

Extended Technology Acceptance Model to Examine the Use of Google Forms – based Lesson Playlist in Online Distance Learning

Fritz M. Ferran

De La Salle Santiago Zobel School - Vermosa Campus, Imus City, Philippines,

<https://orcid.org/0000-0003-2964-6019>

Email Correspondence: fritz.ferran@dlszobel.edu.ph

Abstract

Shifting to online distance learning due to the COVID-19 pandemic challenged educators' roles as instructional materials designers. This study aimed to examine the students' acceptance of the teacher-designed e-learning tool called Google Forms-based Lesson Playlist (GF-LP) in a home-based online distance learning environment. This quantitative research analyzed 570 responses from Grades 11 and 12 students at a private school in the Philippines using the partial least squares-structural equation modeling. Results showed that perceived self-efficacy and system quality strongly affect the users' perceived ease of use while perceived ease of use highly influenced the students' perceived usefulness of GF-LP. Facilitating conditions do not affect the users' attitudes towards using the e-learning tool, which confirmed the effective utilization of GF-LP in online distance learning. The relationships between the original constructs of the Technology Acceptance Model (TAM) were also presented. This study recommends the use of GF-LP or its features for remote learning.

Keywords: digital learning technology, extended technology acceptance model, COVID-19, online distance learning, Philippine Senior High School students, PLS-SEM

1.0 Introduction

COVID-19 pandemic challenged educators to adapt teaching online (König et al., 2020) as a response to control the spread of the coronavirus disease (Toquero, 2020). Hence, they need to explore designing online learning tools and appropriate teaching pedagogy to assist their students in online distance learning. Today, designing appropriate instructional materials comes with great ease brought by technological advancements in the digital age of the 21st century ((Fei & Hung, 2016). Digital Learning Technology (DLT) adoption in times like this

addresses the physical limitations of delivering the lessons and allows students to continue learning anytime and anywhere (Mothibi, 2015). Adopting various digital learning technologies into the learning environment helps achieve the desired goals, learning process, and learning outcomes of educational activities (Ozerbas & Erdogan, 2016).

However, DLT adoption poses barriers, especially during online distance learning. According to Panda and Mishra (2007) and Ancho (2020), the teachers perceived that the significant challenges in utilizing DLT include weak internet connection, insufficient training, lack of institutional

policy, and poor instructional design support for e-learning. The majority of the reviewed literature focused on teachers' perceptions of DLT adoption barriers. Thus, there is a need to elicit information periodically from the students to address these barriers to improve digital learning technologies continuously (Adnan & Anwar, 2020). Similarly, Almaiah, Alamri, & Al-rahmi (2019) emphasized that students' acceptance of mobile learning is essential to guarantee online education success. Hence, designing a specific e-learning tool that would address the DLT adoption barriers in an online learning environment is needed. Furthermore, adopting the online distance learning environment can be successful through a significant pedagogical transformation aided by an appropriate e-learning tool that is designed carefully such that it considers the students' realities at home.

In this study, the teachers of the respondents developed a Google Forms-based Lesson Playlist (GF-LP), a self-made e-learning tool that is used to address the digital technology adoption barriers in the first implementation of online distance learning in the Philippines. A sample template of GF-LP was provided to the teachers for uniformity. Thus, this study sought to examine the use of Google Forms-based Lesson Playlist as students' e-learning tool in their different subjects in a home-based online distance learning.

Google Forms – Based Lesson Playlist as a Digital Learning Technology in ODL

The abrupt transition from traditional to online instruction as an emergency response to the pandemic provides an opportunity for a wider acceptance of technology-aided education (Rajab et al., 2020). Digital Learning Technology (DLT) refers to a set of hardware and software devices that allow information and knowledge to be communicated and accessed, distributed, and stored in a digital environment (Mercader & Gairín,

2020), giving students control over the place, time, path, and, or pace (Kashada et al., 2018). These learning technologies include web-based learning systems, active learning classrooms (ALC), social media in the education context, mobile technologies, video conferencing applications, YouTube, and email (Granić & Marangunić, 2019). However, students may experience difficulties utilizing these technologies because they are challenging to navigate and primarily dependent on internet access. Also, too many tools and links might distract them from their primary tasks (Zanjani et al., 2017). Therefore, designing a user-friendly e-learning tool with specific features allowing the students to navigate and easily access the instructional materials freely can positively affect their use and acceptance. Since DLT adoption and utilization are not always successful in students' learning outcomes (Kashada et al., 2018), this study utilized a teacher-designed e-learning tool (e.g., Google Forms-based Lesson Playlist) based on the features of DLT that affect users' acceptance. Table 1 shows the identified characteristics of DLT that affect the user satisfaction and approval of a DLT.

Teachers' efforts to utilize innovative e-learning tools enable online distance learning (ODL) during the COVID-19 pandemic. In this study, the Google Forms-based Lesson Playlist was created considering the features mentioned in Table 1. A lesson playlist is a set of activities in a lesson that includes online links to video lessons, online articles, and interactive game-based activities. It may also include online formative assessments, summative assessments, reading assignments from student textbooks, etc. (Bohol & Prudente, 2020). The lesson playlists used by the respondents of this study have the same template as this example <http://bit.ly/SampleGF-LP>. To ensure familiarity with the e-learning tool (See Table 3), the teachers used Google forms as the canvas to embed their instructional materials.

