

BACHELOR OF ARTS IN MULTIMEDIA STUDIES
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**ANALYZING THE ACCEPTANCE OF COLLABORATIVE LEARNING TOOLS
AMONG ONLINE STUDENTS USING THE TECHNOLOGY ACCEPTANCE
MODEL**

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10 September 2024

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ANALYZING THE ACCEPTANCE OF COLLABORATIVE LEARNING TOOLS AMONG ONLINE STUDENTS USING THE TECHNOLOGY ACCEPTANCE MODEL

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Acceptance Page:

This paper prepared by **BILLONES, JIA P.** with the title: “**Analyzing the Acceptance Of Collaborative Learning Tools Among Online Students Using Technology Acceptance Model**” is hereby accepted by the Faculty of Information and Communication Studies, U.P. Open University, in partial fulfillment of the requirements for the degree Course.

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Biographical Sketch

Jia Paladin Billones is a 22-year-old student taking a Bachelor of Arts in Multimedia Studies at the University of the Philippines Open University. She is the youngest of three siblings. To acquaintances, friends, and family, she is Ji, Yang, Jiji, or Bunso. She is free-spirited, always curious, and enthusiastic. In her free time, she enjoys discovering new things, places, and experiences. More importantly, she appreciates art in any form, sense, and way.

She completed her pre-kindergarten up to junior high school with Honors at Our Lady of Lourdes Catholic School. Subsequently, she completed her senior high school with Honors at Caloocan National Science and Technology High School. For more than a decade ago, she found herself taking time to edit photos with no academic relation. Years later, she spent time trying out writing, crafting, and painting. Afterward, she found herself drawn to capturing moments through photography. She is finishing formalizing all the bits and pieces she enjoyed in her senior year.

More than completing her degree at the University of the Philippines Open University, she also participated in extracurriculars that continuously enhanced her technical and creative skills. She attended Video Editing and Graphics Designing/Photo Editing Seminars at the University of Perpetual Help (Molino, Cavite), Gender Sensitivity Training at the University of the Philippines Open University (Massive Open Distance eLearning), Girls in ICT Day Philippines and ASEAN Girls in ICT Policy Summit at Department of Information and Communications Technology (Pasig, Metro Manila), and K-Internet Business Management at Halla University (Wonju, Gangwon Province).

Acknowledgment Page

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Dedicated to:

All my fellow online students

This study aims to answer the stereotypes that distance education is subpar, inferior, and less demanding than a traditional university. This study aids in recognizing what needs to be improved and focuses on collaborative learning tools, as distance education requires a more reliable platform. Understanding this situation is one step closer to achieving a better and more accessible education for all students regardless of gender, age, socioeconomic status, or physical abilities.

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Abstract

Information and Communication Technologies, such as collaborative learning tools, were used in educational institutions to alleviate geographical restrictions and facilitate easier collaboration in education. This study used the Technology Acceptance Model (Davis, 1989) to investigate the relationship between online students and their use of collaborative learning tools using a semi-structured survey questionnaire using Google Forms. A convenience sampling technique was used to identify the target participants, and the data from the 67 respondents were analyzed using a combination of data analysis methods. Results showed that online students' Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude Toward Using (AT), and Behavioral Intention to Use (BI) positively influence each component that predicts and confirms the Actual Usage (AU) of collaborative learning tools. Among the six types of collaborative learning tools, the most used is communication, and the least used is consensus building. For advantages, three themes were established from the online students' responses: workflow, usability, and social. For disadvantages, there are four themes established from the responses of online students: workflow, technical, usability, and none. There are concerns regarding the accessibility and usability of the general collaborative learning tools. This study recommended investigating the workflow and usability concerns about using collaborative learning tools as it further understands the user experience (UX) and Human-Computer Interaction (HCI), as not all students can keep up before developing learning technologies that guarantee their future usage.

Chapter 1

INTRODUCTION

Background of the Study

Information and communication technologies, such as collaborative learning tools, were used in educational institutions to alleviate geographical restrictions and facilitate easier collaboration in essential educational activities in an online setting. In the 21st century, collaboration is one of the 4Cs learning skills to possess. Such skills significantly influence us not only as students but also prepare students to succeed in future endeavors since the ability to work in groups is a requirement for the workplace in this modern day (Lowes, 2014). Raja and Nagasubramani (2018) mentioned that ICT increased education access, allowing collaborative and cooperative learning even mediated by distance. Furthermore, ICT developments resulted in products such as collaborative learning tools that alleviate geographical restrictions and facilitate easier collaboration in education.

Even before the advent of COVID-19, the continuous advancements of the Internet and technology, in general, changed people's lifestyles. Gilbert (2015) highlighted that the prominence of technology access has contributed to the shift in the education sector. It changed teaching and learning approaches as education is no longer confined to physical classrooms (Ramo & Caampued, 2020).

Just like any other tool, collaborative learning tools intend to enhance the experience. Conversely, this notion varies from student to student, depending on their abilities and background. This study aims better to understand online students' perceptions of collaborative learning tools.

Statement of the Problem

This study used the Technology Acceptance Model to investigate the acceptance and use of collaborative learning tools among online students and analyze the relationship between the Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Attitude Towards Usage (AT), Behavioral Intention (BI), and Actual Usage (AU) of collaboration tools among online students. Specifically, this study aimed to answer the following questions:

1. What are the socio-demographics of the online students in this research?
2. What are the Online students' Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Attitude Towards Usage (AT), Behavioral Intention (BI) and Actual Usage (AU) of Collaborative Learning Tools?
3. What is the relationship between online students' Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Attitude Towards Usage (AT), Behavioral Intention (BI) and Actual Usage (AU) of Collaborative Learning Tools?
4. What is the actual usage of collaborative learning tools among online students?
5. What are the perceived advantages and disadvantages of collaborative learning tools among online students?

Significance of the Study

Education Sector. Students will be better understood regarding technology adoption upon utilizing TAM. Institution-wise, this study can be a basis for whether to give free services to their students, such as these collaborative learning tools.

Multimedia Industry. Ease of Use and Usefulness are highly related to User Experience (UX) and Human-Computer Interaction (HCI). This study can be a foundation for designing and developing such technologies.

Future Researchers. There is no evidence of a study that evaluates the acceptance of collaborative learning tools using the Technology Acceptance Model (TAM) with the five mentioned determinants. Existing related studies assess online collaborative tools only in one aspect. Current studies mainly cater to the viewpoints of instructors, professors, and faculty.

Scope and Limitations of the Study

This study explored online students' perception of collaborative learning tools using the modified Technology Acceptance Model (TAM) by Davis (1989). Considering that the Technology Acceptance Model (TAM) had a numerous variation applied to different contexts, it was necessary to note that this study focused on the following variables: Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude Towards Usage (AT), Behavioral Intention (BI), and Actual Usage (AU).

Moreover, this study utilized open-ended questions to deepen the understanding of online students' usage of collaborative learning tools, their perceived advantages and disadvantages and preferences. Given the vast selection of collaborative learning tool types, this study gathered the frequently used collaboration tools for communication, project management, resource management, ideation and co-creation, consensus building, and presentation and archiving.

The research targeted online students in the Philippines, specifically from the University of the Philippines Open University. This population has the most exposure

to online learning, considering the university's nature as a fully online campus in the country.

In general, this study used quantitative and qualitative approaches to provide an in-depth insight into users' perceptions of collaborative learning tools. This research hopes to be valuable to the education sector and multimedia industry as they continuously converge and evolve.

Chapter 2

REVIEW OF RELATED LITERATURE

Online Learning in the 21st Century

Online learning is synonymous with web-based education, e-learning, and distance education but is generally defined as a bridge for student-teacher interaction through web-based technologies (Singh & Thurman, 2019). The study of Elango et al. (2008, as cited in Ayu, 2020) highlights that the Internet is the only way to pass through barriers regarding access to education. Applying these technologies allows students to learn anything, anytime, anywhere – accurately depicting a 21st-century learner.

