X = \text{the number of cases}$ .

## RESULTS AND DISCUSSION

This chapter has administered the researcher's data presentation. This study aims to assist the features of the Learning Management System (LMS), the basis for improvement for Teachers and Senior High School students. Data were analyzed, and records were reviewed to address the questions presented in the statement of the problem.

Table 3 shows the efficiency of the LMSs as perceived by the teachers, where efficiency was described as the capability of the system to be user friendly and easy to access.

**Table 3.** Teachers' results on the LMS efficiency  
Number of Respondents: Google Classroom = 14, Moodle = 6, & Schoology = 11

LMS	Assessment	Mean	Result	Percentage
Google classroom	It is user friendly.	4	AGREE	86%
	It is very easy to access.	3.71	AGREE	57%
Moodle	It is user friendly.	3.5	AGREE	50%
	It is very easy to access.	3.5	AGREE	67%
Schoology	It is user friendly.	3.91	AGREE	73%
	It is very easy to access.	4.09	AGREE	82%

According to the results in Table 3, fourteen teachers rated Google Classroom as user-friendly, with 86% and a mean of 4. Meanwhile, six teachers rated Moodle's user friendliness in which 50% agreed with a mean of 3.5. Schoology, on the other hand, was assessed by 11 educators. According to the findings, with a mean of 3.91 and 73% of the respondents agreed that it is indeed user friendly. It simply demonstrates that these LMS were user friendly due to their calculated mean, which determines that the user interface, buttons, and navigation of these LMS were simple to use.

Similarly, in Table 2, Google Classroom received 57% and 3.71 mean, Moodle received 67% and 3.5 mean, and Schoology received 82% and 4.09 mean, indicating that the respondents agreed that these LMS were very easy to access due to their web-based nature and, at the same time, these LMS are supported by their own application that can be downloadable on smartphone devices.

Table 4 delivered the results of teacher's perception about their LMS accuracy in terms of accuracy in generating scores using auto checker feature and accuracy in setting deadlines.

**Table 4.** Teachers' results on the LMS accuracy  
 Number of Respondents: Google Classroom = 14, Moodle = 6, & Schoology = 11

LMS	Assessment	Mean	Result	Percentage
Google classroom	It is accurate in generating scores using auto checker.	3.36	AGREE	71%
	It is accurate in setting deadlines or due dates.	3.43	AGREE	64%
Moodle	It is accurate in generating scores using auto checker.	3.33	AGREE	50%
	It is accurate in setting deadlines or due dates.	3	AGREE	50%
Schoology	It is accurate in generating scores using auto checker.	4.18	AGREE	82%
	It is accurate in setting deadlines or due dates.	4.55	STRONGLY AGREE	82%

According to the results in Table 4, eleven teachers rated Schoology as accurate in generating scores using auto checker, with 82% and a mean of 4.18. Meanwhile, six teachers rated Moodle's accurate in generating scores using auto checker in which 50% agreed with a mean of 3.33. Google Classroom, on the other hand, was assessed by 14 educators. According to the findings, with a mean of 3.36 and 71% of the respondents agreed that it is indeed accurate in generating scores using auto checker. It simply demonstrates that these LMS were user friendly due to their calculated mean, which determines that the user interface, buttons, and navigation of these LMS were simple to use.

Similarly, in Table 4, Schoology received 82% and 4.55 mean, Moodle received 50% and 3 mean, and Google Classroom received 64% and 3.43 mean, indicating that the respondents agreed that these LMS were accurate to access due to their web-based nature and, at the same time, these LMS are supported by their own application that can be downloadable on smartphone devices.

Table 5 shows the teachers' perception towards their LMS customization features in terms of creating, setting deadlines, and scheduling of assignments, activities, and assessments, and in uploading and posting

modules, video lessons, and other learning materials.

According to the results in Table 5, eleven teachers rated Schoology as customization in creating assignments, activities, and assessments, with 82% and a mean of 4.18. Meanwhile, 14 teachers rated Google Classroom in creating assignments, activities, and assessments in which 21% agreed with a mean of 3.21. Moodle, on the other hand, was assessed by six educators.

According to the findings, with a mean of 3.33 and 33% of the respondents agreed that it is indeed efficient in creating assignments, activities, and assessments. It simply demonstrates that these LMS were efficient in creating assignments, activities, and assessments due to their calculated mean, which determines that the user interface, buttons, and navigation of these LMS were efficient to use.

