INTERNATIONAL MULTIDISCIPLINARY JOURNAL OF RESEARCH FOR INNOVATION, SUSTAINABILITY, AND EXCELLENCE (IMJRISE)
https://risejournals.org/index.php/imjrise
Volume 1, Issue no. 6 (2024)
ISSN: 3028-032X (online) | ISSN: 3028-0370 (print)

Utilization of Technology in Teaching: Basis for a Capability Building Plan

DOI: https://doi.org/10.5281/zenodo.11406565

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Abstract

Utilization of technology in teaching is a multifaceted concept, encompassing the integration of digital tools and resources to augment the teaching and learning process (Mishra & Koehler, 2006). This study examines the extent of utilization of technology in teaching practices of the teachers in a medium size private school in Timor Leste. The respondents, predominantly younger foreign teachers with relatively higher family monthly incomes, demonstrated a notable inclination towards integrating technology in various aspects of instruction. Specifically, they rated the use of technology as highly significant in the preparation of learning materials, assessment of learning, and learning delivery. Furthermore, both older and younger teachers, irrespective of age group, displayed similar high ratings for technology integration in these instructional areas. Likewise, teachers from different nationalities, including both local and foreign educators, exhibited comparable levels of technological integration. Moreover, educators with varying income brackets, encompassing those with higher and lower family incomes reported consistent high ratings across all instructional domains. Statistical analysis, employing the Mann Whitney U test, revealed that age was not a significant determinant of technological integration. Conversely, nationality and family income emerged as significant factors in the area of preparation of learning materials. Nevertheless, no significant differences were observed in the assessment of learning and learning delivery across age groups, nationalities, and combined family income levels. This study calls for the widespread acknowledgement and application of technology in teaching practices, emphasizing the universal effectiveness of technological integration across diverse teacher demographics.

Keywords: Utilization, technology, learning materials, assessment of learning, learning delivery.

Introduction

Nature of Problem

In the 21st century, integrating technology into education has become essential to effective teaching. Teachers are expected to be adept at using technology as it offers numerous benefits, such as enhancing student engagement, facilitating personalized learning, and improving educational outcomes (Hew & Brush, 2017). The apt utilization of technology enriches the educational process and equips students with the digital literacy skills essential for success in the modern world (Mishra and Koehler (2016). The use of technology in teaching is not just about using digital tools, but also about creating an innovative learning environment that enhances students' learning experiences (Ertmer & Ottenbreit-Leftwich, 2015). However, the extent to which teachers integrate technology into their teaching practices varies significantly, prompting the need for a comprehensive examination of the current state of affairs.

In the current educational landscape, it is apparent that despite the abundance of technological resources, the extent of their seamless integration into teaching practices remains a topic of investigation. Educators frequently face challenges associated with technological proficiency, resource accessibility, and alignment with pedagogical approaches (Ertmer et al., 2022). This situation prompts essential inquiries about the existing disparities in teachers' technological adeptness and the potential barriers hindering its complete assimilation. Grasping these nuances is crucial for devising a well-considered blueprint for advancing capacity in technology-enhanced pedagogy. This could be due to various factors, such as a lack of technical skills, resources, and support (Hew & Brush, 2017).

The impetus behind this research study arises from a collective dedication to strengthening the teaching profession by equipping educators with the essential skills and knowledge for effective technology utilization. In an era characterized by swift technological progress, ensuring that educators are proficient in employing these tools is not merely a professional obligation, but also a societal imperative (International Society for Technology in Education (ISTE) 2017). A systematic examination of the current landscape of technology integration in education

aims to uncover insights that will serve as the foundation for a carefully devised capability-building plan. This plan, designed to bridge extant gaps in technological proficiency, will empower educators to harness technology's potential in education fully, ultimately amplifying the quality and effectiveness of teaching and learning endeavors.

Current State of Knowledge

The International Association of Universities (2020) reported that more than a billion students around the globe were affected by school interruptions, and the crisis continues to distress the vulnerable segment of learners. The World Bank (2020) has firmly cautioned authorities about the consequences of decreased school attendance, such as the permanent deprivation of knowledge and learners' bleak future financial prospects. Some scholars project that the steep learning curve will haunt learners in the future. Amid these grim realities, the United Nations (2021) has recently encouraged countries to look at the brighter side of the situation, redirecting them to take the disruption as an excellent opportunity to renew education systems.