Collaborative learning is one of the essential activities in a conventional classroom that is now feasible online. Gilbert also revealed that students who are accomplishing general activities already face challenges when they are done online. Thus, working in groups online is more susceptible to hindrances as it involves more than two elements: other students and their constraints. Despite the challenges, online learning tools alleviate such situations. According to the study of Robinson et al. (2017), there are innate benefits and challenges to these online learning tools, but the key is understanding the proper usage. Another study by Donelan and Kear (2023) has a similar stance on utilizing the right learning tool to address an issue for an effective group project.

Collaborative Learning Tools Used

Concerning online learning tools, Wardlow & Harm (2015) revealed collaborative activities performed online, such as editing, discussion, brainstorming, data collection, and task management, alongside its example resource tools. The

study by Sawant (2021) categorized these types of tools into 11 classifications, from brainstorming to content development. Another classification of online collaborative tools is introduced into five categories: video conferencing, collaborative writing applications, digital whiteboards-cork boards, wikis, and social bookmarking (Rhoads et al., 2018). As Carnegie Mellon University (2009) discussed the collaboration tools, it also mentioned the following types: communication (virtual meetings, video conferencing, discussion boards, etc.), project management (task management, time tracking, calendaring, etc.), resource management (file storage, access management, social bookmarking, etc.), ideation & co-creation (concept mapping, virtual whiteboards, real-time collaborative editing, etc.), consensus building (polling, question management, process archiving, etc.), and presentation & archiving (webinars, slideshows, hosted media sharing, etc.) All these studies identified and classified online learning tools used for collaboration. Overall, the types and exemplification of the online learning tools mentioned above will be the basis for further investigation of their relationship with online students from the University of the Philippines Open University (UPOU).

The abovementioned studies explore the identification, classifications, opportunities, and challenges of online collaborative learning tools. However, there are existing studies related to online collaborative learning tools that focus on other areas. An example is from Hernández-Sellés et al. (2019), which highlights the relationship between interaction, emotional support, and computer-mediated tools. Similarly, Qureshi et al. (2021) investigated learning performance and its relationship with collaborative learning through social factors such as interaction with peers and instructors, social presence, and social media usage.

Existing related studies assess online collaborative tools only in one aspect. Current studies mainly cater to the instructors', professors', and faculty's viewpoints. Robinson et al. suggested gathering more diverse participants to enhance the transferability since it only utilized four female instructors. Studies by Al-Rahmi et al. (2014), Sun et al. (2017), and Ansari and Khan (2020) focused on social media platforms as a new domain for collaborative learning. Unlike this study, it aims to investigate other collaborative learning tools, which is a significant contribution as it widens the coverage. It is similar to Hernández-Sellés et al.'s suggestion for future research: establishing larger constructs such as learning contents, learning styles, students' satisfaction, students' perceived learning, and students' expectations.

Technology Acceptance Model (TAM) by Davis (1989)

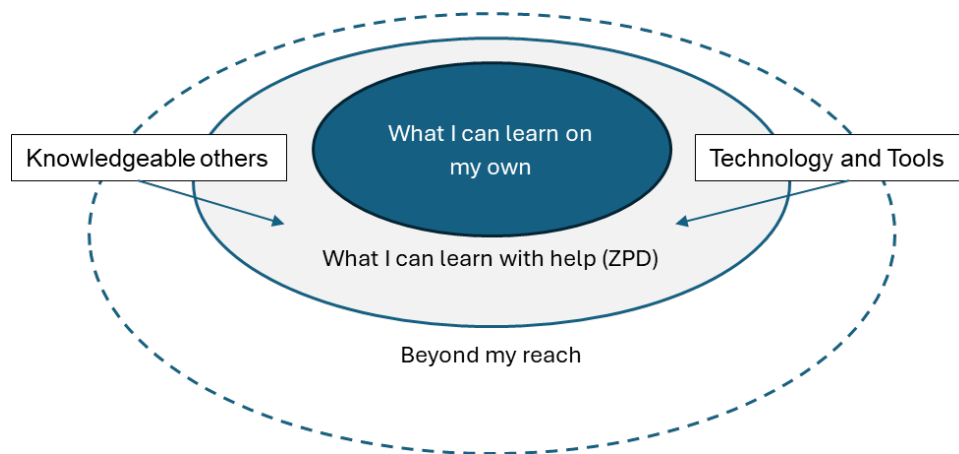
Studies on understanding collaborative learning tools in distance education also utilized the Technology Acceptance Model. Davis (1989) described this model as predicting user intention towards technology. It also covers determining perception regarding specific technology usage. Although there are several modifications and newer versions, the original model investigates the primary determinants, Perceived Ease of Use (PEOU) and Perceived Usefulness (PU), that affect an individual's intention to use a new technology. Perceived Ease of Use (PEOU) refers to users' effort towards the technology. Perceived Usefulness (PU) denotes how the user believes that using the technology introduced improves performance. Other constructs include Attitude Towards Usage (AT), which captures the emotion or sentiment of users; Behavioral Intention (BI), which measures the cognitive likelihood to act; and Actual Usage (AU), which shows the final and observable outcome of technology usage. Granić and Marangunić (2019) highlighted the determinants of Perceived

Ease of Use (PEOU) and Perceived Usefulness (PU) indeed affect the acceptance of learning through a certain technology as studied in 71 primary papers between 2003 and 2018. Baharin et al. (2015) utilized the Technology Acceptance Model (TAM) to analyze the effectiveness of Interactivity Distance Education Web Learning (IDEWL) as an Education Web Learning platform with a modification of an additional variable, system interactivity. Also, a study by Cheung and Vogel (2013) utilized the same model for collaborative technologies, specifically Google Applications. Wu & Chen (2017) focused on the relationship between the determinants of students and Massive Open Online Courses (MOOCs), which resulted in positive and negative influences with strong and weak associations. This study attempts to understand acceptance from online students' perspectives at the University of the Philippines Open University (UPOU).

Theoretical Framework

The Social Development Theory of Lev Vygotsky is one of the most prominent theories used in learning, specifically, understanding mediated learning. Social Development Theory suggests that social interaction is essential to cognitive development. It emphasized that social contribution enables enriched learning by establishing a common ground for people (or learners). The study of Wardlow and Harm utilized this theory to understand how digital tools overcome barriers to enhance collaborative learning in classrooms. In this sense, collaboration directly impacts better functioning cognitive. The following figure presents the Zone of Proximal Development and Scaffolding Theory related to Social Development Theory. It denotes the ease of learning for more learners with knowledgeable people and technology/tools (McLeod, 2023).

Figure 1. Vygotsky's Zone of Proximal Development (ZPD) and Scaffolding

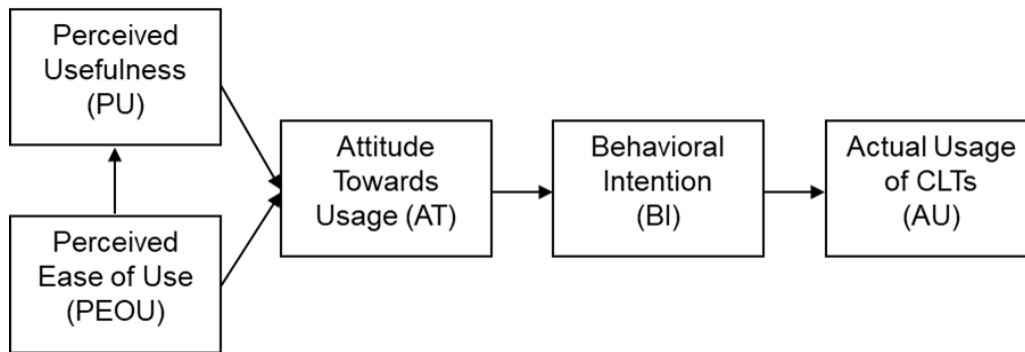


Another theory used is Joseph Walther's Social Information Processing Theory from Ramo and Caampued's study. It highlights how individuals develop interpersonal skills online (Walther, 2015). Interpersonal skills are vital tools for collaboration. This theory becomes more relevant since this study evaluates collaboration in an online environment using online learning tools.

