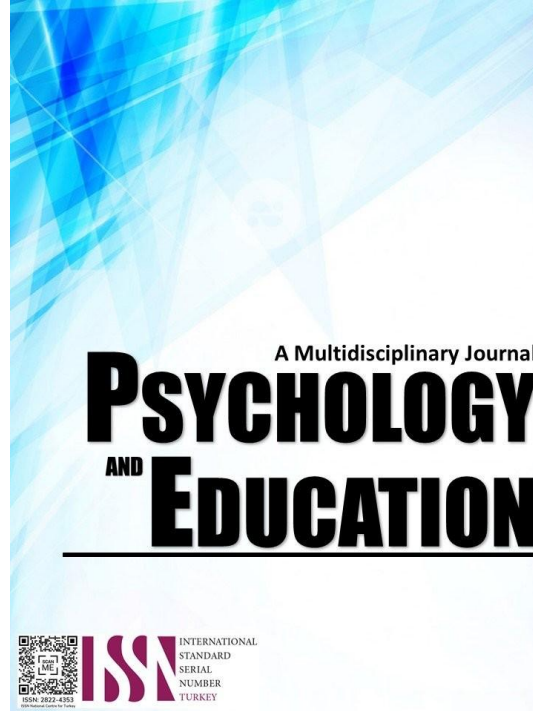


TEACHERS' ACCEPTANCE AND APPLICATION OF EDUCATIONAL TECHNOLOGY IN TEACHING THE 21ST CENTURY LEARNERS



PSYCHOLOGY AND EDUCATION: A MULTIDISCIPLINARY JOURNAL

Volume: 43

Issue 5

Pages: 626-639

Document ID: 2025PEMJ4184

DOI: 10.70838/pemj.430508

Manuscript Accepted: 06-24-2025

Teachers' Acceptance and Application of Educational Technology in Teaching the 21st Century Learners

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Abstract

The global push for 21st-century learning emphasizes technology's role in developing essential student skills. In the Philippines, particularly in rural areas like Cebu Province, integrating technology faces obstacles such as inadequate infrastructure, limited device access, and insufficient teacher training. Understanding these regional dynamics is vital for effective educational policy. This study examined how teachers at three elementary schools in a rural district of Cebu Province embrace and use technology to instruct students in the twenty-first century. By employing a descriptive-correlational research design, the study sought to ascertain the degree of technology application proficiency among teachers, their general acceptance and utilization of technology (assessed using a scale modified from the Unified Theory of Acceptance and Use of Technology, or UTAUT), the correlation between teaching experience and technology application skills, and the perceived barriers to technology integration. According to the results, teachers generally have a high degree of acceptance of technology (mean score of 94.29 out of 120), which suggests that they feel positively about using technology in the classroom. Regarding their technological use, the research also examined the perceptions of the UTAUT factors (effort expectancy, performance expectancy, social influence, enabling conditions, behavioral intents, self-efficacy, and anxiety) by the teachers. "Limited or unstable internet connectivity at school" (3.40 mean) and "Unequal student access to devices at home" (3.00 mean) emerged as the most major perceived obstacles to technology deployment. Conversely, the least significant hindrance (mean of 8.23) was "Believing that standardized testing doesn't appreciate the skills obtained through technology use. The research also examined the relationship between the UTAUT elements and teaching experience and technological application skills. The Pearson's r values of 0.117 and 0.105 indicate a weak, positive linear trend. This indicates that how long they have been teaching does not appear to make much difference in their acceptance or capabilities.

Keywords: *technology application, 21st century learners, UTAUT, teachers' acceptance level of technology*

Introduction

Over the past few years, technology has had a positive impact on education. Technology has made it possible to personalize the learning process. With the use of adaptive learning software, teachers can create individualized lesson plans and assignments based on students' specific needs and capabilities. Technology has also made collaborating and sharing resources with other teachers easier. Online media and social networks allow teachers to link and share lesson plans, activities, and instructional materials using online media and social networks (Zahedi, 2023).

Dexterity Learning Solutions (2023) puts a special focus on the overriding importance of technology in education in the 21st century and its ability to boost information access, support collaboration and communication, engage and motivate, and provide students with crucial skills. Technology profoundly enriches teaching and learning in the classroom. The emergence of new technologies has drastically accelerated the access to knowledge to an exponential degree, making instant sharing possible. Primarily, schools have incorporated technology as part of existing curricula instead of using technology as a crisis-management instrument alone. As such, teachers are able to utilize online learning as a powerful teaching tool (Epistemo, 2021).

The incorporation of technology into the classroom has the potential to transform the traditional teacher-centered model into a student-centered paradigm, wherein students assume a more active role in their learning process. In such a student-centered environment, the teacher assumes the role of a facilitator, guiding students as they engage with and explore the day's lesson (KnowingTech, 2021).

The process of shifting to ERT is going to cause learning loss for most students, with factors contributing towards it being student stress, low motivation, and decreased learning time. These effects disproportionately hit disadvantaged children, who might not have computers, the internet, and other necessary technologies (Willis, 2020). Ertmer (1999) calls these issues 'first-order barriers.' Some students might also not have an environment that is productive for learning in the home.

The inclusion of Information and Communication Technology (ICT) in learning processes poses a complex challenge where several setbacks could occur during its implementation. Bingimlas (2009) describes these challenges as emanating from various barriers, including the lack of confidence among teachers to use ICT. This could be due to a lack of technological pedagogical skills, which in many cases results from inadequate training. Another major hindrance to the successful integration of ICT in classrooms is the educators' acceptance of technology. Therefore, the current paper investigates teachers' acceptance as an important determinant for ICT integration.

Digital technologies have varied capacity in promoting the acquisition of 21st-century skills and abilities in learning environments.

Cheung et al. (2021) posit that digital technologies promote individualized learning, which is further enhanced through different applications that enhance instructional quality. In Cheung et al.'s (2021) opinion, digital technologies make teaching and learning more specific to the traits of both teachers and learners, further adapted by preferences and features intrinsic in ICT tools. Students are able to access vast amounts of information and participate in technology-based classrooms, facilitated by technological progress and their effective application (Yilmaz, 2020). Through the application of technological tools, students are able to gain information and skills such as creativity, critical thinking, technological literacy, flexibility, and adaptability (Yilmaz, 2020).

The research by Eylem Koral Gümüsoğlu et al. (2017) examines the Anadolu University School of Foreign Languages lecturers' technology acceptance levels. Results show that participants tended to have above-average technology acceptance levels. For the majority of components of the scale, the answer ranged from agree to strongly agree with some showing neutrality. This high rate of technology acceptance can be explained by the focus on regular use of technology within classes. In the same manner, institutional support has been shown to lead to high rates of technology acceptance among pre-service teachers in Thailand, as evidenced by the study carried out by Teo et al. (2011).

Bingimlas (2009) also underscores that the unavailability of resources is inextricably tied to some other key matters, which are themselves obstacles to the adoption of ICT by teachers. Likewise, support from the institution was found to lead to strong acceptance of technology among pre-service students in Thailand, as evidenced by the research carried out by Teo et al. (2011).

The research by Birch, A. and Irvine, V. (2011), "Preservice teachers' acceptance of ICT integration in the classroom: applying the UTAUT model," proves that effort expectancy significantly determines preservice teachers' intention to use ICT in their practicum teaching. Those knowledgeable in basic ICT tools (e.g., word processing, email) might self-evaluate as having high skill levels, while those knowledgeable in higher-level ICT tools might identify unknown tools and set their level lower, even though they might have high technological skill. While technology does hold great advantages, difficulties still exist.

