# Utilization of Learning Management System (LMS) and Teachers' Perceived Performance in the Online Learning Modality: A Linear Regression Analysis

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*Abstract*
**Background/Objectives:**
This study aimed to assess the utilization level of Google Workspace for Education as a Learning Management System (LMS) and its effect on the performance of teachers in the online learning environment.

**Methods/Statistical Analysis:**
The research utilized quantitative research approach with a simple linear regression test aimed at explaining whether the utilization of Google Workspace for Education (x) influenced the teachers' performance in the online learning modality (y).

**Findings:**
The correlation coefficient between the utilization level of Google Workspace for Education and teachers' performance in the online learning modality is 0.422 which is according to Cohen (1992), can be interpreted as *moderate correlation.* Furthermore, the relative contribution of the predictor variable to the criterion variable is 17.8%. This means that 17.8% of the teachers' performance in the online learning modality can be attributed to utilization level of the Google Workspace for Education. The p- value of the regression is 0.036 which is lower than the level of significance of 0.05. Therefore, regression is significant.

**Improvements/Applications:**
Trainings on the utilization of the LMS is crucial in the new normal education. In addition, due to the fast- changing digital age, a continuous professional development program is necessary to ensure the effective and efficient use of technology in education.

*Index Terms*
Learning Management System, New Normal Education, Pandemic, Google Workspace for Education, Teachers' Performance

## I. INTRODUCTION

The Coronavirus disease (CoViD-19) pandemic has been quite disruptive to various sectors of each nation. Schools have been closed where the traditional physical interactions complement the pedagogies employed by teachers to ensure learning.

Accordingly, the Department of Education (DepEd) strived to adapt to the new normal setup through the implementation of the Learning Continuity Plan (LCP) which generally aims to: ensure accessible education to every learner in this new learning environment; provide learners

with the necessary tools to deliver the "new normal" mode of education, and secure the health and well-being of the learners and teaching force.

Consequently, due to the risks posed by face to face interaction, the DepEd utilized its Alternative Delivery Mode (ADM) through learning modules to support the continuity of learning for S.Y. 2020- 2021. In addition, flexible learning was promoted as the general learning delivery mode (DepEd, 2021).

Flexible learning offers rich learning choices from the multiple dimensions of study, applies learner- centered constructivist approach which is indicated by a shift from the teacher taking learning responsibilities to the learner taking these responsibilities, and requires learners to be more skilled at self- regulation in terms of goal setting, self- monitoring, self- instruction and self- reinforcement. In a flexible learning environment, teachers promote active learning by creating engaging effective situations (UNESCO, 2020).

Under the flexible learning model, learners and parents choose between online learning and remote printed learning modalities based on their learning needs and socioeconomic conditions. Hence, learners were put under varying learning conditions impactful of their academic achievements. Therefore, pedagogies relevant to the different learning modalities must be utilized by teachers to ensure the attainment of the educational goals of the new normal. The use of self-contained ADM learning modules has been fundamental to the new normal education, especially in the remote printed learning modality. However, online learning, which consists of synchronous and asynchronous set ups, can offer more learning opportunities through the varied techniques available in the internet.

Correspondingly, internet-based Learning Management Systems (LMSs) are popular technologies that have been supporting distance, face-to-face and hybrid/blended educative processes. According to Gautreau (2011), a LMS can be defined as a self-contained webpage with embedded instructional tools that permit faculty to organize academic content and engage students in their study. Likewise, Fathema, Shannon and Ross (2015) pointed out that LMS provide a virtual way of faster communication among students and teachers, and offer speed and effectiveness in educational processes.

Learning Management Systems (LMSs) provide tools and functions like course management tools, online group chats and discussions, documents (lecture materials, homework and assignments etc.), power points, video clips uploading, grading and course evaluations to support teaching and learning. Since, LMS have evolved in a complex way in terms of educational contents, technological resources and interaction possibilities; there is an increasing concern in regard to the quality of the interface and the ways in which tasks are completed in these systems (Freire, Arezes, Campos, Jacobs & Soares, 2012).