Conceptual Framework

This study employs the Technology Acceptance Model by Davis (1989). Generally, the Technology Acceptance Model is an influential and frequently used model to analyze individuals' acceptance through their perception of an information system (Chaudhari, 2023). Davis (1989) enumerated the determinants in the Technology Acceptance Model: Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude Towards Usage (AT), Behavioral Intention to use (BI), and Actual Usage (AU). In this study, the following illustrates the relationship between the mentioned determinants that affect the acceptance of online students on Collaborative Learning Tools (CLTs):

Figure 2. Technology Acceptance Model (TAM) (Davis, 1989)



Operational Definition of Terms

Perceived Ease of Use (PEOU). It is the degree to which users find collaborative learning tools free from effort. It affects the Perceived Usefulness (PU) and Attitude toward usage (AT) of the mentioned technology.

Perceived Usefulness (PU) is the degree to which users find collaborative learning tools beneficial. It affects the Attitude toward usage (AT) of collaborative learning tools.

Attitude Toward Usage (AT) is the users' feelings toward using collaborative learning tools. It affects the behavioral intention of use and can be positive or negative.

Behavioral Intention (BI) is the likelihood of using or not using collaborative learning tools in the future. It also affects actual usage, leading to acceptance of the mentioned tools.

Actual Usage (AU) reflects the degree to which users use collaborative learning tools, including the frequency.

Collaborative Learning Tools (CLTs) are online tools that extend students' collaborative learning and help them accomplish a particular task. They include various technologies used in computer, mobile, and web-based applications and environments that foster learning.

Communication CLTs cover a wide range of types. This tool establishes the connection between users and includes applications that provide services for users in virtual meetings, video conferencing, discussion boards, and more.

Project management CLTs are responsible for the logistics and workflow of the work. These tools perform task management, time tracking, calendaring, and more for users.

Resource Management CLTs manage the products used for work. This tool provides services for file storage, access management, social bookmarking, etc.

Ideation and co-creation CLTs facilitate most of the students' desired output. Concept mapping, virtual whiteboards, and real-time collaborative editing are examples of this tool.

Consensus-building CLTs and ideation and co-creation provide a platform for devising one solution to a problem. This type of tool accommodates polling, questions, process archiving, etc.

Presentation & Archiving CLTs give a platform to showcase and store the students' finished products after they have been planned, monitored, and created. This tool includes webinars, slideshows, hosted media sharing, etc.

Chapter 3

METHODOLOGY

Research Design

This study utilized Technology Acceptance Model (TAM) (Davis, 1989) to determine the online students' acceptance and use of collaborative learning tools. It also analyzed the relationship between the Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Attitude Toward Usage (AT), Behavioral Intention (BI), and Actual Usage (AU) of collaboration tools among online students. It determined the perception of online students of the advantages and disadvantages of collaborative learning tools.

Research Instrument

This study used a semi-structured survey questionnaire using Google Forms to determine the online students' acceptance and use of collaborative learning tools and the relationship between their Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Attitude Towards Usage (AT), Behavioral Intention (BI), and Actual Usage (AU) of collaboration tools among online students. There were seven sections for the research instrument. Section I showed the overview of the research project and data privacy. Section II contained the demographic attributes of respondents, such as name, age, year, classification, and program. Section III presents collaborative learning tools and their types to provide context to respondents, such as communication, project management, resource management, ideation and co-creation, consensus building, and presentation and archiving tools. Section IV contained the modified questions from the Technology Acceptance Model. Section III consisted of 18 items to measure Perceived Ease of Use (PEOU) with four items,

Perceived Usefulness (PU) with four items, Attitude Towards Usage (AT) with four items, Behavioral Intention (BI) with three items, and Actual Usage (AU) with three items. Section V composed the seven questions, retrieved the specific usage of respondents for collaborative learning tools ranking, and mainly used applications/websites for each type. Section VI contained two open-ended questions about the advantages and disadvantages of using collaborative learning tools. Overall, the research instrument had a total of 27 questions.

Units of Analysis

The respondents for this study were 67 undergraduate students from the University of the Philippines Open University.

Sampling

This study used the convenience sampling technique.

Data Gathering Activities and Procedures

The following were the steps to gather data from online students at the University of the Philippines Open University:

1. Questionnaire. The first task was to draft a questionnaire following the Technology Acceptance Model (TAM). The research adviser's suggestions, revisions, and finalization of the questionnaire were crucial to validating the instrument. After approval, the researcher input the questionnaire and the consent agreement into Google Forms.
2. Distribution. The researcher sent the survey questionnaire to different platforms accessible by the University of the Philippines—Open University (UPOU)

students. These included direct and group conversations on social networking sites, MyPortal messaging, and e-mail.

3. Monitor. After distribution, the researcher continued to monitor the participation of the respondents. A total of 67 responses were received.

Data Analysis

After gathering the data from the 67 respondents, the data were analyzed. This study used descriptive, correlation, reliability, and content analysis to analyze online students' acceptance of collaborative learning tools. The researcher utilized Microsoft Excel for descriptive statistics analysis, IBM SPSS Statistics software for reliability and correlation analysis, and QDA Miner for qualitative content analysis.

Descriptive Analysis. Section I of the questionnaire allowed participants to respond about their age, gender, year, and program. This study utilized descriptive statistics through frequency distribution to gain an overview of the sample's demographics.

Correlation Analysis. The researcher applied Pearson correlation analysis to evaluate the variables' correlation. Aburbeian et al. (2022) reiterated that the correlation coefficients vary as follows: weak relation ($0.3 < r < 0.5$), moderate relation ($0.5 < r < 0.7$), and strong relation ($0.7 < r < 0.9$). It is possible to gain a negative or a perfectly negative relation ($r \geq -1$), zero relation ($r = 0$), and a perfectly positive relation ($r \leq 1$).

Reliability Analysis. More than the qualitative validation from the research adviser, reliability analysis further validated the modified TAM questionnaire. Cronbach's Alpha (1951) is a method to measure the reliability of the instrument construct. Tavakol and Dennick (2011) mentioned that 0.70 to 0.95 (or 0.90) are acceptable Alpha values. An

item with a 0 score shows low internal consistency to other questions within a category, and too high a score means redundancy. Whether too low or too high, omitting these items increases the instrument's reliability.

Qualitative Content Analysis. Section VI of the research instrument contained open-ended questions that recalled the perceived advantages and disadvantages of collaborative learning tools for online students. The approach for this analysis was to systematically categorize the text within their similarities and patterns from the responses (Shava et al., 2021). The qualitative content analysis process, as described by Kleinheksel et al. (2020), has four steps: identify units of meaning, label them with codes, group similar instances under a category, and describe the categories into one theme.

Chapter 4

RESULTS AND DISCUSSION

A. Socio-demographic Characteristics of the Respondents

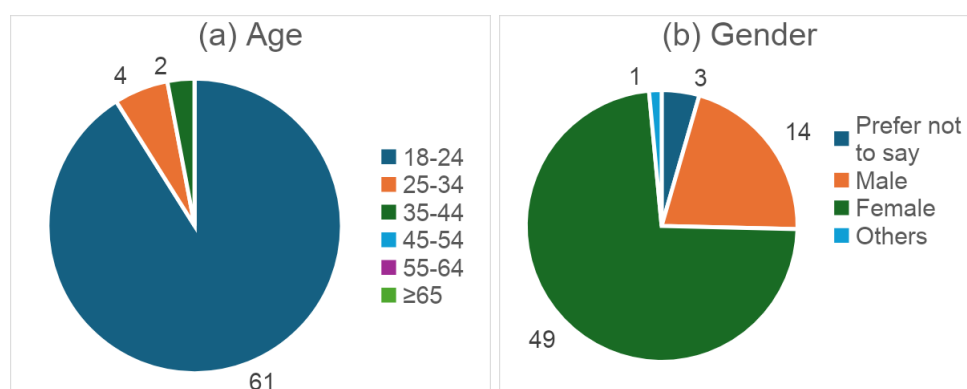
Age

Figure 3 showed that out of the 67 students, 61 (91.04%) were aged 18 to 24. Four (4 or 5.97%) were 25 to 34. Two (2 or 2.99%) were 35 to 44. None of the respondents were 45-54, 55-64, or 65 and above.