Research in the future may investigate: a) the pedagogical effectiveness of different approaches to integrating technology across subjects and age levels; b) the potential of technology in alleviating educational disparities and making education accessible to all students; c) the design of teacher training courses that endow teachers with the ability to efficiently incorporate technology into their classrooms; and d) the ethical implications of using technology in education, including data privacy and management of screen time. Through an analysis of the use of technology by teachers, teaching practices can be enhanced such that all students become responsive to the challenges of the 21st century.

The purpose of this research is to evaluate teachers' acceptance and skill levels in the Barili II District, namely Japitan Elementary School, Kandugay Elementary School, and San Rafael Elementary School, on how to apply and accept technology to teach 21st-century learners. These schools have a high number of enrollees deemed 21st-century learners. Through the examination of this case, the study can identify key lessons in responding efficaciously to the diverse 21st-century learners' needs through the intentional use of technology.

The study has a number of aims: first, to comprehend the skill level of teachers in terms of technology application in instruction, taking into consideration effort expectancy, performance expectancy, social influence, facilitating conditions, behavioral intentions, self-efficacy, and anxiety; second, to recognize the general acceptance and use of technology by teachers; third, to ascertain if there is a substantial relationship between teachers' experience in teaching and their technology application skill levels; fourth, to determine possible hindrances to effective technology application in the classroom; and lastly, to provide recommendations for delivering meaningful learning experiences for diverse 21st-century learners through purposeful application of technology.

Generally, the research is important in the sense that it has the potential to provide insights for schools and teachers that can help to improve teachers' skills in applying technology in instruction for 21st-century students. Teachers should equip themselves with the competencies and knowledge to apply technology in the classroom since young people are adopting technological innovations. With these, teachers design learning outcomes that have relevance and meaning for learners from diverse backgrounds and the twenty-first century.

Research Questions

This study assessed the technological application of the teachers of Barili II District schools, namely: Japitan Elementary School, Kandugay Elementary School and San Rafael Elementary School in teaching 21st century learners during the school year 2024 – 2025. Specifically, it attempted to answer the following questions:

1. What is the demographic profile of the teachers of Japitan Elementary School, Kandugay School and San Rafael Elementary School in terms of:
 - 1.1. age;
 - 1.2. sex;
 - 1.3. teaching experience; and
 - 1.4. technology usage frequency?
2. What is the teachers' level of skills in the use of technology in terms of:
 - 2.1. email;

- 2.2. word processing;
- 2.3. presentation software;
- 2.4. tv monitors, computers, interactive whiteboard;
- 2.5. projectors;
- 2.6. multimedia use (e.g. video);
- 2.7. virtual classrooms (zoom, google meet, skype);
- 2.8. printers and scanners; and
- 2.9. speakers, microphones?
3. What is the teachers' overall acceptance and use of technology in terms of:
 - 3.1. effort expectancy;
 - 3.2. performance expectancy;
 - 3.3. social influence;
 - 3.4. facilitating conditions;
 - 3.5. behavioral intentions;
 - 3.6. self-efficacy; and
 - 3.7. anxiety?
4. What are the barriers to the successful application of technology in teaching the 21st century learners?
5. Is there a significant relationship between the teachers' teaching experience and their level of skills in the use of technology?
6. Is there a significant relationship between the teachers' teaching experience and their overall acceptance and use of technology in terms of:
 - 6.1. effort expectancy;
 - 6.2. performance expectancy;
 - 6.3. social influence;
 - 6.4. facilitating conditions;
 - 6.5. behavioral intentions;
 - 6.6. self-efficacy; and
 - 6.7. anxiety?

Literature Review

Learning Theories

Issroff and Scanlon (2002) state that educational philosophies have always had an impact on how educational technology develops. Cognitive processes and learning are central to contemporary digital technological advances. With claims for the science of learning, a common belief exists that digital technology inherently enhances learning. Today, digital technology applies in education to enhance and streamline learning, both as an instructional tool and an information resource. This chapter will explore the relationship between learning and digital technology by analyzing significant learning theories and their rationale for employing technology in learning. Learning theories are traditionally bypassed despite being an important part of research on educational technology.

Comprehending the lives of individuals who are engaging with today's educational technology and network infrastructure, creating and enhancing learning technologies, are facilitated through these concepts and models. The influence of more abstract theories of education highlights the importance of social and cultural perspectives when analyzing learning environments. Behaviorism was starting to become popular as a theory of learning in the 1950s and 1960s, and it is still significant as far as digital technology and education are concerned. The theory that individuals are conditioned to respond to stimuli, that behavior can be predicted if the same stimulus is introduced once again, and that reinforced behavior—either through reward or punishment—is most likely to happen again is referred to as behaviorism, writes Byrne (1996).

Several behaviorists advocated a teaching and instruction approach in the late 1950s (Saettler, 1990). This method is based on observable and measurable learning product according to Saettler, through a curriculum that is set up as discrete, sequential units, with a close connection between philosophy of behaviorism and technology. A great deal of effort was exercised to develop a teaching machine based on the theories of operant conditioning by Skinner (1958). Seventy-three commercially sold teaching devices were available by 1963 that were supposed to engage pupils by providing feedback for each response. Behaviorist concepts played a significant role in the early computer-assisted education, particularly drill and practice systems.

The theory of learning, which is cognitivism, equates the mind to the computer's information processor with the aim of studying the mind's organization, storage, processing, and retrieval of information. Consequently, cognitivism views learning as internal mental activities as compared to observable behavior.

For this perspective, students internally process information, leading to the potential developments in knowledge, memory, reasoning, and problem-solving abilities (Bordwell, 2008). Cognitive psychologists developed an interest in creating computational metaphors of the mind in the later half of the 20th century. Incoming information is compared to preexisting cognitive structures in mental processes, which are now understood as an internal knowledge system.

One of the most well-known examples of technology-based learning comes from an extension of constructivist theory. Constructionist theory is one of the learning theories that teachers use to help students in learning. Constructionism is a learning, education, and design philosophy that claims that students learn more when they build it themselves. A prominent aspect of constructionist approaches is the utilization of technology to foster emotional aspects of learning. The active learning and engaging the interest of children and adults was emphasized by Seymour Papert (1993). These technologies promote self-explanatory learning by users through creating and experimenting with digital models of complex systems, which supports constructionist philosophy.

Revised Guidelines on Implementing the DepEd Computerization Program (DCP)

The following enclosed Revised Guidelines on Implementing the DepEd Computerization Program (DCP) are released by the Department of Education (DepEd). The DCP shall provide public schools and DepEd offices with fair, high-quality, and appropriate technologies that will enhance teaching, learning, governance, and operations processes, practices, programs, and policies in order to address the challenges of the contemporary world (DepEd, 2023).

The following are some, but not all, of the objectives of the DepEd Computerization Program: a. to provide all public schools with high-quality and complete computer lab packages; b. to provide all public schools with smart TV packages; c. To provide all DepEd personnel—teaching and nonteaching—with the right and needed hardware, software, training, and other program assistance; d. to provide ICT systems and infrastructure in DepEd offices and public schools; and e. in order to ensure that the ICT infrastructure and systems are utilized, and to enhance and strengthen the ICT skills of students, teachers, school managers, and non-teaching personnel.