Table 1. DLT Features Affecting User's Satisfaction

Features of DLT	Source
availability and flexibility, communication, simplicity in learning, portability, cost, and efficiency	Asiimwe and Grönlund (2015)
design factors such as perceived usefulness, appropriate course management tools, and interactivity of the system, perceived ease of use	Zanjani et al. (2017)
familiarity with the technology	Kashada et al. (2018)
system quality, interaction quality, service quality, and platform availability	Chen et al. (2020)

Extended Technology Acceptance Model

Various studies extended the original Technology Acceptance Model (TAM) of Davis (1989) by defining its external variables. These Extended TAMs, which explains the adoption of technology by teachers (Scherer et al., 2020), is a valid model to test different learning technologies (Granić & Marangunić, 2019) and to grasp the attitude of students and teachers towards the use of educational technology (Siyam, 2019). Table

2 shows the external variables employed in the studies utilizing Extended TAMs to examine the use of digital learning technologies.

In this study, system quality, perceived self-efficacy, and facilitating conditions were adopted as the external variables of the Extended Technology Acceptance Model because the features of the Google Forms-based Lesson Playlist (GF-LP) were directly based on them.

Table 2. External Variables of Extended TAM in Studies Assessing DLT Adoption

Source	External Variables
Tarhini et al. (2014)	social norm, self-efficacy
Tarhini et al. (2016)	social norm, quality of work-life, self-efficacy, facilitating conditions
Salloum (2018)	self-efficacy, subjective norm, perceived enjoyment, system quality, information quality, content quality, accessibility, perceived playfulness
Binyamin et al. (2019)	content quality, learning support, visual design, system navigation, ease of access, system interactivity, instructional evaluation, and system learnability
Fearnley & Amora (2020)	system quality, perceived self-efficacy, and facilitating conditions

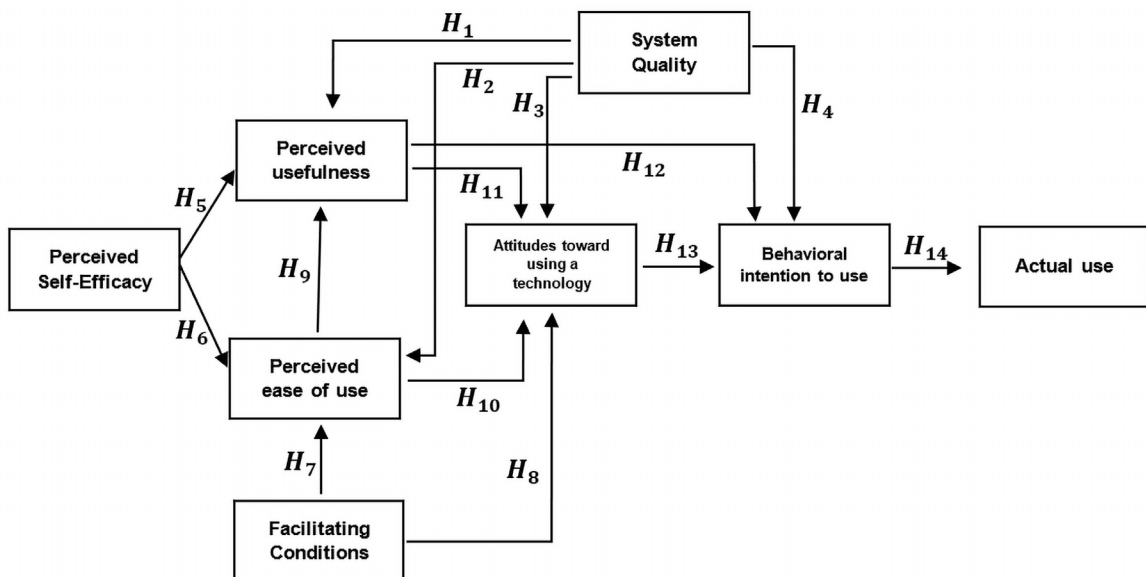


Figure 1. *Extended Technology Acceptance Model for students' acceptance of Google Forms – based Lesson Playlist adopted from Fathema et al. (2015)*

Conceptual Framework and Research Hypotheses

To examine the use of Google Forms-based Lesson Playlist in an Online Distance Learning using the Extended Technology Acceptance Model, the variables in Figure 1 are defined operationally. System quality (SQ) is defined as the satisfaction of the students in using the Google Forms-based Lesson Playlist (GF-LP) in terms of features, content quality, system interactivity and navigation, and adaptability in the ODL context (Binyamin et al., 2019; Fearnley & Amora, 2020). The studies of Fathema et al. (2015); Fearnley and Amora (2020) showed that system quality influences perceived usefulness and ease of use. Nevertheless, they do not support each other on the effect of SQ on attitude towards the use of technology. This study hypothesized that if the students are satisfied with the quality of the e-learning tool, they have positive attitudes towards its use. These attitudes may affect their intention to use this tool in the future.