Gender

Results showed that 49 out of 67 (73.13%) are female, comprising most respondents, while 14 (20.90%) are male and come second. Three (3 or 4.48%) prefer not to say their gender. Moreover, one (1 or 1.49%) indicated others and specified it as bisexual.

Figure 3. Socio-demographic Characteristics of the Respondents

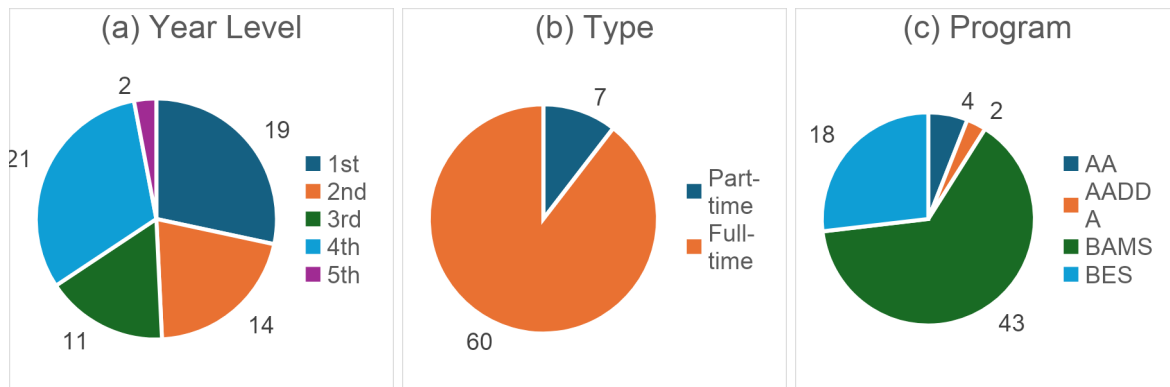


Educational Profile

Results showed in Figure 4 that many of the respondents (31.34%) were from the fourth-year level, 28.36% from the first year, 20.90% from the second year, 16.42% from the third-year level, and 2.99% were from the fifth-year level. Results also showed

that most students (89.55%) are full-time students. In addition, more than half of the students (64.18%) are from BAMS, 26.87% from BES, 5.97% from AA, and 2.99% from AADDA.

Figure 4. *Education Profile of Respondents*



B. Online Students' Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Attitude Towards Usage (AT), Behavioral Intention (BI), and Actual Usage (AU) of Collaborative Learning Tools

This study utilized descriptive analysis to determine the online students' Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Attitude Towards Usage (AT), Behavioral Intention (BI), and toward Actual Usage (AU) of Collaborative Learning Tools. The questionnaire used a seven-point Likert Scale (Strongly Disagree = 1 to Strongly Agree = 7 to determine the PEOU, U, AT, and BI and (Never = 1 to Always = 7) to determine AU. Results in Table 1 presented the descriptive statistics for each statement from the different variables.

1. Students' Perceived Ease of Use (PEOU) of Collaborative Learning Tools

Data in Table 1 showed that online learners somewhat agreed with the statements "My interaction with collaborative learning tools is clear and

understandable,” with a mean value of 5.8995, “I find collaborative learning tools easy to use,” with mean 5.8507, “Learning to use collaborative learning tools would be easy for me,” with a mean value of 5.8358, “It would be easy for me to find information on collaborative learning tools,” data showed a 5.7015 mean. This suggested that all the respondents perceived using collaborative learning tools free from effort exertion.

2. Students’ Perceived Usefulness (PU) of Collaborative Learning Tools

Table 1 showed that online learners agree with the statements “I find collaborative learning tools useful in my education,” with a mean value of 6.4776, and “Using collaborative learning tools would enable me to accomplish tasks more quickly,” with a 6.0299 mean. However, online students only somewhat agree with “Using collaborative learning tools would improve my academic performance,” with a mean value of 5.9552, and “Using collaborative learning tools would increase my productivity,” with a 5.8806 mean. This suggests that only some online students perceived collaborative learning tools as beneficial. On the other hand, online students only somewhat agreed that collaborative learning tools are useful in their education.

3. Students’ Attitude Towards Usage (AT) of Collaborative Tools

About Table 1, online learners agree on the statements “I think it is worthwhile to use collaborative learning tools” with a mean value of 6.3134, “I think it is very desirable to use collaborative learning tools for academic related purposes,” resulting in a 6.2239 mean, and “I have a generally favorable attitude toward using collaborative learning tools” with a 6.0746 mean. However, online students only somewhat agree with the second statement, “I like using collaborative learning tools,” with a mean value of 5.8358. Although these results suggested that only some agree and others

somewhat agree, online students still have a positive attitude towards integrating collaborative learning tools in their education.

4. Students' Behavioral Intention (BI) on Collaboration Tools

Referencing Table 1, online students agree with the statements "I intend to use collaborative learning tools in the future," resulting in a mean of 6.1343, and "I intend to use collaborative learning tools to assist my academic activities," with a 6.0149 mean. On the other hand, the statement "I intend to use collaborative learning tools as often as possible," with a mean of 5.6269, demonstrated that online students only somewhat agree. Despite the resulting agreement and somewhat agreement to the statements, it still exhibited the likelihood to use collaborative learning tools, but it varied at the discretion of online students.

5. Students' Actual Usage (AU) of Collaboration Tools

In Table 1, the results indicated the often usage in the following statements, "On average, how frequently do you use online collaborative learning tools?" with a 5.4925 mean and "On average, how much time do you spend per month using online collaborative learning tools?" resulting to a 5.4030 mean. Contrarily, the online students' responses resulted in sometimes usage on the statement "On average, how much time do you spend per week using online collaborative learning tools?" resulted in a 4.9701 mean. Online students might use collaborative learning tools less per week. Still, results suggested often usage of online students the collaborative learning tools collectively, as reflected in the overall and monthly usage statements.

Table 1. *Descriptive Analysis of the Students' Acceptance on the Use of Collaborative Learning Tools*

Statement Code	Questions	Mean
PEOU1	Learning to use collaborative learning tools would be easy for me.	5.8358
PEOU2	My interaction with collaborative learning tools is clear and understandable.	5.8955
PEOU3	It would be easy for me to find information on collaborative learning tools.	5.7015
PEOU4	I find collaborative learning tools easy to use.	5.8507
PU1	Using collaborative learning tools would enable me to accomplish tasks more quickly.	6.0299
PU2	Using collaborative learning tools would improve my academic performance.	5.9552
PU3	Using collaborative learning tools would increase my productivity.	5.8806
PU4	I find collaborative learning tools useful in my education.	6.4776
AT1	I think it is worthwhile to use collaborative learning tools.	6.3134
AT2	I like using collaborative learning tools.	5.8358
AT3	I think it is very desirable to use collaborative learning tools for academic related purposes.	6.2239
AT4	I have a generally favorable attitude toward using collaborative learning tools.	6.0746
BI1	I intend to use collaborative learning tools to assist my academic activities.	6.0149
BI2	I intend to use collaborative learning tools as often as possible.	5.6269
BI3	I intend to use collaborative learning tools in the future.	6.1343
AU1	On average, how frequently do you use online collaborative learning tools?	5.4925

AU2	On average, how much time do you spend per week using online collaborative learning tools?	4.9701
AU3	On average, how much time do you spend per month using online collaborative learning tools?	5.4030

C. Relationship between online students' Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Attitude Towards Usage (AT), Behavioral Intention (BI), and Actual Usage (AU) of Collaborative Learning Tools

1. Relationship Between Online Students' Perceived Ease of Use (PEOU) and Perceived Usefulness (PU)

The correlation of Perceived Ease of Use (PEOU) to Perceived Usefulness (PU) resulted in $r = 0.671$, $p < 0.01$. It denotes a moderate positive correlation. A moderate positive correlation between Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) suggested that online students who find collaborative learning tools easier to use also tend to find them more useful. With the p-value less than 0.01, the correlation is indeed significant.

