

EXPLORING THE FACTORS AFFECTING GRADE 12 STUDENTS' ACCEPTANCE OF TECHNOLOGY-ASSISTED LEARNING

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ABSTRACT. *Adopting technology-assisted learning has become increasingly common in the Philippines, where the educational system has changed to emphasize flexible learning. However, despite the potential benefits, challenges hinder the widespread adoption of these applications. Using a descriptive-correlational design, the study examines the degree to which technology is acceptable concerning the significant factors that affect students' learning. Using the framework of the extended Technology Acceptance Model (TAM2), the factors considered were perceived usefulness, perceived ease of use, and behavioral acceptance. 198 Grade 12 STEM academic strand students from the Malaybalay City, Bukidnon schools participated in this study during 2022–2023. A self-administered questionnaire was used to collect data. The findings show that behavioral acceptance, perceived usefulness, and perceived ease of use all have high acceptance levels. The variables perceived usefulness and perceived ease of use did correlate, as do behavioral acceptability and perceived ease of use. These factors significantly influence student learning. These results offer insightful suggestions for improving the curriculum in the context of flexible learning. Additionally, it guides increasing students' perceptions of the value of technology integration and the perceived usability and behavioral acceptance of this technology-assisted learning.*

Keywords: Technology-assisted learning; flexible learning; perceived usefulness, perceived ease of use, behavioral acceptance; descriptive-correlational design; Malaybalay City, Bukidnon; technology integration for flexible learning

1. INTRODUCTION

Technology has become an essential component of modern society, and its use is expanding rapidly in all sectors, including education. Embarking on a journey of educational evolution, integrating Information and Communication Technology (ICT) into classroom settings has unfurled as a progressive force. Its purpose is to effortlessly nurture instruction and illuminate the path of student learning [1]. The significance underscores in light of the COVID-19 pandemic technology in education, with the shift to online learning as an alternative method of instruction. Mobile devices and laptops have become essential in this new learning environment [2]. Technology provides several advantages, including low cost, portability, and adaptability, making it desirable and usable in learning [3]. Successful technology integration in the classroom requires time, customization, experimentation, and support [4]. Teachers play a vital role in integrating technology into the classroom and need help and training in effectively using technology for teaching and learning [3]. The intricate utilization of technology has established a profound connection with a broader array of factors that exert substantial influence over academic outcomes. These factors encompass not only family socioeconomic considerations but also the socio-emotional aspects of the students [3]. This study aims to identify the acceptance and benefits of utilizing technology in flexible learning setups for senior high school students in Malaybalay City. The outcome of this quantitative study will help students understand and appreciate the importance and advantages of accepting technology as a tool in flexible or hyper-flexible learning modalities [5, 6].

Statement of the Problem

This study uses the Technology Acceptance Model to investigate the level of acceptability of technology in grade 12 senior high school students in the school year 2022-2023. This study seeks to answer the problem question in terms of the following:

1. What is the level of acceptability of technology in Grade-

12 Senior High School students in terms of (a) perceived usefulness, (b) perceived ease of use, and (c) behavioral acceptance.

2. Is there a significant relationship across the following factors: (a) perceived usefulness, (b) perceived ease of use, and (c) behavioral acceptance.

2. FRAMEWORK OF THE STUDY

The study seeks to identify the acceptance and benefits of utilizing technology in flexible learning setups for senior high school students. It adapts the Technology Acceptance Model (TAM). TAM is a widely used theory that explains how users accept and use technology [7]. The model proposes that perceived usefulness and ease of use are the two main factors influencing users' acceptance of technology. The perceived utility is the extent to which a user believes that using technology will improve their performance; perceived ease of use measures the extent to which the student believes that utilizing technology will be simple [8]. The supporting theories for the present study include the Diffusion of Innovation Theory and the Unified Theory of Acceptance and Use of Technology. The Diffusion of Innovation Theory describes how new insights, products, and technologies propagate throughout a social system [9]. Combining elements of TAM and other theories, the Unified Theory of Acceptance and Use of Technology explains user behavior and technology acceptance [10].