The Department of Education (DepEd) and Global Networks Association of Teachers as a Foreign Language (GENTEFL), Thailand, held the Free International Multidisciplinary Webinar Series for Teachers from June 30 to July 2, 2021, to upskill and equip Filipino teachers with the incorporation of educational technology," according to the Department of Education (2021). Nowadays, there are many tools and gadgets that allow us to accomplish much work and objectives at the same time. We can certainly multitask. As we continue providing our students with a foundational education, ICT will serve us in the long term, said Secretary Leonor Magtolis Briones. "In the Philippines, we have been building and implementing initiatives such as using radio and television, various authoring tools for producing Open Educational Resources (OER), and different learning management systems (LMS)." The pace at which all of these educational technology tools are being developed is unprecedented domestically and internationally, Usec. "Pascua said." Even post-epidemic, these novel technological approaches help bring about more efficient delivery of education. It is our desire that this series of webinars will give you some knowledge and ideas that you can utilize in your own classes," Dir. Abanil halted.

The Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) was formulated in 2003 by Venkatesh et al. Venkatesh et al. formulated their model by integrating elements from eight IT acceptability models. Venkatesh, Morris, Davis, and Davis formulated UTAUT as a comprehensive integration of previous technology acceptance research following a review of the corpus of available literature. In order to moderate the effect of four dimensions (performance expectancy, effort expectancy, social influence, and facilitating conditions) on intention to use and usage behavior, gender, age, experience, and voluntariness of use were added to the model. Technology use is believed to be strongly predicted by behavioral intention (Venkatesh et al., 2003). Venkatesh et al. concluded that self-efficacy and anxiety are indirect variables and should not be a part of the model. Venkatesh et al. analyzed the UTAUT survey and found that it was 70% explained by R², which means that 70% of the variation in user intentions to use IT is explained by the model. ICT acceptance by preservice teachers has not yet been explored using the UTAUT paradigm. There are only three studies that utilize the UTAUT framework in an educational setting. Performance Expectancy is the extent to which the use of a technology will benefit consumers in performing specific tasks; effort expectancy is the extent of ease that comes with consumers' utilization of technology; social influence is the extent to which consumers believe that significant others (e.g., family and friends) think they should employ a specific technology; and facilitating conditions are consumers' perceptions of the amount of resources and support available to undertake a behavior (Brown and Venkatesh 2005; Venkatesh, Morris, Davis & Davis, 2003) Social influence is the extent to which consumers feel that significant others, including family and friends, believe they should employ a specific technology; performance expectancy is the extent to which the use of a technology will benefit consumers in conducting specific tasks; effort expectancy is the extent of ease that accompanies consumers' participation in technology; and facilitating conditions are consumers' perceptions of the resources and amount of support available to undertake a behavior (Brown and Venkatesh 2005; Venkatesh, Morris, Davis & Davis, 2003).

Technology Application Barriers

Eileen Winter, Aisling Costello, Moya O'Brien, and Grainne Hickey (2021) identified the following in their research, Teachers' Use of Technology and the Impact of COVID-19: Technology plays a considerable role in education nowadays. It is expected that schools will employ it to enhance pupils' learning. The main challenges to its successful implementation have been found to be two issues (Johnson et al. 2016). Ertmer (1999) called these external factors—pertaining to tools, resources, and training—"first-order barriers." Internal factors, including attitudes and beliefs, confidence, and capabilities, were called "second-order barriers" Teachers who engage on a regular basis are familiar with using technology and have knowledge about numerous apps and programs. Yet, an infinitesimal fraction of individuals still feel lacking in confidence, are afraid of technology, and avoid it. Barriers remain in spite of the widespread

use evidenced here. Participants require adequate equipment to fully integrate technology, as well as in-school training and support. In spite of the reality that technology is part of the curriculum, research indicates teachers must be willing to use it and have faith in it (Ertmer, 2005). It is noted that, consistent with Ertmer's "first-order barriers," most of the variables that these respondents mention as influencing their use of technology are beyond the instructor (e.g. insufficient equipment, training, absence of home equipment and support, student factors). These might have been easily identified because they are tangible, or they might be an artifact of the question format of this survey.

At any rate, it is very important to raise the question: "Are teachers aware of how 'second-order' variables, such as their attitudes and beliefs, influence the way they use technology in the classroom?" "Teachers will indeed admit that they have negative views toward technology or believe that it is not beneficial for their profession (Orji, 2010).

Methodology

Research Design

The study employed a descriptive-correlational research design. This quantitative approach is well-suited for studies that aim to describe the characteristics of a population or phenomenon (descriptive aspect) and simultaneously explore the relationships between two or more variables without manipulating them (correlational aspect) (Creswell, 2014; Fraenkel, Wallen, & Hyun, 2012). Given that the study aimed to understand existing relationships and characteristics in a real-world setting without direct intervention or manipulation of variables, a descriptive-correlational design was the most ethical and practical choice (Johnson & Christensen, 2019). It allowed for the collection of data on naturally occurring phenomena. This design had an interview schedule and questionnaire which considered the best tool to use. The tools were suitable for assessing the researcher's quantitative measure. The instrument for the study was adapted from Venkatesh et al. (2003) Unified Theory of Acceptance and Use of Technology (UTAUT) and Eileen Winter et al. (2021) UTAUT Survey. The UTAUT model is widely recognized for its robust theoretical foundation and empirical validation in explaining technology acceptance and use across various contexts, thus providing a strong framework for measuring participants' attitudes, behavior, and knowledge toward technology integration in education. The instrument was a set of questions designed to measure the attitudes, behavior, and knowledge of the participants towards the topic of study.

Respondents

The study included a total of 35 teachers from the Barili II District in Barili, Cebu, Philippines. These respondents were drawn from three specific elementary schools within the district: 20 teachers from Japitan Elementary School, 8 from Kandugay Elementary School and 7 from San Rafael Elementary School. The selection of these respondents was based on random sampling, a method chosen by the researcher for its practicality, ensuring both accessibility and convenience in data collection. While the specific names of the respondents were intentionally withheld to maintain confidentiality and ethical standards, the study collected the following demographic information to contextualize their experiences: age, sex, years in service and frequency of technology use. This diverse group of educators represents a significant portion of the teaching staff within these schools, providing a valuable perspective on technology integration in their respective environments.

The study was conducted in the Barili II District, located within the municipality of Barili, Cebu Province, Philippines. This region on the southwestern coast of Cebu Island presents a typical rural Philippine landscape, characterized by a mix of agricultural and coastal areas, and facing common challenges related to infrastructure and connectivity. The socio-economic context, often reliant on farming and fishing, directly influences the resources available to local elementary schools and families, highlighting the real-world impact of the digital divide on educational technology integration. The selection of schools within the Barili II District provides a representative sample for understanding the real-world conditions and specific challenges faced by educators in a rural Philippine setting regarding 21st-century technology integration in teaching.

Instrument

The primary data collection tool employed in this study was a Likert scale questionnaire, designed to assess teachers' skills in applying technology in teaching and their frequency of technology application on a weekly basis. The instrument's core structure and content were adapted from two prominent sources: the Unified Theory of Acceptance and Use of Technology (UTAUT) Survey by Venkatesh et al. (2003) and a modified version by Eileen Winter et al. (2021), specifically for their research study "Teachers' use of technology and the impact of Covid-19." This adaptation ensured the relevance of the questionnaire to the study's purpose of exploring technology embrace and use among educators.