2. Relationship between Online Students' Perceived Ease of Use (PEOU) and Attitude Towards Usage (AT)

Results showed from Table 2 that the coefficient value of Perceived Ease of Use (PEOU) towards Attitude Towards Usage (AT) is 0.790, with a positive sign indicating a strong association. It suggests that online students who find collaborative learning tools easier to use also tend to have a more favorable attitude toward using them.

3. Relationship between Online Students' Perceived Usefulness (PU) and Attitude Toward Usage (AT)

The coefficient value of Perceived Usefulness (PU) towards Attitude Towards Usage (AT) is 0.823, with a positive sign indicating a strong association (Table 2). This suggests that online students who find collaborative learning tools more useful also tend to have a more favorable attitude toward using them. With the p-value less than 0.01, the correlation is indeed significant.

4. Relationship between Online Students' Attitude Toward Usage (AT) and Behavioral Intention (BI)

The coefficient value of Attitude Toward Usage (AT) towards Behavioral Intention (BI) is 0.794, with a positive sign indicating a strong association (Table 2). This suggests that online students who have a favorable attitude toward using collaborative learning tools also tend to have a stronger intention of using them. With the p-value less than 0.01, the correlation is indeed significant.

5. Relationship between Online Students' Behavioral Intention (BI) and their Actual Usage (AU) of Collaborative Learning Tools

Results from Table 2 showed that the coefficient value of Behavioral Intention (BI) towards Actual Usage (AU) is 0.593, with a positive sign indicating a moderate association. This suggests that online students who have a stronger intention of using collaborative learning tools are more likely to actually use them. With the p-value less than 0.01, the correlation is indeed significant.

To summarize, Table 2 presents the correlation coefficients (r) among the variables using IBM SPSS Statistics 26.

Table 2. *Correlation Among Variables*

	Perceived Ease of Use	Perceived Usefulness	Attitude Towards Usage	Behavioral Intention	Actual Usage
Perceived Ease of Use	1				
Perceived Usefulness	.671**	1			
Attitude Towards Usage	.790**	.823**	1		
Behavioral Intention	.612**	.735**	.794**	1	
Actual Usage	.338**	.441**	.481**	.593**	1

** . Correlation is significant at the 0.01 level (2-tailed).

Reliability and Internal Consistency of the Questionnaire

Table 3 shows the reliability analysis measures items' reliability and internal consistency within a group of questions. This study used IBM SPSS Statistics 26 to investigate Cronbach's alpha per group (variable) and overall questionnaire. The variable with the highest Cronbach's alpha (α), 0.935, is Actual Usage (AU). The next are Perceived Usefulness (PU) with 0.914, Behavioral Intention (BI) with 0.909, and Attitude Towards Usage (AT) with 0.886. The lowest Cronbach's alpha (α) is Perceived Ease of Use (PEOU) with 0.861. The Cronbach's alpha (α) of the overall instrument is 0.901. All the resulting values are within the acceptable range of 0.70 to 0.95 (Tavakol & Dennick, 2011). Hence, it indicates the research instrument's reliability.

Table 3. Cronbach's alpha of each Variables and Overall Questionnaire

Variable	N of Items	Range	Cronbach's alpha (α)
Perceived Ease of Use (PEOU)	4	1-4	0.861
Perceived Usefulness (PU)	4	5-8	0.914
Attitude Towards Usage (AT)	3	9-11	0.886
Behavioral Intention (BI)	4	12-15	0.909
Actual Usage (AU)	3	16-18	0.935
Total	18	1-18	0.901

D. Actual Usage of Collaborative Learning Tools Among Online Students

Respondents were asked to rank the tools based on their usage To determine the actual usage of collaborative learning tools among online students (1 = highest to 6 = lowest).

Results in Table 4 showed that respondents used the collaborative learning tools mostly for Communication (virtual meetings, video conferencing, discussion boards, etc.) with a mean value of 2.6148, then resource management (file storage, access management, social bookmarking, etc.), resulting a 3.2836 mean, next is ideation & co-creation (concept mapping, virtual whiteboards, real-time collaborative editing, etc.) with a 3.3731 mean, followed by presentation & archiving (webinars, slideshows, hosted media sharing, etc.) with a mean value of 3.4925, after is project management (task management, time tracking, calendaring, etc.) that resulted in a 3.8806 mean, and lastly consensus building (polling, question management, process archiving, etc.) with a 4.3284 mean.

Based on the results, most respondents ranked communication significantly higher than the rest, as it is the only type with a mean value of less than 3. On the other hand, online students placed resource Management, Ideation and Co-Creation, Project Management, and Presentation and Archiving in the middle ranking and almost identical with one another as the four types reached a mean value of more than 3. Conversely, consensus building was the only type with a mean value of more than four, implying a low ranking from most respondents.

Table 4. *Descriptive Analysis of Types of Collaborative Learning Tools*

Rank	Type of Collaborative Learning Tools	Mean
1	Communication	2.6418
2	Resource Management	3.2836
3	Ideation and Co-Creation	3.3731
4	Project Management	3.4925
5	Presentation and Archiving	3.8806
6	Consensus Building	4.3284

Furthermore, the respondents were also asked to identify the name of the application or website they mostly used for each type of collaborative learning tool: communication, project management, resource management, consensus building, and presentation and archiving. Some respondents answered one, more than one,

and none from all the types indicated, making the total unequal to the number of respondents, which is 67.

For communication, the majority of the responses (90.79%) mentioned Zoom, Google Meet, Discord, and Facebook as their most used collaborative learning tools, as shown in Table 5. Less than 10% of the responses included various applications such as Slack, Trello, Microsoft Teams, Miro (5.93%), and UPOU MyPortal (3.29%), as expected since it is the university's platform with a messaging feature.

Table 5. *Most Used Collaborative Learning Tools for Communication*

Rank	Collaborative Learning Tool	Percentage
1	Zoom	33.55%
2	Google Applications	25.66%
3	Discord	16.45%
4	Facebook Messenger	15.13%
5	Others	5.93%
6	UPOU MyPortal	3.29%
Total		100.00%

Cumulatively, Google Products (80.72%) such as Google Drive, Docs, and Sheets dominated the online students' preference to use as a shared storage space in Table 6. Although Microsoft Office Suite (9.64%), OneDrive, and Excel, as enumerated, were second on the list, they still have a significant margin as compared with the usage of online students on resource management tools. The remaining less than ten percent included other Cloud-based Backup and other types of tools (9.63%) such as DropBox, TeraByte, iCloud, Pinterest, Myportal, and Notion.

Table 6. *Most Used Collaborative Learning Tools for Resource Management*

Rank	Collaborative Learning Tool	Percentage
1	Google Products	80.72%
2	Microsoft Office Suite	9.64%
3	Other Cloud-based Backup	6.02%
4	Others	3.61%
	Total	100.00%

As shown in Table 7, the online students' most preferred tool for ideation and co-creation is Canva (36.19%), which covered more than a third of the results. The second on the list was Google products (35.24%), such as Google Docs, JamBoard, Drive, Suite, Classroom, and Slides, which resulted in only a few percentages lower than Canva. Generally, the first two tools dominated the tools that online students use for ideation and co-creation tools. Some online students mentioned virtual bulletin boards like Miro, Excalidraw, FreeForm, MindMeister, Mural, Padlet, Zoom Whiteboard, and FigJam as their preferred tools for ideation and co-creation. Few mentioned Figma and Jira, product development tools, as their most used tool to interact directly with members towards their projects. A little less than ten percent

(9.53%) of the responses identified tools they still used for ideation and co-creation despite having a different primary purpose, such as notetaking applications (GoodNotes, Notion, and Obsidian), communication (Discord and Facebook Messenger), other (Microsoft Office Suite and Pinterest), and no specified tools used at all.