Facilitating conditions (FC) refer to an individual's perceived enablers that aid technology adoption (Teo et al., 2018). When a user expects assistance and specializes instruction when using technology, it positively affects his/her perceived ease of use and attitude towards using the technology (Fathema et al., 2015; Teo et al., 2018). But this study hypothesized that facilitating conditions do not affect the students' attitude towards using the teacher-designed e-learning tool. Teachers designed the e-learning tool to provide students all the necessary assistance by developing a tool flexible enough to supplement the uncertainties or barriers of the online distance learning environment. This study measured facilitating conditions based on the teacher's assistance to students using the Google Forms-based Lesson Playlist.

According to Fathema et al. (2015), perceived self-efficacy (PSE) is the users' belief in performing the tasks necessary to achieve the required

outcomes. This study shows that teachers' PSE is the predictor of perceived usefulness and perceived ease. When the students can carry out the tasks, they will find the GF-LP valuable and easy to use despite the barriers of digital technology adoption in an online distance learning environment.

Perceived usefulness (PU) was defined by Davis (1989) as "the degree to which a person believes that using a particular system would enhance his or her job performance" (p. 320). Similarly, he defined the perceived ease of use (PEOU) as "the degree to which a person believes that using a particular technology would be free from effort." The systematic literature review conducted by Granić and Marangunić (2019) showed that perceived usefulness and perceived ease of use are the predictors of technology adoption in an educational context emphasizing perceived usefulness as the stronger predictor. In particular, the PU and PEOU directly affect the attitude and the behavioral intention to use the technology (Fathema et al., 2015; Teo & Huang, 2019; Fearnley & Amora, 2020). Their study found that perceived ease of use predicts perceived usefulness. Hence, in this study, it is hypothesized that if the students perceive the GF-LP as easy to use, they will consider this useful. Consequently, this will influence their attitude and intention to use this e-learning tool in future ODL activities despite the barriers of DLTs adoption.

Hence, this study posited the following hypotheses to confirm the results of the previous studies on a self-made e-learning tool called Google Forms-based Lesson Playlist (GF-LP).

H1: System Quality (SQ) directly influences the perceived usefulness (PU) of GF-LP.

H2: System Quality (SQ) directly influences the perceived ease of use (PEOU) of GF-LP.

H3: System Quality (SQ) directly influences the attitude (ATT) towards using the GF-LP.

H4: System Quality (SQ) directly influences the behavioral intention (BI) to use the GF-LP.

H5: Perceived Self-Efficacy (PSE) directly influences the perceived usefulness (PU) of GF-LP.

H6: Perceived Self-Efficacy (PSE) directly influences the perceived ease of use (PEOU) of GF-LP.

H7: Facilitating Conditions (FC) directly influence the perceived ease of use (PEOU) of GF-LP.

H8: Facilitating Conditions (FC) do not affect the attitude (ATT) towards using the GF-LP.

H9: Perceived ease of use (PEOU) directly influences the perceived usefulness (PU) of GF-LP.

H10: Perceived ease of use (PEOU) directly influences the attitude (ATT) towards GF-LP use.

H11: Perceived usefulness (PU) directly influences the attitude (ATT) towards GF-LP use.

H12: Perceived usefulness (PU) directly influences the behavioral intention (BI) to use the GF-LP.

H13: Attitude (ATT) towards the use of GF-LP directly influences the behavioral intention (BI) to use GF-LP.

H14: Behavioral intention (BI) directly influences the actual use (AU) of the GF-LP.

2.0 Methodology

The current study examined the students' utilization of Google Forms-based Lesson Playlist as an e-learning tool in a home-based online

distance learning environment. This study adopted the conceptual and operational definitions of home-based online distance learning from the next-generation digital learning environment (NGDLE) of Brown et al. (2015). It describes the home-based online distance learning environment as a virtual learning space composed of an instructor, students, learning materials, and tools to support self-paced learning.

Participants of the Study

Five-hundred seventy (570) responses were obtained from Grades 11 and 12 students whose subjects utilized Google Forms-based Lesson Playlist as presented in Table 3. The respondents' ages range from 16 to 19 years old. The consent letters were uploaded to the parents' portal and also distributed to the students. The current study used the inverse square root and gamma exponential post-hoc power analysis methods

to calculate the minimum sample size. With the smallest significant path coefficient = 0.133, $\alpha=0.05$, and $1-\beta=0.942$, the minimum sample size was between 568 and 585. Thus, the sample size of this study is sufficient for 94.2 % statistical power.

Table 4 presents the demographic profile of the respondents. There were 253 (44.39%) male and 317 (55.61%) female students whose majority (27.72%) used a combination of tablet, smartphone, and laptop/desktop computer during the home-based online distance learning. The majority of the respondents (91.76%) are moderate to extremely familiar with Google Forms. Approximately 12 percent of the students reported that they were not satisfied with their internet access; a majority (39.47%) were slightly satisfied; 35.61 percent were moderately satisfied; 8.60 percent were very satisfied; and 3.86 percent were extremely satisfied.