The questionnaire's purpose was to measure the attitudes, behavior, and knowledge of the participating teachers regarding technology integration in their instruction. The instrument's strong construct validity is largely supported by its foundation in the empirically validated UTAUT model. The original UTAUT model has demonstrated robust explanatory power, accounting for 70% of the variance in users' intentions to use information technology ($R^2 = 0.70$) (Birch & Irvine, 2009), which provides a solid theoretical basis for the adapted questionnaire's ability to accurately measure its intended constructs: performance expectancy, effort expectancy, attitude towards using technology, social influence, facilitating conditions, self-efficacy, and anxiety. Each part, or construct, was analyzed independently. All variables within the model were measured using a five-point Likert scale, a widely accepted rating scale for

measuring opinions, attitudes, or behaviors (Bhandari, 2023). The response options ranged from 1 (Strongly Disagree) to 5 (Strongly Agree). The total number of items in the adapted questionnaire 24 which can be inferred to be comprehensive across the seven constructs (Creswell & Creswell, 2018). It consisted of a statement or a question, followed by a series of five or seven answer statements. The adapted questionnaire underwent review by three educational technology experts in the Cebu Technological University - Barili Campus to ensure its content relevance and clarity for the local context.

Procedure

The data gathering process followed a systematic approach to ensure proper authorization, preparation, and administration of the survey instruments.

Step 1: Securing Institutional Approvals

Initial approval for the study, "Teachers' Acceptance and Application of Educational Technology in Teaching the 21st Century Learners," was first sought from the Principal's Office of Japitan Elementary School. Following the Principal's guidance, the researcher then prepared and submitted a formal request for a "Permit to Study" to the Schools Division Superintendent. This application included essential attachments: the researcher's study loads, a First Indorsement from the Japitan Elementary School Principal, a Second Indorsement from the Public Schools Division Superintendent, and a formal letter of intent addressed to the SDS.

Step 2: Obtaining Research Permits and Approvals

Upon securing the "Permit to Conduct Research" from the Schools Division Superintendent, the researcher was officially authorized to commence the data collection process. This permit, along with the First Indorsements from the Principals of Kandugay Elementary School and San Rafael Elementary School, and the approved survey questionnaires, were subsequently resubmitted to the relevant authorities, completing the necessary bureaucratic steps for all participating schools.

Step 3: Conducting a Pre-Survey and Instrument Revision

Prior to the full administration of the main survey, the researcher conducted a preliminary pre-survey within the schools to assess the existing availability of technology. This crucial step informed the subsequent revision of the survey questionnaire to ensure its items were contextually relevant and appropriate for the technological realities of the participating schools. The finalized questionnaire comprised sections on teachers' profiles, their weekly frequency of technology application in teaching, their level of acceptance in relation to technology application, and the perceived barriers to successfully applying technology in teaching 21st-century learners.

Step 4: Administering the Survey Questionnaires.

Data was primarily gathered through the direct, personal administration of the revised survey questionnaires to the teacher-respondents in a face-to-face setting. Participants were provided with significant reminders regarding the definition of technology used in the study, encompassing computer hardware (e.g., scanners, cameras, videoconferencing equipment), software programs (e.g., word processing, Excel, Internet, PowerPoint, web page building), and any technology specific to their subject area.

Step 5: Collecting Frequency of Use Data

Respondents were asked to rate their weekly frequency of technology use in teaching using a 5-point Likert-type scale, ranging from 1 (Not at all) to 5 (Extremely high). Each option had a specific qualitative description: "Not at all" denoted no weekly usage; "Low" meant once or twice a week; "Moderate" indicated three or more times a week; "High" represented daily use; and "Extremely High" signified daily usage across all subject areas.

Step 6: Collecting Technology Skills and Acceptance Data

Teachers were also asked to assess their ability to use and embrace technology in the classroom. This section utilized a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), where they circled the number that best indicated their agreement or disagreement with each statement related to their skills. The implied question types for "skills" may have been "Please choose the number that best assesses your ability to use and embrace technology in the classroom," with the options mapping to agreement/disagreement with statements about their skills.

Step 7: Collecting Perceived Barriers Data

For the section on barriers to technology usage, participants were presented with a list of possible obstacles. They were requested to rank these barriers from 1 to 10, with Rank 1 representing the biggest barrier and Rank 10 the smallest barrier to implementing technology in their teaching classrooms.

Step 8: Data Collection Duration

The entire data collection process, from the initial distribution to the retrieval of the survey questionnaires, took a total of five working days, strategically managed for the convenience of the respondents.

Data Analysis

This study employed both descriptive and inferential statistics to analyze the collected data. Descriptive statistics, as defined by Robert Ho (2006), were utilized to summarize and characterize the dataset, focusing on measures such as frequency of occurrence, central tendency (e.g., means), and dispersion. This allowed for a clear overview of teachers' technology application proficiency, their general acceptance and utilization of technology, and perceived barriers. For inferential statistics, the study aimed to draw conclusions and test relationships within the data, which involves making inferences, estimating parameters, and testing hypotheses about a population based on a sample (Simplilearn, 2024). Specifically, the study used Pearson's product-moment correlation coefficient (Pearson's r) to examine the relationship between teaching experience and technology application skills, as well as the relationship between the Unified Theory of Acceptance and Use of Technology (UTAUT) elements and teaching experience and technological application skills.

Ethical Considerations

This research was strictly academic and there's no monetary involvement. The researcher was not going to provide anything to the respondents to prevent biased results. Names and personal details of the respondents were not mentioned in the study. If there was taking of photos or videos, the researcher ensured that they asked permission from the respondents and the promise of privacy to blur their faces. The data and information gathered were confidential. Then they were destroyed and incinerated after being used by the researcher. The researcher prepared and administered a Consent form as a proof that the respondents voluntarily took part in this study. There was no conflict of interest with any individual in this study.

Results and Discussion

The primary aim of the study was to identify whether the level of skills in technology use is related to teaching experience as well as UTAUT survey factors. The study further sought to determine the greatest hindrance towards the effective use of technology in teaching 21st century learners. The study was done by 35 teachers from schools within the Barili II District, specifically Japitan Elementary School, Kandugay Elementary School, and San Rafael Elementary School.

Respondents' Demographic Profile

Age

Table 1.1 presents the demographic profile of the teachers of Japitan, Kandugay, and San Rafael Elementary Schools, District of Barili II, Barili, Cebu in terms of age.

Table 1.1. *Age Percentage Distribution of Teachers*

<i>Age Ranges</i>	<i>Frequency</i>	<i>Percentage</i>
20 - 29 years old	4	11.4 %
30 - 39 years old	12	34.3 %
40 - 49 years old	11	31.4%
50 - 59 years old	6	17.1 %
60 and over	2	5.7 %
Total	35	100 %

There are 35 participants in the study who come from the three schools. The 30-39 years old age group has the highest frequency of 12 people, which represents 34.3% of the population. This shows that this age group is a big part of the considered group. The 40 - 49 years old age group has the second highest frequency of 11 people, which is equal to 31.4%. Kumala et al. (2022) have reported that, "The ability of teachers aged 30-40 years and less than 30 have good technological skills surpassed older teacher."

Sex

Table 1.2 displays the frequency and percentage distribution of the teachers' profiles in terms of sex.

Table 1.2. *Sex Percentage Distribution of Teachers*

<i>Sex</i>	<i>Frequency</i>	<i>Percentage</i>
Male	4	11.4 %
Female	31	88.6 %
Total	35	100 %

Female respondents portrayed the largest frequency of 31 with 88.6% representing the respective percentage. Out of the 35 total number of respondents, merely four were male with the respective percentage being 11.4%. Furthermore, Sebastian et al. (2022) identified that elementary teaching remains a female-dominated field, and students experience merely limited interactions with male and/or father figures in elementary schooling.