Table 7. *Most Used Collaborative Learning Tools for Ideation & Co-Creation*

Rank	Collaborative Learning Tool	Percentage
1	Canva	36.19%
2	Google Products	35.24%
3	Virtual Bulletin Boards	11.43%
4	Product Development Tools	7.62%
5	Others	6.67%
6	None	2.86%
Total		100.00%

In Table 8, almost half of the responses identified Google products (47.12%), namely Google Calendar, Docs, Sheets, and Drive, as their most used tool for project management. Next is Notion (24.04%), which resulted in almost a quarter of the responses. Less than 20% of the specified tools under project management contained list-making applications (12.50%), including Asana, Trello, ClickUp, To-Do lists, and Notes and calendar/time schedulers (6.73%) such as personal calendars, shared calendars, When2Meet, Reminders, Pomodoro, Momentum extension, and Calendly. With this, the collective Google products, notetaking applications, and schedulers are the most used tools for project management, totaling 90.39%. This allotted less than 10% to other tools like communication (Discord, Facebook Messenger, Zoom, and UPOU MyPortal), Microsoft Office Suite (Microsoft Excel), and none, as few online students mentioned they use for project management.

Table 8. *Most Used Collaborative Learning Tools for Project Management*

Rank	Collaborative Learning Tool	Percentage
1	Google Products	47.12%
2	Notion	24.04%
3	List Making Applications	12.50%
4	Calendar/Time Schedulers	6.73%
5	Communication Tools	4.81%
6	Microsoft Office Suite	2.88%
7	None	1.92%
Total		100.00%

In Table 9, The first on the list is slide presentation makers, which Canva (30.77%) dominates, followed by Microsoft PowerPoint and Pechakucha (5.13%). Slightly lower than the first were communication tools that covered more than one-third of the list (35.04%), including Zoom, Discord, Facebook Messenger, and Jitsi.

Google applications (26.50%), including Google Meet, Slides, Drive, YouTube, and Classroom, resulted in more than a quarter of the responses to online students' preferred tools for presentation and archiving. Less than two percent of the responses identified unclassified tools (1.71%) with previously mentioned examples such as UPOU MyPortal and GitHub. Although some online students mentioned that they did not use presentation and archiving tools (0.85%), it was insignificant compared to almost all the responses (97.44%).

Table 9. *Most Used Collaborative Learning Tools for Presentation and Archiving*

Rank	Collaborative Learning Tool	Percentage
1	Slide Presentation Makers	35.90%
2	Communication Tools	35.04%
3	Google Applications	26.50%
4	Others	1.71%
5	None	0.85%
Total		100.00%

More than half of the responses identified communication tools (50.56%) as a tool for consensus building, including Facebook Messenger, Discord, and Zoom, as seen in Table 10. Next are Google applications (25.84%) like Google Forms, Docs, Drive, and Sheets, which covered a little more than a quarter of the responses. Other applications mentioned by the online students include a variety of tools such as When2Meet, Notion, Canva, Rock, UPOU Tagpuan, Threads, and Twitter, which were 13.48% of all the responses. Consensus building has the highest percentage of responses among all the collaborative learning tool types, with none (6.74%) mentioned as their most used tool. This suggests that some online students rely on other tools or methods to reach a consensus. The lowest number of responses resulted from building applications (3.37%) like StrawPoll, tally.so, and UXtweak. Generally, most of the tools mentioned already had a polling feature, but such tools were not exclusive to consensus building, such as in communication, Google applications, etc.

Table 10. *Most Used Collaborative Learning Tools for Consensus Building*

Rank	Collaborative Learning Tool	Percentage
1	Communication Tools	50.56%
2	Google Applications	25.84%
3	Others	13.48%
4	None	6.74%
5	Form Building Applications	3.37%
Total		100.00%

E. Perceived Advantages and Disadvantages of Collaborative Learning Tools Among Online Students

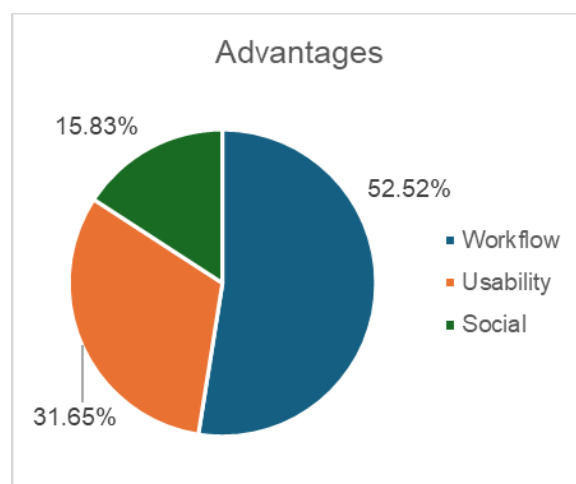
The last portion of the questionnaire included the respondents' perceptions of the advantages and disadvantages of using collaborative learning tools. Here, the respondents were given an option to choose more than one answer.

Advantages of Using Collaborative Learning Tools

Results in Figure 5 showed that the perceived advantages of using collaborative tools among online learners were workflow, usability, and social. More

than half of the respondents mentioned workflow (52.52%) as an advantage of using collaborative learning tools, which included efficiency, collaboration, communication, and productivity, which improved group management. Next was usability (31.65%) advantage, which consumed more than a quarter of the advantages that online students identified as accessibility, real-time tracking, convenience, learning, skills development, time efficiency, and cost efficiency, which lessened the complexity of collaboration. Lastly, the responses comprised less than 20% of the advantages, which were social (15.83%), through engagement, connection, and community, which brought online students together, easing the distance.

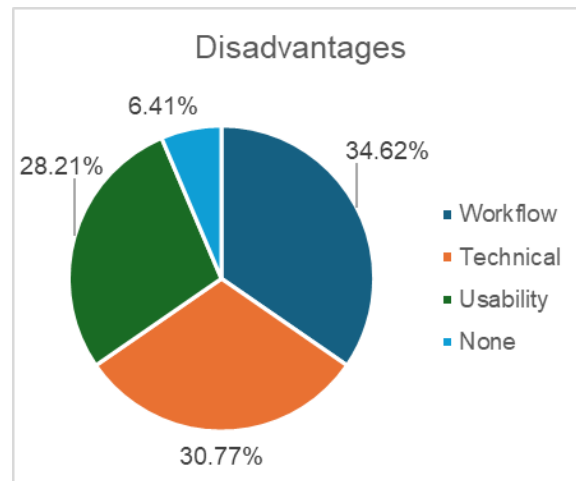
Figure 5. *Perceived Advantages of Using Collaborative Learning Tools*



The perceived disadvantages of collaborative learning tools among online students were focus, usability, social, and none, as shown in Figure 6. More than a third of the responses mentioned the workflow (34.62%) as a disadvantage when using collaborative learning tools, which included the requirement of more attention, group coordination, physical interaction, personal challenges, and distractions. These exemplifications hindered online students' focus and ability to accomplish tasks using

collaborative learning tools. The second and third categories had a little less than the third of the responses were technical (30.77%) and usability (28.21%) disadvantages. For technical disadvantages, online students enumerated them as issues in internet dependency, technical error, and privacy and security. These technical concerns focused on issues for service providers. On the other hand, online students elaborate on usability disadvantages in terms of more skill requirements, not being user-friendly, and availability and cost. This category discussed the user-end problems of using collaborative learning tools. Lastly, a portion of 6.41% of the responses mentioned that there were no known disadvantages of using collaborative learning tools in their education.

Figure 6. *Perceived Disadvantages of Using Collaborative Learning Tools*



As evident from Figures 5 and 6, workflow and usability both reoccurred in the advantages and disadvantages of collaborative learning tools. This suggests that while some online students recognized the potential benefit of collaborative learning tools, others found them challenging.

Chapter 5

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Summary and Conclusion

Students in the 21st century require collaboration, one of the 4Cs learning skills every learner should possess. Collaborative tools used in distance learning alleviate geographical restrictions for online students. This study aims to understand better online students' perceptions, relationships, actual usage, and perceived advantages and disadvantages of collaborative learning tools.

The Perceived Ease of Use (PEOU) of collaborative learning tools resulted in some agreement, which denoted that not all but some online students find using these tools was free from effort. Also, most online students recognized the benefit and contribution of collaborative learning tools in their education, as the Perceived Usefulness (PU) resulted in agreement. The case was similar to the Attitude Towards Usage (AT) of online students, who positively accepted integrating collaborative learning tools into their education. Behavioral Intention (BI) still exhibited a likelihood of using collaborative learning tools in their education despite only resulting in some agreement.