The model proposes that perceived usefulness and ease of use are the two main factors influencing users' acceptance of technology [7]. The conventional TAM depicts the technology acceptance behaviors of individuals as a processual mechanism that begins with their technology acceptance attitude. Norms are created by normative beliefs and compliance motivation [12]. Venkatesh and Davis (2000) proposed an extended technology acceptance model (TAM 2) that now considers external social factors and behavioral intentions to use new technology. TAM has used the Theory of Reasoned Action (TRA) and the Social Cognitive Theory (SCT) as a theoretical basis to find the links between

perceived usefulness, perceived ease of use, the user's attitude, intention, and actual technology behavior [13]. The theory of planned behavior states that senses guide all activities. Based on this theory, any action must first be preceded by a person's choice to perform or not to perform a specific behavior [14].

[15] Al-Emran et al. (2018) found that perceived usefulness, perceived ease of use, and attitude toward technology significantly influenced students' acceptance of technology in the classroom [12]. In another study [16], Alzahrani and Alghamdi (2021) found that perceived usefulness and perceived ease of use significantly influenced students' acceptance of technology in higher education [15]. The TAM model was modified and extended to include external social factors and behavioral intentions to use new technology, making it a more comprehensive model for predicting technology acceptance [11]. However, the model has limitations, such as not accounting for external factors influencing technology acceptance, such as social norms, organizational culture, and individual differences [12].

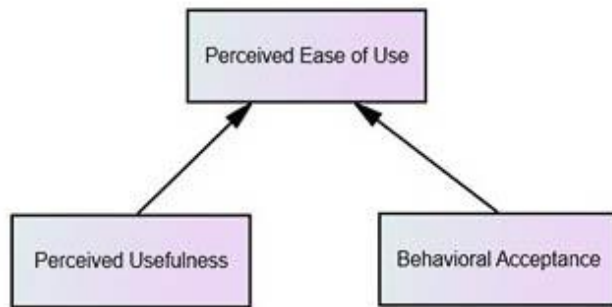


Figure 1: The Technology Acceptance Model 2 shows the parameters of the study

3. METHODOLOGY. MATERIALS AND METHODS

3.1. Research Design, Participants, and Instruments

This study presents the design, the research locale, the study's participants, sampling, the research instrument, the scoring procedure, and the administration of the instrument. This study examined the level of acceptability in the students regarding the new mode of learning. A descriptive-correlational research design was used. It investigated the level of acceptability in the students in using the technology in the new mode of learning. The mean and standard deviation of the questionnaire results were used to compute the levels of acceptability of technology. The study was conducted in various public and private schools during the school year 2022-2023 in Malaybalay City, Province of Bukidnon, Northern Mindanao, Philippines.

The participants were 150 Grade-12 senior high school students under the Science, Technology, Engineering, and Mathematics (STEM) strand in the school year 2022-2023. They came from Bukidnon State University, Bukidnon National High School, Casisang National High School, San Isidro College, and Malaybalay City National Science High School.

Instrumentation was based on the Technology Acceptance Model 2 (TAM), developed by Venkatesh and Davis (2000). The 21 items of TAM 2 regarding perceived usefulness, perceived ease of use, and behavioral acceptance will be subject to reliability tests. The participants have indicated whether they agree or disagree with the statement using a five-point Likert scale as 5 = strongly agree, 4 = agree, 3 = neither (neutral), 2 = disagree, and 1 = strongly disagree. The questions in the instrument have either a positive or negative statement. Reverse coding was used to score the negative items.

Description of the means for the 5-point Likert Scale used to investigate students' level of acceptability of technology as presented in the scoring procedure in Table 1:

Table 1. Scoring

Scale	Range	Description	Qualitative Descriptors
5	4.20 – 5.00	Strongly Agree	Very high acceptability level
4	3.40 – 4.19	Agree	High Acceptability level
3	2.60 – 3.39	Neutral	Undecided
2	1.80 – 2.59	Disagree	Low Acceptability Level
1	1.00 – 1.79	Strongly Disagree	Very Low Acceptability Level

The researcher has obtained a recommendation letter from the office of the principal of the Bukidnon State University Secondary School Laboratory for the conduct of the study. Once approved, a letter was attached and sent to the various school heads or principals in the public and private high schools in the Division of Malaybalay who offer the Science, Technology, Engineering, and Mathematics (STEM) strand in the school year 2022-2023.

The researchers will administer the instrument from October 2022 to November 2022. Before administering the instrument, there will be a proper orientation; the goals and importance will be clearly explained to the participants to get a valid and reliable result. The distribution of modified questionnaires by technology acceptance model (TAM) will be given after the proposal for the technology acceptance model.