Teaching experience

Table 1.3 shows the frequency and percentage distribution of the teachers' profiles in terms of their teaching experience. Teachers with

5 - 9 years of teaching experience had the greatest frequency and percentage from the bracket of years of teaching, that is, 13 and 37.1%, respectively. There are nine respondents with over 20 years of teaching experience, which accounts for 25.7%. This is comparable to the research of Odanga et al. (2022) where most of the respondents were in the category of 5–9 years of experience.

Table 1.3. Percentage Distribution of the Teachers' Teaching Experience

<i>Years of Teaching</i>	<i>Frequency</i>	<i>Percentage</i>
1 - 4 years	4	11.4 %
5 - 9 years	13	37.1 %
10 -14 years	6	17.1%
15 - 19 years	3	8.6 %
20 years plus	9	25.7 %
Total	35	100 %

Demographic profile of the respondents included age, gender, and teaching experience. 34.3% of the respondents were aged 30-39 years. 88.6% of the respondents were female. The largest category of teachers (37.1%) possessed 5-9 years of teaching experience.

Technology Usage Frequency

Table 2 displays the frequency and percentage distribution of the teachers' technology usage frequency every week.

Table 2. Percentage Distribution of the Teachers' Technology Usage on a Weekly Basis

<i>Not at all</i>		<i>Low</i>		<i>Moderate</i>		<i>High</i>		<i>Extremely High</i>	
<i>F</i>	<i>P</i>	<i>F</i>	<i>P</i>	<i>F</i>	<i>P</i>	<i>F</i>	<i>P</i>	<i>F</i>	<i>P</i>
0	0%	0	0%	21	60%	10	28.6%	4	11.4%

Legend: P – Percentage, F – Frequency

Participants were also required to indicate how often they utilize technology in their instruction each week. They responded on a Likert Scale from 1 (not at all) to 5 (very high). The table indicates that the majority of the participants utilize technology at a moderate level each week, with the frequency of 21, which also represents 60%. Ten instructors (28.6%) employed technology at a high frequency on a weekly basis. Instructors who employed technology at an extremely high frequency had (4) frequency with 11.4% of total participants. Winter et. al (2021) observes that, "Teacher participants use technology regularly and have a good level of skill in using a wide variety of programmes and apps." The majority of teachers (60%) used technology moderately once a week.

Level of Skills in the Use of Technology

Table 3. Teachers' Level of Skills in the Use of Technology

<i>Technologies</i>	<i>Weighted Mean</i>	<i>Verbal Interpretation</i>
Email	3.51	Advanced
Word Processing (Microsoft Office, Google Workspace)	3.49	Advanced
Presentation Software	3.26	Medium
TV monitors, computers, interactive whiteboard	3.43	Advanced
Projectors	3.23	Medium
Multimedia use (e.g. video)	3.54	Advanced
Virtual Classrooms (Zoom, Google Meet, Skype)	2.91	Medium
Printers and scanners	3.91	Advanced
Speakers, microphones	3.77	Advanced
Overall Mean	3.45	Advanced

Legend: 4.20 - 5.00 Expert 1.80 – 2.59 Beginner 3.40 – 4.19 Advanced 1.00 – 1.79 No Awareness 2.60 – 3.39 Medium

Table 3 shows the weighted mean distribution and verbal translation of the teachers' skill level in technology usage. As seen in the table, the overall mean score for all of the recognized technologies was 3.45, and its verbal translation is "Advanced." Teachers labeled themselves as advanced-level users of the majority of the technologies listed. Teachers were advanced-level users of email with a weighted mean of 3.51. Microsoft Office, Google Workspace received a weighted mean of 3.49 and verbal score of Advanced. Teachers labeled themselves as advanced-level users of TV monitors, computers, and interactive whiteboards with a weighted mean of 3.43. Multimedia usage (e.g., video) had a weighted mean of 3.54, which suggests that the teachers were advanced-level users of this technology. Teachers also reported themselves as advance-level users of Speakers and Microphones with a weighted mean of 3.77. Printers and scanners recorded the greatest weighted mean of 3.91, which equates to Advance as its verbal meaning. A majority of the teachers reported themselves as medium level users of presentation software, Projectors and Virtual classrooms (Zoom, Google Meet, Skype) with a weighted mean of 3.26, 3.23, and 2.91, respectively. From the table, teachers exhibit the lowest usage level of Virtual Classrooms (Zoom, Google Meet, Skype), as it has the lowest weighted mean of 2.91. The overall mean score (3.54) reflected a positive attitude toward teachers' level of expertise in teaching 21st century students. Responses suggest that teachers' optimum use of technology is linked to integration and facilitation of teaching and learning (Winter E., et.al, 2021)

The overall mean score showed an "Advanced" level of technological skills usage among the teachers. Teachers tended to view themselves as advanced-level users for the majority of the technologies, with ratings of "Advanced" for email, word processing, TV

monitors, computers, interactive whiteboards, use of multimedia, printers and scanners, and speakers and microphones. "Medium" level was seen for presentation software, projectors, and virtual classrooms.

The Unified Theory of Acceptance and Use of Technology (UTAUT) Survey

Here, participants were reminded that the researcher was employing a definition of technology that includes computer hardware (e.g. scanners, cameras, videoconferencing equipment), software applications (e.g. word processing, Excel, Internet, PowerPoint, web page creation) and any technology specific to their teaching subject. They were required to circle the figure that most accurately reflects their level of agreement or disagreement with every statement, on a scale of 1 being Strongly Disagree, 2 being Disagree, 3 being Neutral, 4 being Agree and 5 being Strongly Agree. The grand mean score for this factor shows that the participants generally had a positive attitude towards their effort expectancy.

Effort Expectancy

Effort expectancy refers to the teachers' belief that their effort in applying technology in teaching will lead to a desirable outcome.

Table 4.1. Frequency and Mean Distribution of Effort Expectancy

Statements	Mean	Verbal Interpretation
My interaction with technology for teaching in the 21st century classroom would be clear and understandable.	4.31	Strongly Agree
I would find using technology for teaching the 21st century learners easy to do.	4.26	Strongly Agree
It would be easy for me to become skillful at using technology for teaching in the 21st century learners.	4.17	Agree
Learning to use technology for teaching in the 21st century classroom would be easy for me.	4.29	Strongly Agree
Overall Mean	4.26	Strongly Agree

Effort expectancy refers to the teachers' belief that their effort in applying technology in teaching will lead to a desirable outcome. The overall mean score reached in this factor indicates that participants mostly have a positive attitude towards their effort expectancy. According to Table 3.1, most of the teachers think that they strongly agreed to the item that "their interaction with technology is clear and understandable" as their mean score is 4.31. For the second item in this factor: "I would find using technology for teaching the 21st century learners easy to do.", the mean score of the lecturers was 4.26. Also, the mean score of the third item in this factor: "It would be easy for me to become skillful at using technology for teaching in the 21st century learners." was 3.80, which means the participants found technology as easy as it may be thought. Item 4 in this factor: "Learning to use technology for teaching in the 21st century classroom would be easy for me." indicated a mean score of 4.29. It may be inferred that the participants are mostly capable of learning how to operate technology on teaching 21st century learners as to their overall mean score was 4.26. This study corroborates with Gümüşoğlu, et.al (2017), who stated that "The responses given for the items in this factor reveal that participants mean scores are above 3.00, which means their attitude is positive."