Results showed that online students' Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude Toward Using (AT), and Behavioral Intention to Use (BI) positively influence each component that predicts and confirms the Actual Usage (AU) of collaborative learning tools.

This study also investigated the status of online students' actual usage of collaborative learning tools and the types of tools used. It revealed that online students frequently used collaborative learning tools in their education. As observed from the responses about the most used application/website for each type, the number of examples from each category exceeded the number of respondents. It means that most students mentioned one or more tools for each type. However, there is also a case in which a respondent mentioned none or did not use any application/website for presentation and archiving type. Also, this study revealed the types of collaborative learning tools used and specific tools per type used by online students. It showed that the most used collaborative learning tool is communication, with Zoom as the most used tool. Resource management is the second most used type, with Google products being the most used tool. The third type is ideation and co-creation, with Canva as the most used tool. The fourth most used type is project management, with Google products as the most used tool again. The fifth most used type is presentation and archiving, with variations of slide presentation makers as the most used tool. The sixth and the least used type is consensus building, with collective communication platforms as the most used tool.

In addition, this study also examined the advantages and disadvantages of using collaborative learning tools. For advantages, three themes were established from the online students' responses: workflow, usability, and social. For disadvantages, there are four themes established from the responses of online students: workflow, technical, usability, and none. There are overlapping themes like workflow and usability, which can be compared by comparing the advantages and disadvantages. Collaboration was an advantage for workflow, while group

coordination was a disadvantage to online students as they use collaborative learning tools. For usability, it was contrasting to see cost efficiency as an advantage and cost issues as one of the disadvantages. The occurrence of this theme as an advantage and disadvantage also confirms that there are two sides to the usability of collaborative learning tools. It can be helpful or detrimental depending on how online students use it.

Overall, this study offers a broader scope of understanding to gauge online students' usage of collaborative learning tools. It also demonstrated the validity of the Technology Acceptance Model (TAM) in predicting and confirming users' adoption of new technologies compared with related studies. At the same time, it also delivered a new direction as it investigated existing tools or platforms and the advantages and disadvantages of using collaborative learning tools.

Recommendations

Here are some of the researcher's recommendations:

1. Expanding the sample size is recommended. Since most respondents came from the BAMS program, reaching other programs that will diversify the responses is crucial. Also, it is valuable to explore the perception of graduate programs in addition to the undergraduate programs covered in this study.
2. The respondents ranked the six types of collaborative learning tools: Communication, Resource Management, Ideation and Co-Creation, Project Management, Presentation and Archiving, and Consensus Building. This study suggests further investigation to understand better how online students use collaborative learning tools among online learners.

3. It also collected the most used applications/websites per collaborative learning tool type. Some tools, such as Google applications and Zoom, were in all forms. Identified tools such as Facebook Messenger, Discord, Notion, Canva, and Microsoft Office Suite were available in more than three collaborative learning tool types. It was also crucial to highlight the presence of UPOU MyPortal in the three types of collaborative learning tools, considering that it was one of the university's primary learning platforms. Further investigation is recommendable regarding the specified tools, especially among online learners.
4. For multimedia practitioners, the online students' responses in terms of Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) provide critical points. This study recommended investigating the workflow and usability concerns about using collaborative learning tools as it further understands the user experience (UX) and Human-Computer Interaction (HCI), as not all students can keep up before developing learning technologies that guarantee their future usage.

References

- Aburbeian, A. M., Owda, A. Y., & Owda, M. (2022). A Technology Acceptance Model Survey of the Metaverse Prospects. *AI*, 3(2), 285-302.
- Al-Rahmi, W. M., Othman, M. S., & Musa, M. A. (2014). The improvement of students' academic performance by using social media through collaborative learning in Malaysian higher education. *Asian Social Science*, 10(8), 210.
- Ansari, J. A. N., & Khan, N. A. (2020). Exploring the role of social media in collaborative learning the new domain of learning. *Smart Learning Environments*, 7(1), 1-16.
- Ayu, M. (2020). Online learning: Leading e-learning at higher education. *The Journal of English Literacy Education: The Teaching and Learning of English as a Foreign Language*, 7(1), 47-54.
- Baharin, A. T., Lateh, H., Nathan, S. S., & mohd Nawawi, H. (2015). Evaluating effectiveness of IDEWL using technology acceptance model. *Procedia-Social and Behavioral Sciences*, 171, 897-904.
- Carnegie Mellon University. (2009). Collaboration tools. Eberly Center for Teaching Excellence & Educational Innovation. Retrieved from https://www.cmu.edu/teaching/technology/whitepapers/CollaborationTools_Jan09.pdf

- Chaudhari, T., Linge, A. A., Kakde, B. B., & Singh, M. (2023). Empirical Evaluation of Technology Acceptance Model for Predicting Actual Usage of Mobile Payment Apps.
- Cheung, R., & Vogel, D. (2013). Predicting user acceptance of collaborative technologies: An extension of the technology acceptance model for e-learning. *Computers & education*, 63, 160-175.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16, 297-334
- Davis, F. D. (1989). User acceptance of information systems: the technology acceptance model (TAM).
- Donelan, H., & Kear, K. (2023). Online group projects in higher education: persistent challenges and implications for practice. *Journal of Computing in Higher Education*, 1-34.
- Gilbert, B. (2015). Online learning revealing the benefits and challenges. *Education Masters*, 303.
https://fisherpub.sjf.edu/cgi/viewcontent.cgi?article=1304&context=education_ETD_masters
- Granić, A., & Marangunić, N. (2019). Technology acceptance model in educational context: A systematic literature review. *British Journal of Educational Technology*, 50(5), 2572-2593.

Hernández-Sellés, N., Muñoz-Carril, P. C., & González-Sanmamed, M. (2019).

Computer-supported collaborative learning: An analysis of the relationship between interaction, emotional support and online collaborative tools.

Computers & Education, 138, 1-12.

Kleinheksel, A. J., Rockich-Winston, N., Tawfik, H., & Wyatt, T. R. (2020).

Demystifying content analysis. *American journal of pharmaceutical education*, 84(1), 7113.

Lowes, S. (2014). How Much " Group" Is There in Online Group Work?. *Journal of Asynchronous Learning Networks*, 18(1), n1.

McLeod, S. (2023). Zone of Proximal Development. Simply Psychology.

<https://www.simplypsychology.org/zone-of-proximal-development.html#ZPD-Theory>

Moore, M. (2011). Vygotsky's Cognitive Development Theory. In: Goldstein, S., Naglieri, J.A. (eds) *Encyclopedia of Child Behavior and Development*. Springer, Boston, MA. https://doi.org/10.1007/978-0-387-79061-9_3054

Qureshi, M. A., Khaskheli, A., Qureshi, J. A., Raza, S. A., & Yousufi, S. Q. (2021). Factors affecting students' learning performance through collaborative learning and engagement. *Interactive Learning Environments*, 31(4), 2371-2391.

Raja, R., & Nagasubramani, P. C. (2018). Impact of modern technology in education. *Journal of Applied and Advanced Research*, 3(1), 33-35.

Ramo, P. L. M., & Caampued, R. S. (2020). USING ONLINE PLATFORMS AS AN EXTENSION OF LEARNING COMMUNICATION–FROM INSTRUCTORS PERSPECTIVES. *Luz y Saber*, 14(1 and 2), 1-1.

Rhoads, M., Sierra, H., and Mercado Toro, J.T. (2018). Collaboration Tools. In M. Rhoads & B. Stachowiak (Eds.). *Igniting Your Teaching with Educational Technology* (p. 4). Innovate Learning, LLC.
<https://pressbooks.pub/edd7032017f2/chapter/4/>

Robinson, H., Kilgore, W., & Warren, S. (2017). Care, communication, support: Core for designing meaningful online collaborative learning. *Online Learning Journal*, 21(4). <https://www.learntechlib.org/p/183775/>

Sawant, S. (2021). Online collaborative learning tools and types: Their key role in managing classrooms without walls. In *Human-computer interaction and technology integration in modern society* (pp. 12-41). IGI Global.