Table 3. Number of Responses per subject that uses Google Forms – based Lesson Playlist

Level	Subjects	Responses
G11	Science Enrichment 3	10
	Fundamentals of ABM 1	11
	Personal Development	12
	Understanding Culture, Society & Politics	30
	English For Academic and Professional Purposes	32
	Applied Economics	39
	Pre-Calculus	45
G12	Basic Calculus Enrichment 2	52
	Physical Science	88
	Science Enrichment 3	95
	Mathematics Enrichment 3	156
Total Responses (N)		570

Table 4. Demographic Profile of the Respondents (N = 570)

Variables	frequency	percentage
Sex		
Male	253	44.39
Female	317	55.61
Mobile Learning Device Used		
Tablet	25	4.39
Smartphones	1	0.18
Tablet/smartphones	11	1.93
Laptop/desktop computer	156	27.37
Tablet, laptop/desktop computer	66	11.58
Smartphone, laptop/desktop computer	153	26.84
tablet, smartphones, laptop/desktop computer	158	27.72
Internet access satisfaction		
Extremely satisfied	71	3.86
Very satisfied	225	8.60
Moderately satisfied	203	35.61
Slightly satisfied	49	39.47
Not at all satisfied	22	12.46
Familiarity with Google Forms		
Extremely familiar	378	66.32
Moderately familiar	145	25.44
Somewhat familiar	42	7.37
Slightly familiar	3	0.53
Not familiar at all	2	0.35
Total	570	100.00

Research Instrument

An online survey through Google Forms was utilized for the data collection. The questionnaire has three parts: (1) Introduction - this includes the objectives of the study, informed consent to the participants, and the e-Form Confidentiality; (2) Demographic Profile - this section comprises participant's gender, type of MLD used, level of familiarity in using Google Forms, and internet access satisfaction.; and (3) Survey Questionnaire

- adapted from Fathema et al. (2015) with 28 items all rated using a four-point Likert scale: 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree.

Data Gathering Procedure

The participants of the study answered the online survey questionnaire with the help of their respective subject teachers. The study was conducted during the third term (January 25, 2021

– April 8, 2021) of the academic year when the school adopted the home-based online distance learning to address the limitation of meeting face-to-face brought by the COVID-19 pandemic. The institution approved the conduct of the study following the ethical guidelines in data collection.

Data Analysis

The students' acceptance of the Google Forms-based Lesson Playlist was analyzed by examining the underlying relationships between the Extended TAM variables of Fathema et al. (2015) using the partial least squares-structural equation modeling (PLS-SEM). According to Granić and Marangunić (2019), PLS-SEM is the most commonly used data analysis technique when TAM is involved and becomes the recommended multivariate statistical technique for examining e-learning related research (Lin, H. et al., 2020).

3.0 Results and Discussion

The analysis using PLS-SEM was adopted from Janadari et al. (2018) and performed using WarpPLS Version 7.0. First, the validity and

reliability tests were conducted, followed by the hypothesis tests relevant to the research framework.

Reliability and Validity

Fornell and Larcker (1981) and Kock (2020) suggested that the construct reliability is acceptable if the composite reliability (CR) is greater than ≥ 0.70 and the Cronbach's alpha (CA) is greater than ≥ 0.70 .

Table 5 presents the construct and convergent validity as the construct reliability (CR) and Cronbach's alpha (CA) are at least 0.70 and the factor loadings and AVE are more than 0.50.

The discriminant validity was determined using the Fornell-Larker criterion with the condition that is if the \sqrt{AVE} (diagonal values) is greater than any of the off-diagonal values, then that particular construct is more highly correlated with its items than with the other constructs in the model (Fornell & Larcker, 1981). Since any \sqrt{AVE} shown in Table 6 is greater than any of the off-diagonal values, then discriminant validity was achieved by all the constructs.

Table 5. Factor loadings, AVE, and Reliability of Constructs

Constructs	No. of items	Factor loadings	AVE	CA	CR
System Quality	4	.897 – .925	.911	.932	.951
Perceived Self-Efficacy	3	.844 – .902	.881	.856	.912
Facilitating Conditions	3	.896 - .910	.904	.889	.931
Perceived Usefulness	4	.909 - .934	.921	.940	.957
Perceived Ease of Use	4	.775 - .910	.872	.894	.927
Attitude Towards Using GF-LP	4	.898 - .941	.929	.947	.962
Behavioral Intention	3	.931 - .950	.942	.936	.959
Actual Use	3	.915 - .961	.942	.936	.959

All factor loadings are significant at 0.001 ($p < 0.001$). AVE = average variance extracted; CA = Cronbach's alpha; CR = composite reliability

Table 6. Correlation Coefficients and \sqrt{AVE} values of the constructs

	SQ	PSE	FC	PU	PEOU	ATT	BI	AU
SQ	(.954)							
PSE	.761	(.939)						
FC	.681	.724	(.951)					
PU	.747	.738	.720	(.960)				
PEOU	.727	.739	.707	.770	(.934)			
ATT	.730	.736	.665	.802	.738	(.964)		
BI	.741	.704	.648	.771	.727	.856	(.971)	
AU	.742	.711	.662	.775	.737	.793	.796	(.971)

Note: The square roots of average variances extracted (AVE) of constructs are shown on diagonal. The off-diagonal values are the correlation between constructs. All $p < .001$.