Performance Expectancy

Table 4.2. Frequency and Mean Distribution of Performance Expectancy

Statements	Mean	Verbal Interpretation
Using technology for teaching in the 21st century classroom would enable me to accomplish tasks more quickly.	4.60	Strongly Agree
Using technology for teaching in the 21st century classroom would increase my productivity.	4.54	Strongly Agree
If I use technology for teaching in the 21st century classroom, I will increase my employment opportunities.	4.40	Strongly Agree
I would find using technology for teaching in the 21st century classroom useful.	4.63	Strongly Agree
Overall Mean	4.54	Strongly Agree

Performance expectancy is defined as the teachers' belief that using a particular technology will improve their teaching performance. The responses given for the items in this factor reveal that participants' mean scores are above 4.20, which means their attitude is very positive. As seen in Table 4.2, most teachers who took the questionnaire think that strongly agree that using technology would enable them to accomplish tasks more quickly with the mean score of 4.60. Also, they believed that using technology would increase their productivity as they strongly agreed with a mean score of 4.54. The mean score of the third item (4.40) indicates that participants think that using technology would increase their employment opportunities. In addition, teachers strongly agreed that they find using technology useful in the classroom. The result of this factor coincides with the previous study. According to Gümüşoğlu, et.al (2017), "Overall mean scores reached in this factor indicate that participants mostly have positive attitude towards their performance expectancy."

Social Influence

Social influence refers to the degree to which teachers perceive that important others believe he or she should use technology in teaching the 21st century learners. Respondents' attitude towards the social influence in using technology is above the agree threshold according to the overall mean score reached. Table 4.3 shows that teachers mostly agree to all the items of social influence factors with a uniform

mean score of 4.11. Teachers agree with this statement “People who are important to me would think that I should use technology for teaching in the 21st century classroom”.

Table 4.3. *Frequency and Mean Distribution of Social Influence*

<i>Statements</i>	<i>Mean</i>	<i>Verbal Interpretation</i>
People who are important to me would think that I should use technology for teaching in the 21st century classroom.	4.11	Agree
People who influence my behavior would think that I should use technology for teaching in the 21st century classroom.	4.11	Agree
In general, the school has supported the use of technology.	4.11	Agree
Overall Mean	4.11	Agree

They also agreed that people who influence their behavior would think that they should use technology. Furthermore, they agreed that their school supported them to use technology in their teaching, in general. “Participants’ attitudes about the social influence for using technology is above the neutral threshold according to the mean scores reached”, Gümüşoğlu, et.al (2017).

Facilitating Conditions

Table 4.4. *Frequency and Mean Distribution of Facilitating Conditions*

<i>Statements</i>	<i>Mean</i>	<i>Verbal Interpretation</i>
A specific person (or group) would be available for assistance with difficulties when using technology for teaching in the 21st century classroom.	4.23	Strongly Agree
I have the knowledge necessary to use technology for teaching in the 21st century classroom.	3.94	Agree
I have the resources necessary to use technology for teaching in the 21st century classroom.	3.63	Agree
Overall Mean	3.93	Agree

Facilitating conditions is defined as the degree to which teachers believe that an organizational and technical infrastructure exists to support the use of technology. The overall mean score reached in this factor reveals that respondents have a positive attitude towards the facilitating conditions in their schools. As reflected in Table 4.4, respondents agreed with the first item: “A specific person (group) would be available for assistance with difficulties when using technology for teaching in the 21st century classroom” This has a mean score of 4.23 which indicates that they have somebody to help them while using technology.

Also, the teachers agreed that they have the knowledge necessary to use technology with a mean score of 3.94. Additionally, they agreed to the last item with a mean score of 3.63, which states that, “I have the resources necessary to use technology for teaching in the 21st century classroom. Gümüşoğlu, et.al (2017), states in their study that, “Overall mean scores reached in this factor reveal that participants have positive attitude towards the facilitating conditions in their institution.”

Behavioral Intentions

Table 4.5. *Frequency and Mean Distribution of Behavioral Intentions*

<i>Statements</i>	<i>Mean</i>	<i>Verbal Interpretation</i>
I am determined that I will use technology for teaching in the 21st century classroom.	4.34	Strongly Agree
I plan to use technology for teaching in the 21st century classroom.	4.51	Strongly Agree
I intend to use technology for teaching in the 21st century classroom.	4.46	Strongly Agree
Overall Mean	4.44	Strongly Agree

Behavioral intention is defined as the teachers’ intention to use technology in the teaching-learning process which is influenced by their attitude towards technology. As seen in Table 4.5, the overall mean score (4.44) indicates that teachers have a positive attitude with the behavioral intentions factor. Most of the teachers strongly agreed with first item: “I am determined that I will use technology for teaching in the 21st century classroom” with a mean score of 4.34.

They also strongly agreed that they plan to use technology in teaching which revealed a mean score of 4.51. A mean score of 4.46 was distributed to the third item: “I intend to use technology for teaching 21st century classroom”, which indicates that they strongly agreed with this item. The result of this factor is similar with the study of Birch, A., & Irvine, V. (2011), who stated that, “The mean response for the behavioral intention construct was 5.92, indicating a high intention of the participants to use ICT during their practicum teaching.”

Self-Efficacy

Table 4.6. *Frequency and Mean Distribution of Self-Efficacy*

<i>Statements: I could complete a job or a task using technology...</i>	<i>Mean</i>	<i>Verbal Interpretation</i>
If there was no one around to tell me what to do.	3.74	Agree
If I could call someone for help if I got stuck.	3.66	Agree
If I had a lot of time to complete the job for which the software was provided.	3.91	Agree
If I had just the built-in help facility or assistance.	4.06	Agree
Overall Mean	3.84	Agree

The mean scores achieved show that participants mostly feel positive about the statements in this factor. In Table 4.6, we can see that the teachers mostly believe that they could complete a job or a task using technology even if there was no one around to tell them what to do, with a mean score of 3.74. They mostly agreed that they need to call someone for help if they get stuck with a mean score of 3.66. They also agreed with the third item: "I could complete a job or a task using technology if I had a lot of time to complete the job for which the software was provided," which has a mean score of 3.91. Also, they believe that they could complete the task if they had just the built-in help facility or assistance by choosing to agree with the mean score of 4.06. This is supported in the study according to Gümüşoğlu, et.al (2017), who stated, "Their scores were lower than the other factors, which means that teachers may have some doubts about their self-efficacy in using technology in the classroom."

Anxiety

The mean scores of the items in this factor show that they tended to disagree with the overall mean score of 2.57.

Table 4.7. Frequency and Mean Distribution of Anxiety

Statements	Mean	Verbal Interpretation
I hesitate to use technology for fear of making mistakes I cannot correct.	2.31	Neutral
I feel apprehensive (anxious) about using technology.	2.37	Neutral
Using technology is somewhat intimidating to me.	2.09	Neutral
Overall Mean	2.57	Neutral

The mean scores of the items in this factor show that they tend to disagree with the overall mean score of 2.57. According to Table 4.7, teachers disagreed with a 2.31 mean score with the first item that they hesitate to use technology for fear of making mistakes they cannot correct. Moreover, the mean score of the second item (2.37) revealed that the teachers do not feel anxious about using technology. Also, they think that they do not find technology somewhat intimidating, with the mean score of 2.09. This is supported by Gümüşoğlu, et.al (2017) who stated that, "The mean scores of the items in this factor show a neutral tendency. However, the items were stated negatively and their disagreement on a negative statement is considered as a positive attitude."