Furthermore, the popular use of the Google Classroom, introduced in 2014, as a LMS has provided a basic, easy to use platform (Dash, 2019). Google Classroom is a part of the online Google Apps for Education (GAFE) suite of productivity applications for teachers and students in online learning (Sudarsana1, Putra1, Astawa and Yogantara, 2018). However, on February 17, 2021, Google announced its line of revamped educational- all of the services that used to be packaged in G Suite for Education are now part of Google Workspace for Education (Clark, 2021). Google Workspace for Education includes Docs, Slides, Sheets, Drive, Forms, Jamboard, Classroom, Assignments, Gmail, Meet, Chat, Keep, Calendar and Admin.

Moreover, Dash (2019) found out that through the utilization of the above-mentioned LMS, there was better access to learning material and supplementary teaching resources, helpfulness of immediate feedback, and learning outside of class environment were reported by students.

Preference of mobile phone over laptop to access this LMS was also reported, and its free usage has encouraged greater access to e-learning to limited low and middle income countries.

Apparently, LMSs have been part of the online learning modality implemented in schools in the new normal education. Hence, sufficient knowledge and skills on their utilization are key in ensuring learning continuity despite the challenges. The adaptation of online classes with the assistance of LMSs is undeniably one of the giant leaps in the Philippine education system. However, the question on their effective and efficient use remains.

In light of the pieces of information mentioned above, this study aimed to assess the utilization level of Google Workspace for Education as a Learning Management System (LMS) and its effect on the performance of senior high school teachers in the online learning environment at Hagonoy West District in the Educational District (EDDIS) I of the Schools Division of Bulacan.

The unforeseen shift on the education system may unlock breakthroughs in improving the quality education in our country. Pieces of information about online teaching may lead to other scholars and researchers to further unfold its effectiveness.

## II. STATEMENT OF THE PROBLEM

The general problem of the study is to assess how the utilization of Google Workspace for Education as a Learning Management System (LMS) affect the senior high teachers' performance in the online learning modality?

Specifically, the study sought to answer the following questions:
1. What is the utilization level of Google Workspace for Education as a Learning Management System (LMS) of senior high school teachers at Hagonoy West District, EDDIS I of SDS Bulacan?
2. What is the perceived level of performance of teachers in the online learning modality?
3. What is the association between the utilization of Google Workspace for Education and level of performance of teachers in the online learning modality?
4. What is the relative contribution of the predictor variable to the criterion variable?
5. What pedagogical implications can be drawn from the results of the study?

### Conceptual Framework

The study was based on the conceived relationship between the predictor and criterion variables as presented in the related studies and policy guidelines on the continuing professional development of teachers and utilization of the learning management system.
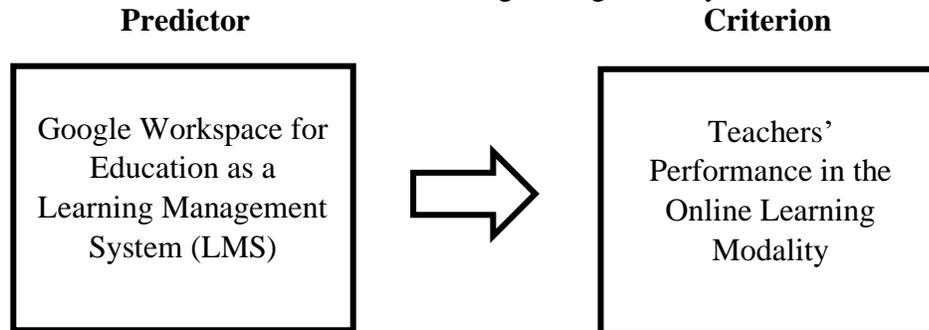
**Predictor**                                    **Criterion**

Google Workspace for Education as a Learning Management System (LMS) → Teachers' Performance in the Online Learning Modality

**Figure 1.** The paradigm emphasizes the association between the utilization of the learning management system (LMS) and level of performance of teachers in the online learning modality.

**Hypothesis**

The null hypothesis was tested at 0.05 level of significance.

The utilization of Google Workspace for Education as a Learning Management System (LMS) has no significant association to the level of performance of teachers in the online learning modality.