Similarly, in Table 5, Schoology received 91% and 4.64 mean, Moodle received 50% and 3.33 mean, and Google Classroom received 36% and 2.93 mean, indicating that the respondents agreed that these LMS were reliable to access due to their web-based nature and, at the same time, these LMS are supported by their own application that can be downloadable on smartphone devices.



**Table 5.** Teachers' results on the LMS customization  
Number of Respondents: Google Classroom = 14, Moodle = 6, & Schoology = 11

LMS	ASSESSMENT	MEAN	RESULT	PERCENTAGE
Google classroom	It is efficient in creating assignments, activities, and assessments	3.21	NEUTRAL	21%
	It is reliable in uploading and posting modules, video lessons, and other learning materials	2.79	NEUTRAL	21%
	It is easy to set deadlines and scheduling of activities, assignments, and assessments	2.93	NEUTRAL	36%
Moodle	It is efficient in creating assignments, activities, and assessments	3.33	AGREE	33%
	It is reliable in uploading and posting modules, video lessons, and other learning materials	3.33	AGREE	50%
	It is easy to set deadlines and scheduling of activities, assignments, and assessments	3.33	AGREE	50%
Schoology	It is efficient in creating assignments, activities, and assessments	4.18	AGREE	82%
	It is reliable in uploading and posting modules, video lessons, and other learning materials	4.36	AGREE	91%
	It is easy to set deadlines and scheduling of activities, assignments, and assessments	4.64	STRONGLY AGREE	91%

Table 6 shows the efficiency of LMS as perceived by the students, whereas efficiency was determined as being user friendly, very easy

to access, submission of outputs, answering assessment, and downloading and watching video lessons at ease

**Table 6.** Learners' results on the LMS efficiency  
Number of Respondents: Google Classroom = 48, Moodle = 45, & Schoology = 170

LMS	Assessment	Mean	Result	Percentage
Google classroom	It is user friendly.	3.92	AGREE	60%
	It is very easy to access.	4.04	AGREE	60%
	It is easy to submit outputs.	3.79	AGREE	56%
	It is efficient to answer assessment.	3.77	AGREE	60%
	It is convenient in downloading and watching lessons.	3.58	AGREE	52%
Moodle	It is user friendly.	3.31	NEUTRAL	31%

	It is very easy to access.	3.22	NEUTRAL	38%
	It is easy to submit outputs.	3.31	NEUTRAL	31%
	It is efficient to answer assessment.	3.18	NEUTRAL	40%
	It is convenient in downloading and watching lessons.	2.89	NEUTRAL	42%
Schoology	It is user friendly.	3.6	AGREE	54%
	It is very easy to access.	3.62	AGREE	55%
	It is easy to submit outputs.	3.58	AGREE	52%
	It is efficient to answer assessment.	3.61	AGREE	55%
	It is convenient in downloading and watching lessons.	3.37	NEUTRAL	35%

According to the results in Table 6, 48 students rated Google Classroom as user-friendly, with 60% and a mean of 3.92. Meanwhile, 170 students rated Schoology's user friendliness in which 54% agreed with a mean of 3.6. Moodle, on the other hand, was assessed by 45 students. According to the findings, with a mean of 3.31 and 31% of the respondents agreed that it is user friendly. It simply demonstrates that these LMS were user-friendly, which determines that the user interface, buttons, and navigation of these LMS were accurate to use.

Similarly, in Table 6, Google Classroom received 60% and 4.04 mean, Moodle received 38% and 3.22 mean, and Schoology received 55% and 3.62 mean, indicating that the respondents agreed that these LMS were very easy to access due to their web-based nature and, at the same time, these LMS are supported by their own application that can be downloadable on smartphone devices.

Table 7. shows learners' evaluation on the accuracy of their LMS in terms of reviewing scores, following the set deadlines, and sending of notifications as reminders.

**Table 7.** Learners' results on the LMS accuracy  
Number of Respondents: Google Classroom = 48, Moodle = 45, & Schoology = 170

LMS	Assessment	Mean	Result	Percentage
Google classroom	It is accurate in reviewing scores.	3.73	AGREE	54%
	It is accurate in following the set deadlines.	3.88	AGREE	60%
	It is accurate in sending notifications for reminders.	3.77	AGREE	54%
Moodle	It is accurate in reviewing scores.	3.09	NEUTRAL	40%
	It is accurate in following the set deadlines.	3.31	NEUTRAL	29%
	It is accurate in sending notifications for reminders.	3.09	NEUTRAL	31%