The Technology Acceptance Model (TAM) instruments used include perceived usefulness, perceived ease of use, and behavioral intention, which predict technology acceptance [15]. The notion of perceived usefulness is the degree to which a student believes that integrating technology will enhance academic capabilities, whereas perceived ease of use refers to the degree to which a user believes that using technology will be uncomplicated [16]. Behavioral intention refers to the user's intent to use technology [17]. The TAM model was modified and extended to include external social factors and behavioral acceptance of new technology, making it a more comprehensive model for predicting technology acceptance.

4. RESULTS AND DISCUSSIONS

The results and discussion section presents the study's findings, including the study's limitations, and suggests areas for future research.

Table 2. Technology Acceptance Level in terms of Perceived Ease of Use

Perceived Ease of Use	Mean	SD	Qualitative Description
1. I can clearly interact with technology.	4.28	0.7201	Very High Acceptability
2. Learning with technology has been easy.	4.27	0.7974	Very High Acceptability
3. I understood how technology interacts.	4.23	0.7449	Very High Acceptability
4. I became skillful with the use of technological tools and devices.	4.13	0.7668	High Acceptability
5. I can easily use technology in any task given.	4.08	0.7865	High Acceptability
Overall	4.20	1.1116	Very High Acceptability

Table 2 presents the acceptance level of TAM in terms of perceived ease of use, having scores in the items above the rating of 4. It indicates that students find it easy to interact with technology, learn with it, understand how it interacts, become skillful with using technological tools and devices, and use technology in any task [18]. These results are consistent with previous TAM research, predicting technology acceptance in various contexts, including education [19]. TAM indicates the level of technology acceptance and usage and has identified two primary constructs that signify technology acceptance: perceived usefulness and perceived ease of use. However, the study also found that external factors such as social norms, organizational culture, and individual differences can influence technology acceptance [20]. The COVID-19 pandemic has highlighted the importance of technology in education, with the shift to online learning as an alternative method of teaching [21]. Adopting technology in education is challenging because of poor infrastructure, inadequate technology, and insufficient technological tools. Teachers play a crucial role in integrating technology into the classroom and can influence students' acceptance and engagement with technology-assisted learning [22].

Table 3 presents the results of technology acceptance regarding the perceived usefulness among grade 12 senior high school students, as measured by specific items. The mean scores for the items were all above 4, indicating that students perceived technology as enabling them to accomplish learning tasks more quickly (mean = 4.32, SD = 0.7312), making their learning activities easier to perform (mean = 4.28, SD = 0.7598), improving the quality of their learning outputs (mean = 4.15, SD = 0.7722), allowing them to perform other tasks beyond studying (mean = 4.10, SD = 0.8525), and providing better control over their learning activities (mean = 3.80, SD = 0.9232).

These findings are consistent with previous research that has used the Technology Acceptance Model (TAM) to predict technology acceptance. TAM identifies perceived usefulness is one of the primary constructs influencing users' acceptance of new technologies [23]. Studies have shown that perceived usefulness positively influences users' attitudes toward technology and their intention to use it [24]. The positive perception of technology's usefulness in this study supports the notion that technology integration in education

can enhance learning outcomes and provide students with various benefits.

Table 3. Technology Acceptance Level in terms of Behavioral Acceptance

Perceived Usefulness	Mean	SD	Qualitative Description
1. Enabled me to accomplish learning tasks more quickly.	4.32	0.7312	Very High Acceptability
2. Made my learning activities easier to perform.	4.28	0.7598	Very High Acceptability
3. Improved my quality of learning outputs.	4.15	0.7722	High Acceptability
4. Made me perform other tasks beyond studying.	4.10	0.8525	High Acceptability
5. Provided me better control over my learning activities.	3.80	0.9232	High Acceptability
6. I have met my desired expectations in learning.	3.72	0.8482	High Acceptability
7. Made me more productive.	3.70	0.9108	High Acceptability
Overall	4.01	0.8648	High Acceptability

Table 4 presents the technology acceptance in terms of behavioral acceptance of technology among grade 12 senior high school students, as measured by specific items. The mean scores for behavioral acceptance items were all above 3, indicating that students found working with technology enjoyable (mean = 4.39, SD = 0.7379), admirable (mean = 4.31, SD = 0.7146), and believed that other tools could be used aside from the provided technology (mean = 4.24, SD = 0.7668). However, the study also found difficulties in learning to use technology, with some students finding it challenging to become proficient in using technological tools and devices (mean = 3.91, SD = 0.809). Additionally, some students reported that technology was not always used appropriately (mean = 3.85, SD = 0.8331), and there were complaints about the services of technology (mean = 2.57, SD = 0.9412) [18].