## III. MATERIALS AND METHODS

The research utilized quantitative research approach with a simple linear regression test aimed at explaining whether the utilization of Google Workspace for Education (x) influenced the teachers' performance in the online learning modality (y).

The respondents of this study included 25 senior high school teachers at the Hagonoy West District in the Educational District (EDDIS) I of the Schools Division of Bulacan.

The researchers utilized a self-made 14- item questionnaire based on the fundamentals of Google Workspace for Education to determine the utilization of the learning management system of senior high school teachers. On the other hand, a 6- item self-assessment tool based on the Revised Bloom's Taxonomy of Educational Objectives was utilized to determine the teachers' performance in the online learning modality. Furthermore, the two tools featured the 5- point Likert scale.

**Table 1.** SCALING SYSTEM UTILIZED FOR UTILIZATION LEVEL OF GOOGLE WORKSPACE FOR EDUCATION AND TEACHERS' PERFORMANCE IN THE ONLINE LEARNING ENVIRONMENT

| Likert Scale | Instrument Rating for Utilization of Google Workspace for Education | Instrument Rating for Teachers' Performance in the Online Learning Modality | Descriptive Interpretation | Mean Bracket |
|---|---|---|---|---|
| 5 | Always/ Very much aware | Excellent | Very High | 4.50-5.00 |
| 4 | Frequent/ Very aware | Very Good | High | 3.50-4.49 |
| 3 | Moderate/ Aware | Good | Moderate | 2.50-3.49 |
| 2 | Seldom/ Partly Aware | Needs Improvement | Low | 1.50-2.49 |
| 1 | Never/ Not Aware | Poor | Very Low | 1.00-1.49 |

The data gathered in the study were tallied, tabulated, and processed through the computer system using the Statistical Package for Social Sciences (SPSS). To interpret raw scores of the predictor and criterion variables, the equivalents in Table 1 were used.

## IV. RESULTS AND DISCUSSION

This section deals with the presentation, analysis and interpretation of the results of the study on the utilization level of Google Workspace for Education and teachers' performance in the online learning modality.

### A. Descriptions of the Utilization Level of the Google Workspace for Education as a Learning Management System (LMS)

The popular use of the Google Classroom, introduced in 2014, as a LMS has provided a basic, easy to use platform (Dash, 2019). Google Workspace for Education includes Docs, Slides, Sheets, Drive, Forms, Jamboard, Classroom, Assignments, Gmail, Meet, Chat, Keep, Calendar and Admin.

Accordingly, the results of the survey on the Google Workspace for Education showed *high utilization* of the LMS as evidenced by the overall mean score of 4.12.

**Table 2.** DESCRIPTIONS OF THE UTILIZATION LEVEL OF GOOGLE WORKSPACE FOR EDUCATION AS LEARNING MANAGEMENT SYSTEM

| | Indicators | Mean | Descriptive Interpretation |
|---|---|---|---|
| | **Fostering collaboration for more impactful instruction** | | |
| 1 | Collaborate in real time with Docs, Sheets, Slides, Forms, Sites, and Jamboard | 3.96 | **Frequent** |
| 2 | Communicate with learners, educators, guardians, and administrators from anywhere with Google Meet, Chat, and Gmail | 4.68 | **Frequent** |
| 3 | Engage students directly within Classroom to provide clear guidance for doing their best work | 3.64 | **Frequent** |
| 4 | Enable an inclusive learning environment with individual accessibility settings that fit each student's unique learning style | 3.44 | **Moderate** |
| | **Empowering educators and amplifying productivity** | | |
| 5 | Help educators save time with Classroom and Assignments by easily creating courses, organizing classwork, distributing assessments, and sharing rich feedback | 4.48 | **Frequent** |
| 6 | Ensure consistent, transparent grading and feedback with rubrics and a comment bank | 4.48 | **Frequent** |
| 7 | Help educators streamline workloads by posting and scheduling coursework and building to-do lists in Classroom | 4.20 | **Frequent** |
| 8 | Guide original thinking and academic integrity with quick scans to flag citation issues in originality reports | 3.80 | **Frequent** |
| | **Creating a secure foundation for digital learning** | | |
| 9 | Easily add users, manage devices, and configure security and settings so your data stays safe | 5.00 | **Always** |
| 10 | Stay protected on any device, distribute apps on mobile devices, and limit remote access to any endpoint | 5.00 | **Always** |