Technology, as a term, had never been given a standard definition due to the varying meanings people attached to it. An ethological perspective of its definition connotes that something inherently intelligent enough to function, be used to function, or be interpreted as having a function that intelligent beings like humans can appreciate, something devised, designed or discovered serving a particular purpose (La Shun, 2017). Raja and Nagasubramani (2018) found that technology has a positive impact on education and, at the same time, may also pose adverse effects. Teachers and students should take advantage of this in a good light and eliminate the drawbacks that are pulling many students and schools from achieving excellence. It is thus time for every country to introduce a more technologically equipped education sector in the future.

With the current realities, technology has been dubbed by scholars as the "holy grail" that will solve the educational implementation issues brought about by COVID-19 Obana (2020) as cited in Anoba and Cahapay (2020). Educational continuity and recovery have been enabled with teachers and learners barred at home. Amid the continual crisis, technology under ideal conditions has promoted flexibility in the place and time to study, accessibility of different teaching and learning resources, personalized ways of teaching and learning, and readiness for future digital demands. The scale of teaching and learning required for effective educational continuity mainly relies on adopting and integrating technology into the practice. The COVID-19 crisis has motivated schools and education to engage in extensive technological transformation (Iivari et al., 2020).

The study by Carstens, Mallon, Bataineh et al. (2021) showed many positive and negative aspects of technology use in the classroom. Although looking through survey results, teachers shared more positive impacts of technology than negative ones. In some areas, teachers felt they could use more support but felt that student motivation and engagement were higher with technology in the classroom. Teachers would benefit from more personal training on implementing technology in the classroom to feel more comfortable with including technology. Educators also felt that students need more training with the provided technology to help promote more independence. The researchers believe that more research must be completed to determine technology's effects on the classroom.

In another study conducted by Johnson, Smith, and Jones (2021) corroborates the present findings, reinforcing the notion that integrating technology into the assessment process yields substantial benefits. Their research underscores that educators spanning various age groups recognize the instrumental role of technological tools in enhancing the assessment of student learning. By leveraging technology, educators are better equipped to conduct thorough and precise evaluations, allowing for a more holistic understanding of each student's progress and areas for improvement. This alignment between the current study and Johnson et al.'s research underscores a consistent acknowledgment within the educational community of technology's transformative potential in refining assessment practices and, ultimately, the quality of education delivered to students.

Theoretical Underpinnings

The study draws upon the Technological Pedagogical Content Knowledge in utilizing and integrating technology in teaching (TPACK) framework, a comprehensive theoretical construct developed by Mishra and Koehler (2006). TPACK integrates three essential components in educational practice: technological knowledge, pedagogical knowledge, and content knowledge. It emphasizes the dynamic interplay between these elements, highlighting the importance of teachers' ability to integrate technology to enhance learning experiences effectively. Technological knowledge pertains to understanding various technological tools and their applications, while pedagogical knowledge refers to the expertise in employing effective teaching strategies. Content knowledge encompasses the subject matter expertise. The intersection of these knowledge domains, as posited by the TPACK framework, is crucial in realizing meaningful and effective technology integration in education.

TPACK provides a nuanced understanding of how teachers can leverage technology to optimize instructional practices. It acknowledges that mere technological proficiency is insufficient; educators must also possess a profound comprehension of the subject matter and pedagogical strategies to integrate technology

seamlessly into their teaching. This theoretical framework acknowledges the complex and multifaceted nature of teaching, recognizing that effective technology integration requires a balanced amalgamation of technological competence, pedagogical prowess, and content expertise. TPACK aligns closely with the objectives of this study, which seeks to assess the extent of technology utilization in teaching. By utilizing this framework, we can discern the extent to which technology is employed and how it is integrated within the broader context of teaching practices.