Schoology	It is accurate in reviewing scores.	3.27	NEUTRAL	42%
	It is accurate in following the set deadlines.	3.76	AGREE	61%
	It is accurate in sending notifications for reminders.	3.29	NEUTRAL	30%

According to the results in Table 7, 48 students rated Google Classroom as accurate in reviewing scores, with 54% and a mean of 3.73. Meanwhile, 170 students rated Schoology's accuracy in reviewing scores in which 42% agreed with a mean of 3.27. Moodle, on the other hand, was assessed by 45 students. According to the findings, with a mean of 3.09 and 40% of the respondents agreed that it is accurate in reviewing scores. It simply demonstrates that these LMS were accurate, which determines that the user interface, buttons, and navigation of these LMS were accurate to use.

Similarly, in Table 6, Google Classroom received 60% and 3.88 mean, Moodle received 29% and 3.31 mean, and Schoology received 61% and 3.76 mean, indicating that the respondents agreed that these LMS were accurate to access due to their web-based nature and, at the same time, these LMS are supported by their own application that can be downloadable on smartphone devices.

In this study, the capabilities of LMS to be efficient and accurate to use, and get personalized according to its admin's preferences, which makes an LMS very dependable, were assessed according to its capable users. Just like any other LMS, each LMS has its own strengths and weaknesses that needs to be look after before using it. Identifying the users' needs must be the priority in choosing the right LMS along with proper trainings and updates.

In a study by Shaharanee, et. al., (2016), Google Classroom was evaluated as an active learning tool. The study showed that it is effective resulting with high results. The LMS was assessed as very easy to access and useful with above the average mean results. The highest was in submitting assignments with a 4.55 mean and the lowest was navigating the system with a mean of 4.24. Similarly in this study, Google Classroom was evaluated as very easy to access with a mean of 4 by the students and 3.71 by the teachers. Although the past study resulted with a high 4.42 mean in terms of grading system, this

study, as perceived by the teachers, was evaluated in an unbiased result in generating grades which is 3.36 but perceived by the students, with a 3.73 mean, as acceptable when reviewing their grades. Teachers may seem to have vague understanding about the capability of the system to auto-check exams and auto-generate grades because not all types of exams can be auto-correct using the system alone it still needs teachers' intervention. In contrast, another study looked at the overall usefulness of Google Classroom in teaching, teachers were neutral due to some issues, seeing it as a minor component of the overall teaching strategy. Some challenges and issues were faced by the students as assessed by their teacher such as for them it has no peer-interaction, it is not user-friendly, WhatsApp is much easier, it is hard to upload and edit materials, etc. (Azhar, et. al., 2018). Unlike in this study, Google Classroom, as evaluated by the teachers and students, was efficient enough in terms of being user-friendly and easy to access with its latest updates. The LMS developers always prefer suggestions from its users for future developments.

Meanwhile, a study conducted to test the effectivity of Moodle, a free open source LMS, in an elementary school using a quasi-experimental design with a pretest-posttest control group. The results showed that there is a significant difference in applying the LMS as part of their learning strategy in which learners have improved their academic results (Rachmadtullah, et. al., 2020). Likewise, this study has concluded that Moodle, as positively perceived by the teachers was efficient, accurate, and customizable enough to be used as part of their online learning with modest enhancements, as their recommendations, such as chat for collaboration. In a similar study, due to the lack of interaction between teachers and students in Moodle, researchers added a collaborative element to the LMS. The results indicated that by incorporating the said feature, it can meet the learning needs of students just like in a traditional classroom. Online collaboration between teachers and students is possible (Cavus, et. al.,

2006). Although, students in this study have just unanimously agreed that various areas should be improved, and new features must be added. One feature that these students desired was notification alerts for reminders, particularly when submitting outputs because there was a high possibility that they would be late, as evidenced by the study of Marikar, et. al., (2016).

In several research, Schoology's efficacy was also assessed. A foreign study showed that Schoology was effective using an experimental research design. Based on the findings, the students' speaking had an improvement according to their pretest and posttest scores while using the system. Students' perception was also good with a calculated result of 3.42 which means that the LMS can be practically used although they struggled in a technical problem in the registration phase (Yuniarti, et. al., 2019). Likewise, another study using quasi-experimental research with 2x2 factorial design showed that Schoology is more effective than Picture Series, another teaching strategy using picture with a sequential series of events, as suggested due to the results of higher mean value (Masyhudianti, et. al., 2018). Comparably in this new study, teachers thought it was acceptable to use it in their schools and it produced good results in their work since results are considerably high in terms of its efficiency, accuracy, and customization features. Although, few enhancements were suggested such as in video conferencing to have live recording, and certain new features, as well, such as attendance monitoring to make it more innovative. Students, on the other hand, acknowledged that it is easy to use, but expressed some skepticism about its veracity, particularly when examining results and sending reminder messages. Students, like teachers, sought to expand the video conferencing function of the platform and add a new feature called chat. Overall, the Schoology's present features were beneficial based on these findings.