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These findings align with previous research that has examined the impact of technology in education and its influence on users' acceptance and usage [25]. The positive perception of technology's usefulness suggests that students recognize its potential to enhance their learning experience, improve their productivity, and enable them to perform various tasks beyond studying.

Table 4 provides correlation coefficients between the factors. It shows that those with *p*-values less than 0.01 demonstrate a strong correlation, except between behavioral acceptance and

perceived usefulness, i.e., with a *p*-value greater than 0.05. The perceived usefulness and ease of use correlate highly, indicating that students use technology in their classes as they can interact with it.

Table 4. Technology Acceptance Level in terms of Behavioral Acceptance.

Behavioral Acceptance	Mean	SD	Qualitative Description
1. Working with technology has been enjoyable.	4.39	0.7379	Very High Acceptability
2. The use of technology has been admirable.	4.31	0.7146	Very High Acceptability
3. Other tools can be used aside from the provided technology.	4.24	0.7668	Very High Acceptability
4. There is a high level of proficiency in learning how to use technology.	3.91	0.809	High Acceptability
5. The technology was used appropriately.	3.85	0.8331	High Acceptability
6. The work performance is done more quickly even without using technology.	3.34	0.9189	High Acceptability
7. There has been difficulty in learning how to use the technology.	2.93	1.1403	Moderate Acceptability
8. There has been difficulty in learning how to use the technology.	2.71	1.0101	Moderate Acceptability
9. Users were complaining about the services of technology.	2.57	0.9412	Moderate Acceptability
Overall	3.58	1.1116	High Acceptability Level

According to these findings, students' expectations of the usefulness and simplicity of a technological tool predict both their intention to use it and their actual frequency of using it. Meaningful, desired, and usable technology integration in the classroom is more likely to be adopted by students (e.g., [26]).

Table 5

TAM Factors	Correlation	<i>p</i> -value
Perceived Ease of Use vs. Behavioral Acceptance	0.222	0.002
Perceived Usefulness vs. Perceived Ease of Use	0.484	0.000
Behavioral Acceptance vs. Perceived Usefulness	0.114	0.110

5. CONCLUSION

This study indicates that learners in Grade 12 have a high acceptance of technology in terms of perceived usefulness and perceived ease of use, which are important indicators of their intent and attitude toward using technology (Table 1). In addition, the students find technology simple to use and can interact with other students, and this will enhance educational outcomes and employ technology integration into the classroom as it is already an educational component today (Table 2). Nonetheless, the students yet to have a high acceptability level in Behavioral Acceptance

regardless of having a difficult time adjusting to technology for educational activities and their services, and it is typically warmly regarded by students (Table 3). Yet, they can learn and work quickly, leading to a change in behavior since they are interacting with gadgets. According to the findings, there is no correlation between perceived utility and behavioral acceptance of technology. In increasing students' use behavior, it is necessary to alter their perceptions of technological platforms since the perceived utility of a tool directly promotes positive behavioral intention to use it.

Administrators may reassess students' preferences for utilizing technology to advance students' digital skills, as this could serve as a way to identify students who are not into technology. Furthermore, the institution's authorities should enable students to participate in skill competitions, especially those that employ technology. Instructors of ICT or MIL courses may receive additional instruction to improve the innovation of their instructional strategies. Moreover, school administration may take into account the use of technology in a variety of academic disciplines. Students can use technology to have a broad range of online information and materials provided. Since technology has made some activities active, quicker, and more straightforward for students, it contributes to maintaining interest and improves learning. Students utilize technology for leisure and unrelated activities; as a result, it can help them with engagement, communication, opportunities for hands-on learning, and the development of their technological abilities. With easy-to-access information, future student researchers may explore more in the use of technology to accelerate learning. Future researchers can use our study as a supporting study relating to technology acceptance and a data source to have it as a reference of findings for correlation through perceived usefulness, perceived ease of use, and behavioral acceptance of TAM 2, Table 5.

6. ACKNOWLEDGMENT

The researcher expresses her heartfelt thanks to all the student- respondents for their favorable response and to all the principals who have contributed much to this study.

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