| | | | | |
|---|---|---|---|---|
| 11 | | Safeguard sensitive data in Gmail and Drive with automated data loss prevention (DLP) | 5.00 | **Always** |
| | | **Meeting rigorous compliance and accessibility standards** | | |
| 12 | What I Know | Retain, hold, search, and export user data for compliance and eDiscovery in Vault | 3.00 | **Aware** |
| 13 | | Use in compliance with numerous requirements and industry standards including FERPA, COPPA, and GDPR | 3.00 | **Aware** |
| 14 | | Reach all types of learners with built-in accessibility tools like closed-caption, Screen Reader, braille readers, screen magnification, and more | 4.00 | **Very aware** |
| | | Overall Mean | **4.12** | **High Utilization** |

Furthermore, among the indicators, those that feature creating a secure foundation for digital learning got the highest mean score of 5.00, which is fundamental in the digital age. "Communicating with learners, educators, guardians, and administrators from anywhere with Google Meet, Chat, and Gmail" also got a high mean score of 4.68, which was interpreted as *very high.* Similarly, Fathema, Shannon and Ross (2015) pointed out that LMS provide a virtual way of faster communication among students and teachers, and offer speed and effectiveness in educational processes.

The indicator with the lowest mean score, rated as *moderate,* was enabling an inclusive learning environment with individual accessibility settings that fit each student's unique learning style. This means that there is an opportunity for professional growth for teachers in providing more inclusive learning environment for learners which is a challenge especially in the new normal education. If properly planned and coordinated, seminar- trainings on the accessibility and inclusiveness of learning approaches can be conducted before the opening of the next academic year.

**B. Descriptions of the Teachers' Performance in the Online Learning Modality**

The revised Bloom's Taxonomy of Educational Objectives provides a framework for determining and clarifying learning objectives. Learning activities often involve both lower order and higher order thinking skills as well as a mix of concrete and abstract knowledge. The cognitive process dimension, utilized in the instrument of the study, represents a continuum of increasing cognitive complexity—from lower order thinking skills to higher order thinking skills.

**Table 3.** DESCRIPTIONS OF THE TEACHERS' PERFORMANCE IN ONLINE CLASSES

| | **Cognitive Process Dimension** | **Mean** | **Descriptive Interpretation** |
|---|---|---|---|
| 1 | **Remember** Retrieve relevant knowledge from long-term memory | 5.00 | **Very High** |
| 2 | **Understand** Construct meaning from instructional messages, including oral, written, and graphic communication | 5.00 | **Very High** |

| 3 | **Apply**<br>Carry out or use a procedure in a given situation | 3.56 | **High** |
|---|---|---|---|
| 4 | **Analyze**<br>Break material into constituent parts and determine how parts relate to one another and to an overall structure or purpose | 3.40 | **Moderate** |
| 5 | **Evaluate**<br>Make judgments based on criteria and standards | 4.00 | **High** |
| 6 | **Create**<br>Put elements together to form a coherent whole; reorganize into a new pattern or structure | 3.44 | **Moderate** |
| | Overall Mean | 4.07 | **High** |

Consequently, the perceived level of teachers' performance is *high* as evidenced by the overall mean score of 4.07. This means that teachers view their performance as sufficient for their learners to attain the required level of proficiency in the online learning environment. Moreover, they exhibit high level of preparedness in handling classes under the new normal education. Since several practices initiated in the new normal may continue even after the pandemic, the training of teacher will prove to be useful in the improvement of the education system, at least based on the standard learning objectives featured above.

Furthermore, among the cognitive process dimensions, "remember" and "understand" have the highest mean scores of 5.00, which were both interpreted as *very high,* as these dimensions represent the lowest order thinking skills. Moreover, it is noteworthy to mention that the other dimensions that require higher order thinking skills were rated as *high to moderate,* ranging from 3.40 to 4.56.