Kock (2020) recommends discussing the quality indices shown in Table 7 to determine if the model shown in the conceptual framework has a better fit. Table 7 shows the six quality indices, namely average path coefficient (APC), average R-squared (ARS), average adjusted R-squared (AARS), average block VIF, average full collinearity VIF (AFVIF), and Tenenhaus goodness of fit (GoF). For the structural model to be fit, APC, ARS, and AARS must be significant. That is, their corresponding p-value must be less than 0.05 (Kock, 2020). Since the coefficients of APC = 0.319, ARS = 0.693, and AARS = 0.691 have p-values less

than 0.05, then the structural model fits with the original data.

Regarding AVIF and AFVIF, their coefficients must have values less than 5 or ideally less than 3.3 (Kock, 2020). Table 6 shows that both coefficients of AVIF and AFVIF are within acceptable ranges. GoF is a measure of the explanatory power of the structural model (Tenenhaus et al., 2005), where it is small if $GoF \geq 0.1$, medium if $GoF \geq 0.25$, and large if $GoF \geq 0.36$ (Kock, 2020). Since $GoF = 0.760$, then the explanatory power of the model is large. Overall, the structural model shown in the research framework is highly acceptable.

Table 7. Model Fit and Quality Indices

Index	Coefficient
average path coefficient (APC)	0.319, $p < 0.001$
average R-squared (ARS)	0.693, $p < 0.001$
average adjusted R-squared (AARS)	0.691, $p < 0.001$
average block VIF (AVIF)	2.805 (acceptable if 5, ideally 3.3)
average full collinearity VIF (AFVIF)	3.782 (acceptable if 5, ideally 3.3)
Tenenhaus goodness of fit (GoF)	0.760 (large if > 0.36)

Table 8. *Extended TAM Parameter estimates for GF-LP*

Hypotheses	β	p-value	SE	f^2	Results
H1: SQ → PU	.289	< .001	.041	.217	Supported
H2: SQ → PEOU	.306	< .001	.040	.223	Supported
H3: SQ → ATT	.192	< .001	.041	.140	Supported
H4: SQ → BI	.214	<.001	.041	.160	Supported
H5: PSE → PU	.232	<.001	.041	.171	Supported
H6: PSE → PEOU	.308	<.001	.040	.228	Supported
H7: FC → PEOU	.276	<.001	.041	.195	Supported
H8: FC → ATT	.056	.089	.042	.037	Not Supported
H9: PEOU → PU	.394	<.001	.040	.305	Supported
H10: PEOU → ATT	.240	<.001	.041	.181	Supported
H11: PU → ATT	.435	<.001	.040	.349	Supported
H12: PU → BI	.133	<.001	.041	.102	Supported
H13: ATT → BI	.595	<.001	.039	.510	Supported
H14: BI → AU	.803	<.001	.038	.645	Supported

Note: f^2 is Cohen's effect size: .02 = small, .15 = moderate, .35 = large; β = path coefficient,

Test of Research Hypotheses

Table 8 shows that the system quality (SQ) has a positive effect on perceived usefulness (PU), perceived ease of use (PEOU), attitude (ATT) towards the use of the Google Forms-based Lesson Playlist (GF-LP), and their behavioral intention to use this e-learning tool. This result implies that a high SQ will result in high PU, PEOU, and ATT towards using the GF-LP. In particular, SQ has a significant moderate effect on the PEOU ($f^2 = 0.223$) and PU ($f^2 = 0.217$), and a small effect on ATT ($f^2 = 0.140$), and BI ($f^2 = 0.160$). This result supports the findings of Fathema et al. (2015), Salloum, et al. (2019), and Fearnley and Amora (2020). SQ proved to be a powerful predictor of students' PEOU of the GF-LP, which implies that designing the e-learning tool considering students' realities during a pandemic helps them utilize the technology with less mental effort. Consequently, they become aware of its usefulness in learning the lessons despite DLT adoption barriers. Furthermore,

PEOU and PU mediate the influence of SQ on ATT, which emphasizes that the desirable features and flexibility of the e-learning tool to adjust to the learning environment assure the positive attitudes towards the use of the digital learning technology during the pandemic. This result confirms Granić and Marangunić (2019) findings that PEOU and PU influence the users' attitudes towards using DLT irrespective of its types, features, and navigation tools. This study also extends that PEOU and PU are significant predictors of the ATT in a different learning environment, which is, in this study, a home-based online distance learning environment.