Overall Acceptance of Technology

Table 5. Overall acceptance of technology

UTAUT Factors	Weighted Mean	Verbal Interpretation
Effort Expectancy	4.26	Strongly Agree
Performance Expectancy	4.54	Strongly Agree
Social Influence	4.11	Agree
Facilitating Conditions	3.93	Agree
Behavioral Intentions	4.44	Strongly Agree
Self - Efficacy	3.84	Agree
Anxiety	2.57	Disagree
Grand Weighted Mean	3.96	Agree

Legend :4.20 - 5.00 Strongly Agree 1.80 - 2.59 Disagree 3.40 - 4.19 Agree 1.00 - 1.79 Strongly Disagree 2.60 - 3.39 Neutral

As indicated in Table 5, Anxiety possessed the least weighted mean of 2.57. The sentences in this factor were, however, phrased negatively so that the teachers possess a positive mindset towards their anxiety. Overall acceptance of technology based on the factors identified in the UTAUT survey was 3.96. This finding may suggest that the subjects in this research experienced a positive feeling towards using technology in teaching.

In the opinion of Birch, A. and Irvine, V. (2009), "Those who are skilled at basic ICT tools (word, e-mail, etc.) will be likely to score their skills as high skill level, while those students who are more sophisticated in their ICT skills will know the tools available which they are not familiar with yet and might score themselves lower. Actually, these people should be scored as high technology skill level."

Gümüşoğlu, et.al (2017) also asserted that, "Overall, the results revealed that participants in this study had above-average level of technology acceptance." The teachers were provided a list of the top ten possible obstacles to effectively using technology in the instruction of 21st-century learners.

Technology Application Barriers

They were requested to order these barriers by how significant of an obstacle they are to overcome in their respective schools when incorporating technology into their classroom instruction. Rank 1 was the most important barrier and 10 was the least important barrier. Table 6 presents the 10 barriers with their rank based on their calculated means. The lowest means were most important and the highest means were least important. The teachers opined that "Unequal student access to devices at home" is the most important, with a mean score of 3.00. They also found that "Limited or unreliable internet connectivity at school" is also a considerable obstacle, being the second in order, with a mean of 3.40. Moreover, the respondents selected "Feeling that standardized testing doesn't value the skills developed through technology use" as being least important, with a mean of 8.23.

Table 6. *Technology Application Barriers*

<i>Statements</i>	<i>Mean</i>	<i>Rank</i>
Unequal student access to devices at home.	3.00	Most
Limited or unreliable internet connectivity at school.	3.40	2
Outdated computers, tablets, or software in the classroom.	3.94	3
Lack of professional development opportunities on using technology in teaching.	4.83	4
Concerns about student data security and online safety when using technology.	5.26	5
Students getting distracted by social media or games on devices during class.	5.86	6
Limited access to IT support staff to troubleshoot technical problems.	6.03	7
Difficulty finding time to plan technology-integrated lessons with a packed schedule.	7.06	8
Personal discomfort or limited digital literacy skills when using technology.	7.57	9
Feeling that standardized testing doesn't value the skills developed through technology use.	8.23	Least

Livingstone, S., & Helsper, E. J. (2007) report that "Little academic and policy attention has addressed the 'digital divide' among children and young people." Their article discusses results from a national survey of UK 9—19-year-olds that show inequalities by age, gender, and socioeconomic status regarding their quality of access to and use of the Internet. Since both the level of usage and the motivations for low and non-internet use differ with age, there needs to be a different explanation for the digital divide between children and adults.

Correlation

Table 7 shows the correlation between the teachers' teaching experience and the teachers' level of skills in using technology and the UTAUT Survey factors.

Table 7. *Correlation between the Teachers' Teaching Experience Versus Their Level of Skills in Using Technology and the UTAUT Survey Factors*

<i>Factors</i>	<i>Correlation Coefficient</i>	<i>p-value</i>
A. Level of Skills in Using Technology	0.117	0.503
B. The UTAUT Survey Factors		
Effort Expectancy	0.105	0.548
Performance Expectancy	0.148	0.395
Social Influence	0.196	0.260
Facilitating Conditions	0.001	0.995
Behavioral Intentions	0.116	0.507
Self-Efficacy	0.231	0.182
Anxiety	0.120	0.493

Teaching Experience and Level of Skills in Using Technology

As seen in the table, the level of skills in using technology among teachers has a p-value of 0.503, which is larger than 0.05. This implies that there is no statistical linear correlation between teaching experience and the level of skills in using technology among the sample. The correlation coefficient of 0.117 shows a weak positive linear trend.

The UTAUT Survey

According to the table and at a significance level of 0.05, there was no statistical linear relationship between teaching experience and any of the UTAUT Survey factors.

Effort Expectancy is the first UTAUT Survey factor with a p-value of 0.548, which was greater than 0.05. This means that there is no statistical linear relationship between teaching experience and effort expectancy. The correlation coefficient of 0.105 indicates a weak positive linear trend.

Performance Expectancy has a p-value of 0.395, which is larger than 0.05. This indicates there is no statistical linear relationship between teaching experience and performance expectancy. The correlation coefficient of .148 indicates a weak positive linear trend.

Social Influence is 0.260, which is larger than 0.05. This means that there is no statistically significant linear relationship between social influence and teaching experience. The correlation coefficient of .196 indicates a weak, positive linear trend.

A p-value of 0.995 is in Facilitating Conditions, which is higher than the 0.05 significance level. This means that there is no statistically significant linear association between teaching experience and facilitating conditions. The correlation coefficient of 0.001 is a very weak, near-zero linear trend.

The p-value for the Behavioral Intentions factor is 0.507, which is higher than the threshold significance level of 0.05. This means that there is no statistically significant linear relationship between teaching experience and the behavioral intentions. The linear trend indicated by the correlation coefficient of 0.116 is weak and positive.

The p-value for self-efficacy was 0.182, higher than the significance level of 0.05. This implies that there is no statistically significant

linear correlation between teaching experience and self-efficacy. The linear trend is weak to moderate at 0.231 as indicated by the correlation coefficient.

Anxiety factor had a p-value of 0.493, which is larger than 0.05. That suggests that there is no statistically significant linear correlation between teaching experience and anxiety. The correlation coefficient of 0.120 indicates a weak positive linear trend.

Conclusions

Based on the study's findings, it is concluded that the teacher population across Japitan, Kandugay, and San Rafael Elementary Schools is predominantly female, generally mid-career (30-49 age range), with significant teaching experience (5-9 years). These teachers exhibit frequent and advanced technology usage, perceiving themselves as highly skilled in applying diverse technologies. Their high level of technology acceptance is notably driven by positive perceptions across all Unified Theory of Acceptance and Use of Technology (UTAUT) factors, including effort and performance expectancy, social influence, facilitating conditions, and behavioral intentions, coupled with low anxiety; however, their self-efficacy, while positive, is slightly less pronounced. The primary impediments to technology integration are external, specifically the unequal student access to devices at home and unreliable internet connectivity at school. Critically, the study found no statistically significant linear relationship between teaching experience and teachers' self-reported technology skills or their technology acceptance perceptions as per the UTAUT model. This suggests that in this particular sample, teachers' years in service do not meaningfully differentiate their technology skills or their readiness to adopt technology.