As a result of the finding of Lewis, et. al. (2015), LMS is the key to the effectiveness and efficiency of the online course. Instructors need to understand the different components of the LMS and how these components will work to make the course effective and efficient. The LMS should be able to create pedagogically sound course content and learning objects easily and efficiently. It should have all the necessary e-learning tools for assessment, communication, collaboration, and community building, as well

as for the creation and management of online learning courses.

Therefore, the researchers studied and summarized the respondents' suggestions on how to improve and expand the features of their current LMS.

Learners' suggestions for improvement: (1) Video conferencing. Majority stated that it needs improvement because it tends to lag even if they have a stable internet connection; (2) Instant notifications/reminders; (3) User interface; (4) Organize e-learning content locations.

Learners' suggestions for additional features: (1) Educational games; (2) Video filters or screen backgrounds; (3) Built-in timer system. Can be customized according to students' and teachers' needs; (4) Key functions in personal computers must also be available on mobile applications; (5) Chat system.

Teachers' suggestions for improvement: (1) Video conferencing. Can record the live conference but it should not be deleted after days; (2) Accuracy in deadline; (3) Be more user-friendly.

Teachers' suggestions for additional features: (1) Monitoring feature. Add an automatic attendance checker for students attending conferences; (2) Filters in video conferencing; (3) Emojis during video conference.

### **Google Classroom**

Learners' suggestions for improvement: Notifications for reminder

Learners' suggestions for additional features: (1) Search bar/icon; (2) Auto-submit/turn in; (3) Automatic alerts and notifications about activities before the deadline of submission

Teachers' suggestions for improvement: (1) Submission/Resubmission of attached file; (2) Evaluation of answers submitted; (3) Investigate the bugs/errors.

Teachers' suggestions for additional features: (1) Assessment tool. Notification on the facilitator when a student opens another tab while taking assessment; (2) Insert video. Embed educational video wherein learners can directly navigate and watch; (3) Display. Learners and Teachers may adjust the appearance of google classroom from light to dark mode.

### **Moodle**

Learners' suggestions for improvement: Ads should be removed.

Learners' suggestions for additional features: (1) Automated alerts and notifications; (2) Chat; (3)

Teachers' suggestions for improvement: (1) Ads should be removed; (2) Chat system should be simplified; (3) Automatically generate a certificate of completion upon completing all the activities

Teachers' suggestions for additional features: Availability offline.

Based on the study findings, institutions using these three LMS should consider the preferences of its end users, the learners, and the teachers. Given that they have different needs in terms of using the LMS in their respective schools, LMS providers should continue to improve these systems as well as giving attention from instructors, instructional designers, and researchers to achieve their potential as a technological facilitator for student learning.

This study is a great challenge at improving the current state of LMS technology since it provided feedbacks from the respondents' own perception. There are still many challenges that should be examined to come up with an ideal virtual learning system or personalized learning environment that can really satisfy all the needs and uniqueness of each learner or the end users.

## CONCLUSIONS AND SUGGESTION

The study's findings helped understand the three LMSs' differences (Google Classroom, Schoology, and Moodle). This study focused into how professors and students used LMSs. Respondents were not totally satisfied with their current LMS, but they were satisfied enough to use it in their classes despite worries about its efficiency, correctness, and customisation. In order to make their LMSs more effective, collaborative, and productive, respondents suggested adding new features. This study evaluated the LMS's efficiency, accuracy, and customization, and made recommendations for future development.

Schools using Google Classroom, Schoology, or Moodle as their LMS should take advantage of the many capabilities provided to get the most out of these successful and usable systems. The research indicated features and usability difficulties that should be considered when creating and/or evaluating an LMS to achieve a useful and usable system that satisfies users. LMS helps students to stay up-to-date on schoolwork and get fast assignment updates. The LMS allows teachers to communicate with students outside of class and keep them informed about their coursework. While using LMS may

have some drawbacks, it is all part of learning and using a new system. LMS is now obligatory in all schools worldwide.

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