Table 8 also shows that perceived self-efficacy (PSE) positively affects the PU ($\beta = 0.232$) and PEOU ($\beta = 0.308$). This result means that students' familiarity with digital technology positively and highly influences the ease of use and usefulness of that digital technology. This study reaffirms that students' PSE influences PU and PEOU, which means that the students showed confidence in

using the features and functions of the GF-LP to carry out the required tasks in a home-based online distance learning environment. Similarly, they felt confident in controlling the time and pacing of the lessons with the e-learning tool. This result agrees with the findings of Fathema et al. (2015), Nikou and Economides (2019), and Fearnley and Amora (2020) that PEOU mediates the effect of PSE on PU across different DLTs, users, and learning environment.

Facilitating conditions (FC) significantly affect PEOU ($\beta = 0.276$) but the positive effect on ATT is not significant, $f^2 = 0.037$, $p > 0.05$. This relationship implies that the students' perceived ease of the use of the GF-LP is directly affected by the teacher's support, but this does not influence their attitudes towards using the GF-LP. Consistent with the hypothesis in this study, FC does not affect ATT, which contradicts Fathema et al. (2015) and Teo et al. (2018). This difference may be due to a different learning environment and digital learning technology. This study confirms that the GF-LP is a useful e-learning tool during home-based online distance learning since the students' attitudes towards using the playlists were not affected by the facilitating conditions. The possible reason could be that the teachers designed the e-learning tool so that the students can work independently on their activities. With this result, the use of Google Forms-based Lesson Playlist is an effective e-learning tool during home-based online distance learning.

PEOU positively and significantly affects ATT and PU, and consequently, PU positively affects both ATT and BI. These findings suggest that when there is a high value on PEOU, the students perceived high usefulness in the GF-LP, which leads to a high impact on their attitudes and behavioral intentions to utilize it. This study reports that PEOU and PU are strong predictors of accepting the GF-LP, consistent with the TAM-related studies (Granić & Marangunić, 2019). In particular, PU

significantly mediates the effect of PEOU on the students' attitudes towards the use of GF-LP in a home-based ODL environment. When the students feel that the e-learning tool is easy to use, useful in acquiring the course's competencies, and relevant in increasing their productivity despite the pandemic, they have positive attitudes and intentions to use that e-learning tool. Perceived usefulness is the most vital determinant of the student's attitude towards the use of GF-LP, consistent with the findings of Teeroovengadam et al. (2017), Granić and Marangunić (2019), and Fearnley and Amora (2020). This result showed that PU is consistently the robust determinant of technology acceptance in different countries and users, various digital learning technologies, and diverse learning environments. The strong positive effect of the students' attitudes to their behavioral intentions towards GF-LP use consequently proves the effective utilization (AU) of the GF-LP. In conclusion, the GF-LP adoption in a home-based online distance learning environment during the COVID-19 pandemic was successful.

ATT positively influences BI, and in turn, BI positively and significantly affects the actual use (AU) of GF-LP. The high effect of ATT on BI ($f^2 = 0.510$) led to a stronger behavioral intention to use the GF-LP and consequently positively affects the technology's actual use ($f^2 = 0.645$).

4.0 Conclusion and Recommendation

This study utilized the Extended Technology Acceptance Model by Fathema et al. (2015) to examine the use of Google Forms-based Lesson Playlist (GF-LP) as an e-learning tool in a home-based online distance learning. Perceived self-efficacy (PSE) and system quality (SQ) have the most substantial effect on users' perceived ease of use (PEOU) while PEOU strongly influences digital learning technology's perceived usefulness (PU). Facilitating conditions (FC) have a small

impact on PEOU but no significant effect on the students' attitudes towards using the Google Forms-based Lesson Playlist. This result implies that when educators carefully design a digital learning technology (DLT) addressing its adoption barriers, the students can independently use that technology without difficulty while they increase their productivity in accomplishing the tasks with less assistance from the teacher. This study also found out that PU highly influences the students' attitudes towards using GF-LP compared to SQ and PEOU. The positive and high effect of ATT on the students' behavioral intentions (BI) to use GF-LP and the similar effect of BI on the actual use of GF-LP imply that the use of GF-LP during online distance learning was favorable to the students.

This study contains limitations that open opportunities for future studies. The constructs used in examining students' acceptance of technology were adopted from Fathema et al. (2015). Hence, this study highly recommends future researchers explore other Extended TAM constructs in users with different cultures Hanif et al., 2018, different ages and education levels (Putra, 2019), and various learning environments. The current research also suggests conducting a longitudinal survey (Salloum et al., 2019) and a mixed-method approach (Fearnley & Amora, 2020) to provide a deep understanding of the power of Extended TAM constructs.

Conflict of Interest

None.

Ethical Clearance

The institution approved it.