Stemming directly from these conclusions, the recommendations aim to leverage the existing high acceptance and skill levels while strategically addressing the identified barriers. For school administration and policymakers, priorities include implementing robust strategies to bridge the digital divide by mitigating unequal student access to devices and enhancing school internet infrastructure through targeted investments. Sustained professional development opportunities, particularly those focused on pedagogical technology integration and practical IT support, are also crucial, along with developing action plans for broader barriers like outdated technology. Furthermore, considering technology skills within teacher evaluations could foster greater value for digital proficiency. For teachers, recommendations focus on fostering a collaborative environment to share best practices in technology integration and actively encouraging the exploration and utilization of available IT support and professional development to continuously refine their skills. Future research should build on these findings by investigating potential non-linear relationships between teaching experience and technology variables, exploring qualitative perspectives to gain deeper insights into teachers' experiences, and conducting longitudinal studies to observe the evolution of skills and acceptance over time. Additionally, replicating this study with a larger, more diverse sample would enhance the generalizability of these findings, and future studies should specifically investigate the impact of identified barriers on actual technology integration practices and student outcomes.

References

- Bhandari, P. (2023). What is a Likert scale? | Guide & Examples. Scribbr. Retrieved August 6, 2024, from <https://www.scribbr.com/methodology/likertscale/#:~:text=A%20Likert%20scale%20is%20a,five%20or%20seven%20answer%20statements>.
- Bingimlas, K. A. (2009). Barriers to the successful Integration of ICT in teaching and learning Environments: A Review of the literature. *Eurasia Journal of Mathematics Science and Technology Education*, 5(3). Retrieved June 24, 2024, from <https://doi.org/10.12973/ejmste/75275>
- Birch, A., & Irvine, V. (2011). Preservice teachers' acceptance of ICT integration in the classroom: applying the UTAUT model. *Educational Media International*, 46(4), 295–315. Retrieved June 20, 2024, from <https://doi.org/10.1080/09523980903387506>
- Bordwell, D (2008) A case for cognitivism. (Spring 1989): 11-40. Retrieved August 13, 2024 from <https://blog.yorksj.ac.uk/digitallearning/>
- Brown, N., & Venkatesh, N. (2005). Model of adoption of technology in households: A baseline model test and extension incorporating household life cycle. *MIS Quarterly*, 29(3), 399. <https://doi.org/10.2307/25148690>
- Byrne, A (1996) Behaviourism. In S. D. Guttenplan (ed.), *A Companion to the Philosophy of Mind*. Blackwell (1996). Retrieved August 13, 2024 from <https://blog.yorksj.ac.uk/digitallearning/>
- Cheung, S. K., Wang, F. L., Kwok, L. F., & Poulova, P. (2021). In search of the good practices of personalized learning. *Interactive Learning Environments*, 29(2), 179–181. Retrieved June 18, 2024, from <https://doi.org/10.1080/10494820.2021.1894830>
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Sage Publications.
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage Publications.
- Dexterity Learning Solutions. (2023). Why is technology important in 21st century education and how does it play an vital role and benefit students and teachers? Retrieved June 2, 2024, from <https://www.linkedin.com/pulse/why-technology-important-21st-century>

- Epistemo. (2021). Use of technology in 21st-Century Education- Epistemo. Epistemo Vikas Leadership School. Retrieved May 17, 2024, from <https://epistemo.in/blog/the-growing-use-of-technology-in-21st-century-education-2/>
- DepEd. (2021). Department of Education and GENTEFLL Host Free International Multidisciplinary Webinar Series for Teachers. Retrieved January 11, 2024 from <https://www.deped.gov.ph/2021/07/22/filipino-teachers-join-international-webinar>
- DepEd. (2023). DO 16, s. 2023: Revised Guidelines on Implementing the DepEd Computerization Program (DCP). RETrieved January 11, 2024 from https://www.deped.gov.ph/wp-content/uploads/DO_s2023_016.pdf
- Ertmer, P. A. (1999). Addressing first- and second-order barriers to change: Strategies for technology integration. *Educational Technology Research and Development*, 47(4), 47–61. Retrieved January 6, 2024, from <https://doi.org/10.1007/bf02299597>
- Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational Technology Research and Development*, 53(4), 25–39. Retrieved January 6, 2024, from <https://doi.org/10.1007/bf02504683>
- Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2012). *How to design and evaluate research in education* (8th ed.). McGraw-Hill.
- Gümüsoğlu, E. K., Akay, E. (2017). Measuring technology acceptance level of teachers by using unified theory of acceptance and use of technology. *International Journal of Languages Education*, 1(Volume 5 Issue 4), 378–394. Retrieved June 21, 2024 from <https://doi.org/10.18298/ijlet.2239>
- Issroff, K., & Scanlon, E. (2002). Educational Technology: The Influence of Theory. *Journal of Interactive Media in Education*, 2002(1), 6. Retrieved June 21, 2024 from <https://doi.org/10.5334/2002-6>
- Johnson, A. M., Jacovina, M. E., Russell, D. G., & Soto, C. (2016). Challenges and Solutions when Using Technologies in the Classroom. In *Routledge eBooks* (pp. 13–30). Retrieved January 6, 2024 from <https://doi.org/10.4324/9781315647500-2>
- Johnson, R. B., & Christensen, L. (2019). *Educational research: Quantitative, qualitative, and mixed approaches* (7th ed.). Sage Publications.
- KnowingTech. (2021). Why technology is essential to a 21st century education? Knowing Technologies. Retrieved June 23, 2024 from <https://knowingtechnologies.com/21st-century-education-technology/>
- Kumala, F. N., Ghufon, A., & Pujiastuti, P. (2022, October 1). Elementary school teachers' TPACK profile in science Teaching based on demographic factors. <https://e-iji.net/ats/index.php/pub/article/view/253>
- Livingstone, S., & Helsper, E. J. (2007). Gradations in Digital Inclusion: Children, Young people and the Digital divide. *New Media & Society*, 9(4):671-696. Retrived May 1, 2025 from <https://doi.org/10.1177/1461444807080335>
- Odanga, S. J., Aloka, P. J., & Raburu, P. (2022). Effects of Experience on Teachers' Self-Efficacy in Secondary Schools. *Alberta Journal of Educational Research*, 68(1), 119–132. Retrieved May 22, 2025 from <https://doi.org/10.55016/ojs/ajer.v68i1.70744>
- Orji, R. (2010). Effect of academic discipline on technology acceptance. "Effect of Academic Discipline on Technology Acceptance." Retrieved January 6, 2024 from <https://doi.org/10.1109/icemt.2010.5657581>
- Papert, S (1993) *the children's machine*. New York, basic books. Retrieved August 13, 2024 from <https://blog.yorks.ac.uk/digitallearning/>
- Saettler, P (1990) *The evolution of American educational technology*. Englewood, CO libraries unlimited. Retrieved August 13, 2024 from <https://blog.yorks.ac.uk/digitallearning/>
- Sebastian, M., Banate, R., & Saquin, M. (2022). GENDER ROLES AMONG PUBLIC ELEMENTARY TEACHERS: BASIS FOR GENDER-RESPONSIVE INTERVENTION ACTIVITIES. *International Online Journal of Primary Education*, 11(2), 401–411. Retrieved May 22, 2025 from <https://doi.org/10.55020/iojpe.1222199>
- Simplilearn. (2024). What is Descriptive Statistics: Definition, Types, Applications, and Examples. *Simplilearn.com*. Retrieved August 13, 2024 from <https://www.simplilearn.com/what-is-descriptive-statistics->

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