**C. Regression Analysis for the Relationship between the Utilization Leve of Google Workspace for Education and Teachers' Performance in the Online Learning Modality**

After conforming to the assumptions of simple linear regression, the data collected were processed using SPSS. The following sections show the results of the analysis.

Table 4 shows the correlation coefficient between the utilization level of Google Workspace for Education and teachers' performance in the online learning modality. The Pearson correlation is 0.422 which according to Cohen (1992), can be interpreted as *moderate correlation.*

**Table 4.** CORRELATION BETWEEN UTILIZATION LEVEL OF GOOGLE WORKSPACE FOR EDUCATION AND TEACHERS' PERFORMANCE IN THE ONLINE LEARNING MODALITY

| **Correlations** | | | |
|---|---|---|---|
| | | Teacher's Performance in Online Learning Modality | Google Workspace for Education |
| Pearson Correlation | Teacher's Performance in Online Learning Modality | 1.000 | .422 |

| | | | |
|---|---|---|---|
| | Google Workspace for Education | .422 | 1.000 |
| Sig. (1-tailed) | Teacher's Performance in Online Learning Modality | . | .018 |
| | Google Workspace for Education | .018 | . |
| N | Teacher's Performance in Online Learning Modality | 25 | 25 |
| | Google Workspace for Education | 25 | 25 |

Furthermore, the data show that the predictor variable has significant relationship with the criterion variable. Results showed a p- value of 0.018 which is less than the 0.05 level of significance.

Accordingly, various seminar- trainings were conducted for teachers in the Hagonoy West District prior to the opening of classes last October 2020 to ensure learning continuity and relevant pedagogies are employed in different learning modalities for the new normal education. The utilization of LMS had been an important component of training programs as it was found crucial in the performance of teachers in the online learning modality (Perez, Sabaulan & Plete, 2021).

As shown in Table 5, the relative contribution of the predictor variable to the criterion variable is 17.8%. This means that 17.8% of the teachers' performance in the online learning modality can be attributed to utilization level of Google Workspace for Education (from the result of the R square calculations x 100= 0.178 x 100 = 17.8%).

Likewise, Zweig and Stafford (2020) reported that teachers may benefit from professional development, specifically in relation to supporting student perseverance and engagement in online courses.

**Table 5.** REGRESSION ANALYSIS OF VIRTUAL LAC FOR THE NEW NORMAL (X) AND TEACHERS' PERFORMANCE IN ONLINE CLASSES (Y)

| Model Summary[b] | | | | | |
|---|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
| 1 | .422[a] | .178 | .142 | .18982 | 1.534 |
| a. Predictors: (Constant), Google Workspace for Education | | | | | |
| b. Dependent Variable: Teacher's Performance in Online Learning Modality | | | | | |

Still, there is 82.2% of the performance of teachers that can be attributed to other factors aside from the identified predictor variable. Accordingly, Lapada (2020) stated that learning education, the length of teaching experience and specialization are shown to be strongly correlated to readiness in managing distance learning. These factors play important roles in their performance in different modalities including online learning.

**Table 6.** ANOVA TABLE

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | .179 | 1 | .179 | 4.980 | .036[b] |
| | Residual | .829 | 23 | .036 | | |
| | Total | 1.008 | 24 | | | |
| a. Dependent Variable: Teacher's Performance in Online Learning Modality | | | | | | |
| b. Predictors: (Constant), Google Workspace for Education | | | | | | |

The table header reads ANOVA[a].

As shown in Table 6, the p- value of the regression is 0.036 which is lower than the level of significance of 0.05; regression is significant. Therefore, the null hypothesis of no significant association between utilization level of Google Workspace for Education and level of performance of teachers in the online learning modality is rejected.

## V. CONCLUSION AND RECOMMENDATIONS

The study showed that the utilization level of Google Workspace for Education has significant influence on the level of performance of teachers in the online learning modality.

Furthermore, an analysis of the teachers' responses suggests that: (1) trainings on the utilization of the LMS is crucial in the new normal education; (2) due to the fast- changing digital age, continuous professional development program is necessary to ensure the effective and efficient use of technology in education.

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