References

- Adnan, M., & Anwar, K. (2020). Online learning amid the COVID-19 pandemic: Students' perspectives. *Journal of Pedagogical Sociology and Psychology*, 2(1), 45-51. <https://doi.org/10.33902/JPSP>.
- Almaiah, M. A., Alamri, M. M., & Al-rahmi, W. (2019). Applying the UTAUT model to explain the students' acceptance of mobile learning system in higher education. *IEEE Access*, 7, 174673–174686. <https://doi.org/10.1109/ACCESS.2019.2957206>
- Ancho, I. (2020). Graduate education during COVID-19 pandemic: Inputs to policy formulation in the new normal. *Recoletos Multidisciplinary Research Journal*, 8(2), 87-105. <https://doi.org/10.32871/rmrj2008.02.07>
- Asiimwe, E. N., & Grönlund, Å. (2015). MLCMS actual use, perceived use, and experiences of use. *International Journal of Education and Development Using Information and Communication Technology*, 11(1), 101–121. <https://files.eric.ed.gov/fulltext/EJ1061487.pdf>
- Binyamin, S. S., Rutter, M. J., & Smith, S. (2019). Extending the Technology Acceptance Model to understand students' use of learning management systems in Saudi higher education. *International Journal of Emerging Technologies in Learning*, 14(3), 4–21. <https://doi.org/10.3991/ijet.v14i03.9732>
- Bohol, D. O., & Prudente, M. S. (2020, January 10-12). *Using lesson playlist through schoology-based Flipping The Classroom (FTC) approach in enhancing STEM students' performance in General Biology 1* [Conference session]. The 11th International Conference on E-Education, E-Business, E-Management, and E-Learning, Osaka, Japan. <https://doi.org/10.1145/3377571.3377588>

- Brown, M., Dehoney, J., & Millichap, N. (2015). *The next generation digital learning environment: A report on research* [ELI Paper]. <https://library.educause.edu/resources/2015/4/the-next-generation-digital-learning-environment-a-report-on-research>
- Chen, T., Peng, L., Jing, B., Wu, C., Yang, J., & Cong, G. (2020). The impact of the COVID-19 pandemic on user experience with online education platforms in China. *Sustainability*, *12*(18), 7329. <https://doi.org/10.3390/SU12187329>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319–340. <https://doi.org/10.2307/249008>
- Fathema, N., Shannon, D., & Ross, M. (2015). Expanding the Technology Acceptance Model (TAM) to examine faculty use of Learning Management Systems (LMSs) in higher education institutions. *MERLOT Journal of Online Learning and Teaching*, *11*(2), 210–232. https://www.researchgate.net/publication/281842180_Expanding_The_Technology_Acceptance_Model_TAM_to_Examine_Faculty_Use_of_Learning_Management_Systems_LMSs_In_Higher_Education_Institutions
- Fearnley, M.R., & Amora, J. T. (2020). Learning management system adoption in higher education using the extended technology acceptance model. *IAFOR Journal of Education*, *8*(2), 89–106. <https://doi.org/10.22492/ije.8.2.05>
- Fei, V. L., & Hung, D. (2016). Teachers as learning designers: What technology has to do with learning. A view from Singapore. *Educational Technology*, *56*(4), 26–29. https://www.researchgate.net/publication/306080401_Teachers_as_Learning_Designers_What_Technology_has_to_do_with_Learning_A_View_from_Singapore#:~:text=It%20proposes%20that%20as%20a,the%20mastery%20of%20subject%20knowledge
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39. <https://doi.org/10.1177/002224378101800104>
- Granić, A., & Marangunić, N. (2019). Technology acceptance model in educational context: A systematic literature review. *British Journal of Educational Technology*, *50*(5), 2572–2593. <https://doi.org/10.1111/bjet.12864>
- Hanif, A., Jamal, F. Q., & Imran, M. (2018). Extending the Technology Acceptance Model for use of e-learning systems by digital learners. *IEEE Access*, *6*, 73395–73404. <https://doi.org/10.1109/ACCESS.2018.2881384>
- Janadari, M. P. N., Ramalu, S. S., & Wei, C. C. (2018). Measurement of organizational citizenship behaviour; reliability and validity in Sri Lankan context. *Kelaniya Journal of Human Resource Management*, *13*(1), 1-9. <http://doi.org/10.4038/kjhrm.v13i1.45>
- Kashada, A., Li, H., & Koshadah, O. (2018). Analysis approach to identify factors influence digital learning technology adoption and utilization in developing countries. *International Journal of Emerging Technologies in Learning*, *13*(2), 48–59. <https://doi.org/10.3991/ijet.v13i02.7399>