Shava, G. N., Hleza, S., Tlou, F., Shonhiwa, S., & Mathonsi, E. (2021). Qualitative content analysis, utility, usability and processes in educational research. *International Journal of Research and Innovation in Social Science*, 5(7), 553-558.

Singh, V., & Thurman, A. (2019). How many ways can we define online learning? A systematic literature review of definitions of online learning (1988-2018). *American Journal of Distance Education*, 33(4), 289-306.

Sun, Z., Liu, R., Luo, L., Wu, M., & Shi, C. (2017). Exploring collaborative learning effect in blended learning environments. *Journal of computer assisted learning*, 33(6), 575-587.

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International journal of medical education*, 2, 53.

Walther, J. B. (2015). Social information processing theory (CMC). *The international encyclopedia of interpersonal communication*, 1-13.

Wardlow, L., & Harm, E. (2015). Using appropriate digital tools to overcome barriers to collaborative learning in classrooms. *Educational Technology*, 32-35.

Wu, B., & Chen, X. (2017). Continuance intention to use MOOCs: Integrating the technology acceptance model (TAM) and task technology fit (TTF) model. *Computers in human behavior*, 67, 221-232.

APPENDICES

Appendix A

Survey Instrument

Analyzing the Acceptance of Collaborative Learning Tools Among Online Students Using Technology Acceptance Model

Greetings!

I am Jia Billones, a fourth-year BA Multimedia Studies student from the University of the Philippines Open University. I humbly request your time to answer a short survey for my undergraduate research entitled, "Analyzing the Acceptance of Collaborative Learning Tools Among Online Students Using Technology Acceptance Model," in partial fulfillment for the MMS 200 Special Project. This study evaluates online students' perspectives on using existing collaborative learning tools for studies.

Rest assured that personal information, data, and answers will be treated with utmost confidentiality by Republic Act No. 10173, also known as the DATA PRIVACY ACT. The researcher will strictly use the responses for the benefit of the study. Proper and immediate information disposal comes after usage.

For any further information about this project, feel free to contact me via my university email: jobillones1@up.edu.ph.

Thank you and God Bless!

* Indicates required question

1. Email *

2. Data Privacy *

I have read the statement above and consent to the processing of my personal data. I understand that my consent does not preclude the existence of other criteria for lawful processing of personal data and does not waive any of my rights under the Data Privacy Act of 2012 and other applicable laws.

Mark only one oval.

- Yes, I hereby give my consent to voluntarily participate and answer the survey.
 No, I do not give my consent to voluntarily participate and answer the survey.

Demographics

8. Program (e.g.: AA, BAMS, BES, etc.) *

Collaborative Learning Tools

The 21st century has enabled the development of Web 2.0. Along with it is the shift in the learning mode in the education sector. One of the changes in this sector is the popularization of collaborative learning tools usage. Collaborative learning tools create an environment where students can work with other students for academic activities. According to Carnegie Mellon University (2009), there are six (6) commonly used types of collaborative learning tools: communication, project management, resource management, ideation & co-creation, consensus building, and presentation & archiving. Overall, these tools foster a virtual environment that attempts to mimic the experience of face-to-face group work.

Technology Acceptance

Perceived Ease of Use

9. Learning to use collaborative learning tools would be easy for me. *

Mark only one oval.

1 2 3 4 5 6 7

Strongly Disagree Strongly Agree

10. My interaction with collaborative learning tools is clear and understandable. *

Mark only one oval.

1 2 3 4 5 6 7

Strongly Disagree Strongly Agree

3. Name *

4. Age *

5. Gender *

Mark only one oval.

- Male
 Female
 Prefer not to say
 Other: _____

6. Year *

Mark only one oval.

- 1st
 2nd
 3rd
 4th
 Other: _____

7. Classification *

Mark only one oval.

- Full-time
 Part-time

11. It would be easy for me to find information on collaborative learning tools. *

Mark only one oval.

1 2 3 4 5 6 7

Strongly Disagree Strongly Agree

12. I find collaborative learning tools easy to use. *

Mark only one oval.

1 2 3 4 5 6 7

Strongly Disagree Strongly Agree

Perceived Usefulness

13. Using collaborative learning tools would enable me to accomplish tasks more quickly. *

Mark only one oval.

1 2 3 4 5 6 7

Strongly Disagree Strongly Agree

14. Using collaborative learning tools would improve my academic performance. *

Mark only one oval.

1 2 3 4 5 6 7

Strongly Disagree Strongly Agree

15. Using collaborative learning tools would increase my productivity. *

Mark only one oval.

1 2 3 4 5 6 7
Strongly Agree

19. I think it is very desirable to use collaborative learning tools for academic related purposes. *

Mark only one oval.

1 2 3 4 5 6 7
Strongly Agree

16. I find collaborative learning tools useful in my education. *

Mark only one oval.

1 2 3 4 5 6 7
Strongly Agree

20. I have a generally favorable attitude toward using collaborative learning tools. *

Mark only one oval.

1 2 3 4 5 6 7
Strongly Agree

Attitude Towards Usage

17. I think it is worthwhile to use collaborative learning tools. *

Mark only one oval.

1 2 3 4 5 6 7
Strongly Agree

Behavioral Intention

21. I intend to use collaborative learning tools to assist my academic activities. *

Mark only one oval.

1 2 3 4 5 6 7
Strongly Agree

18. I like using collaborative learning tools. *

Mark only one oval.

1 2 3 4 5 6 7
Strongly Agree

22. I intend to use collaborative learning tools as often as possible. *

Mark only one oval.

1 2 3 4 5 6 7
Strongly Agree

23. I intend to use collaborative learning tools in the future. *

Mark only one oval.

1 2 3 4 5 6 7
Strongly Agree

27. Rank the following types of collaborative learning tools based on its usage frequency (1 = highest, 6 = lowest) *

- Communication (virtual meetings, video conferencing, discussion boards, etc.)
Project Management (task management, time tracking, calendaring, etc.)
Resource Management (file storage, access management, social bookmarking, etc.)
Ideation & Co-Creation (concept mapping, virtual whiteboards, real-time collaborative editing, etc.)
Consensus Building (polling, question management, process archiving, etc.)
Presentation & Archiving (webinars, slideshows, hosted media sharing, etc.)

Mark only one oval per row.

Table with 6 columns (1-6) and 6 rows (Communication, Project Management, Resource Management, Ideation & Co-Creation, Consensus Building, Presentation & archiving)

Actual Usage

24. On average, how frequently do you use online collaborative learning tools? *

Mark only one oval.

1 2 3 4 5 6 7
New Always

25. On average, how much time do you spend per week using online collaborative learning tools? *

Mark only one oval.

1 2 3 4 5 6 7
New Always

28. Kindly add the specific name of the application or website used for each type of collaborative learning tools that you mostly use for. *

Communication (virtual meetings, video conferencing, discussion boards, etc.)

29. Project Management (task management, time tracking, calendaring, etc.) *

Types of Collaborative Learning Tools

30. **Resource Management** (file storage, access management, social bookmarking, etc.) *

31. **Ideation & Co-Creation** (concept mapping, virtual whiteboards, real-time collaborative editing, etc.) *

32. **Consensus Building** (polling, question management, process archiving, etc.) *

33. **Presentation & Archiving** (webinars, slideshows, hosted media sharing, etc.) *

Deepening Understanding

34. What do you think are the advantages of using collaborative learning tools as an online student? *

35. What do you think are the disadvantages of using collaborative learning tools as an online student? *

Token of Appreciation

I want to thank you for helping me with this project. Your participation is greatly appreciated! Every completed survey entitles the participant to a raffle entry to win PHP 500 worth of GCash as a token of appreciation. Please provide the following details for a raffle entry:

36. Most accessible communication mode *

Mark only one oval.

- Phone
- E-mail
- Social Media Account
- Other: _____

37. Please provide the number, address, or link *

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Appendix B

TCPS 2: CORE