- Kock, N. (2020). *WarpPLS 7.0 user manual : Version 7.0*. https://www.scriptwarp.com/warppls/UserManual_v_7_0.pdf
- König, J., Jäger-Biela, D. J., & Glutsch, N. (2020). Adapting to online teaching during COVID-19 school closure: Teacher education and teacher competence effects among early career teachers in Germany. *European Journal of Teacher Education*, 43(4), 608-622. <https://doi.org/10.1080/02619768.2020.1809650>
- Lin, H. M., Lee, M. H., Liang, J. C., Chang, H. Y., Huang, P., & Tsai, C. C. (2020). A review of using partial least square structural equation modeling in e-learning research. *British Journal of Educational Technology*, 51(4), 1354-1372. <https://doi.org/10.1111/bjjet.12890>
- Mercader, C., & Gairín, J. (2020). University teachers' perception of barriers to the use of digital technologies: The importance of the academic discipline. *International Journal of Educational Technology in Higher Education*, 17(4). <https://doi.org/10.1186/s41239-020-0182-x>
- Mothibi, G. (2015). A meta-analysis of the relationship between e-learning and students' academic achievement in higher education. *Journal of Educational and Practice*, 6(9), 6–10. <https://www.iiste.org/Journals/index.php/JEP/article/view/21025>
- Nikou, S. A., & Economides, A. A. (2019). Factors that influence behavioral intention to use mobile-based assessment: A STEM teachers' perspective. *British Journal of Educational Technology*, 50(2), 587–600. <https://doi.org/10.1111/bjjet.12609>
- Ozerbas, M. A., & Erdogan, B. H. (2016). The effect of the digital classroom on academic success and online technologies self-efficacy. *Educational Technology and Society*, 19(4), 203–212. <https://eric.ed.gov/?id=EJ1115665#:~:text=This%20study%20aimed%20to%20observe,efficacy%20of%207th%20grade%20students.&text=However%2C%20it%20has%20been%20shown,'%20online%20technologies%20self%2Defficacy>
- Panda, S., & Mishra, S. (2007). E-Learning in a Mega Open University: Faculty attitude, barriers, and motivators. *Educational Media International*, 44(4), 323–338. <https://doi.org/10.1080/09523980701680854>
- Putra, I. D. G. R. D. (2019). The evolution of Technology Acceptance Model (Tam) and recent progress on technology acceptance research in E-Learning: State of the art article. *Yavana Bhasha : Journal of English Language Education*, 1(2), 25–37. <https://doi.org/10.25078/yb.v1i2.724>
- Rajab, M. H., Gazal, A. M., & Alkattan, K. (2020). Challenges to online medical education during the COVID-19 pandemic. *Cureus*, 12(7), e8966. <https://doi.org/10.7759/cureus.8966>
- Salloum, S. A. (2018). *Investigating students' acceptance of E-learning system in higher educational environments in the UAE: Applying the extended Technology Acceptance Model (TAM)* [Master's thesis, The British University in Dubai]. The British in Dubai Digital Repository. <https://bsp.space.buid.ac.ae/handle/1234/1150>
- Salloum, S. A., Qasim Mohammad Alhamad, A., Al-Emran, M., Abdel Monem, A., & Shaalan, K. (2019). Exploring students' acceptance of e-learning through the development of

- a comprehensive technology acceptance model. *IEEE Access*, 7, 128445–128462. <https://doi.org/10.1109/ACCESS.2019.2939467>
- Scherer, R., Siddiq, F., & Tondeur, J. (2020). All the same or different? Revisiting measures of teachers' technology acceptance. *Computers & Education*, 143, 103656. <https://doi.org/10.1016/j.compedu.2019.103656>
- Siyam, N. (2019). Factors impacting special education teachers' acceptance and actual use of technology. *Education and Information Technologies*, 24(3), 2035–2057. <https://doi.org/10.1007/s10639-018-09859-y>
- Tarhini, A., Elyas, T., Akour, M. A., & Al-Salti, Z. (2016). Technology, demographic characteristics and e-learning acceptance: A conceptual model based on extended technology acceptance model. *Higher Education Studies*, 6(3), 72-89. <https://doi.org/10.5539/hes.v6n3p72>
- Tarhini, A., Hone, K., & Liu, X. (2014). Measuring the moderating effect of gender and age on e-learning acceptance in England: A structural equation modeling approach for an extended technology acceptance model. *Journal of Educational Computing Research*, 51(2), 163-184. <https://doi.org/10.2190/EC.51.2.b>
- Teeroovengadam, V., Heeraman, N., & Jugurnath, B. (2017). Examining the antecedents of ICT adoption in education using an Extended Technology Acceptance Model (TAM). *International Journal of Education and Development Using Information and Communication Technology*, 13(3), 4–23. <https://files.eric.ed.gov/fulltext/EJ1166522.pdf>
- Tenenhaus, M., Vinzi, V. E., Chatelin, Y. M., & Lauro, C. (2005). PLS path modeling. *Computational Statistics & Data Analysis*, 48(1), 159-205. <https://doi.org/10.1016/j.csda.2004.03.005>
- Teo, T., & Huang, F. (2019). Investigating the influence of individually espoused cultural values on teachers' intentions to use educational technologies in Chinese universities. *Interactive Learning Environments*, 27(5–6), 813–829. <https://doi.org/10.1080/10494820.2018.1489856>
- Teo, T., Huang, F., & Hoi, C. K. W. (2018). Explicating the influences that explain intention to use technology among English teachers in China. *Interactive Learning Environments*, 26(4), 460–475. <https://doi.org/10.1080/10494820.2017.1341940>
- Toquero, C. M. (2020). Challenges and opportunities for higher education amid the COVID-19 pandemic: The Philippine context. *Pedagogical Research*, 5(4). <https://doi.org/10.29333/pr/7947>
- Zanjani, N., Edwards, S. L., Nykvist, S., & Geva, S. (2017). The important elements of LMS design that affect user engagement with e-learning tools within LMSs in the higher education sector. *Australasian Journal of Educational Technology*, 33(1), 19–31. <https://doi.org/10.14742/ajet.2938>