The TPACK framework is particularly well-suited for this study due to its holistic perspective on technology integration in education. It acknowledges that effective technology use in teaching is contingent upon the harmonious integration of technological, pedagogical, and content knowledge. This aligns seamlessly with the study's objectives of evaluating the extent of technology utilization in teaching across various domains. By adopting the TPACK framework, the study is poised to provide a comprehensive and nuanced assessment, going beyond surface-level examinations of technological proficiency. It enables a deeper exploration of how teachers' proficiency in technology interacts with their pedagogical approaches and subject matter expertise, offering valuable insights for formulating a tailored capability-building plan. The TPACK framework's emphasis on the interplay of knowledge domains ensures that the study's findings will be robust and multifaceted, providing a solid foundation for actionable recommendations**.**

Objectives

This study sought to determine the extent of utilization of technology in teaching in a medium-sized private school in an independent country in Southeast Asia for the school year 2022-2023 as basis for capability building plan. Specifically, it seeks to answer the following questions:1) the extent of technology utilization in teaching in the area of preparation of learning materials, assessment of learning, and learning delivery; 2) the extent of technology utilization in teaching when grouped according to the aforementioned variables; and 3) the significant difference in the extent of utilization of technology in teaching when grouped and compared according to the aforementioned variables

Methodology

This chapter presents the research design used, the locale, the subjects, the respondents of the study, the research instruments, the conduct of the study, the procedure in the analysis of the data relative to the specific objectives, and the statistical tools used in the study.

Research Design

This study used the descriptive research design to determine the extent of technology utilization in teaching in a medium-sized private school in an independent country in Southeast Asia for the school year 2022-2023 as the basis for a capability-building plan. The descriptive method of research, according to Loeb (2017), seeks to determine the relationship between variables, explore the causes of phenomena and hypotheses, and develop generalizations, principles, and theories based on the findings. The nature of this study determined the condition of things in their present state. It determined differences between variables that were considered in the study. Based on the above premise, the researcher considered using the descriptive research design most appropriate.

Respondents

The sample size was determined using Cochran's Formula, and stratified random sampling was utilized to determine the actual number of respondents. The population size of the study is quite manageable to handle. The respondents of the study consist of all 60 teaching personnel of the school, encompassing both local and foreign teachers.

Instruments

The researcher gathered data by administering the researcher-made survey questionnaire to the total teacher population of teachers in the venue. It was subjected to validity (4.37-excellent) and reliability (0.965-excellent). All of them were interpreted as worthy and good; respectively. To determine the extent of the utilization of technology in teaching, a researcher-made data-gathering instrument, which is composed of two parts, was used. Part 1 contains queries on respondents' profiles, such as their sex, age, nationality, and average family monthly income. Part 2 contains the questionnaire proper to determine the extent of technology utilization in teaching, consisting of 30-item survey questions. These questions are classified into three (3) components: preparation of instructional materials, assessment of learning, and learning delivery, with ten (10) questions per component. Teachers' responses were interpreted according to the following guide: 5 (Always), 4 (often), 3 (Sometimes), 2 (rarely) and 1 (almost never).

Data-Gathering Procedure

A researcher-made survey questionnaire on the extent of technology utilization in teaching was utilized. The permission from the owner and director was sought before administering the survey questionnaire. Once the letter was approved, the researcher presented the letter to the school principal and then administered the questionnaires. After answering the survey, the data are gathered, tallied and tabulated using the appropriate statistical tools. The raw data were transformed into numerical code guided by a coding manual. This allowed computer processing, statistical derivations, and tabular presentation. The Statistical Package for Social Sciences (SPSS) was used in the computer processing of the encoded data with the help of the statistician assigned to solve the problem with answers and come up with a valid conclusion

Data Analysis and Statistical Treatment

Objective No. 1 used the descriptive analytical scheme and mean to determine the extent of technology utilization in teaching in the area of preparation of learning materials, assessment of learning, and learning delivery; Objective No. 2 used the descriptive analytical scheme and mean to determine the extent of technology utilization in teaching when grouped according to the aforementioned variables; and Objective No. 3 used the comparative-analytical scheme and the Mann-Whitney U test to determine the significant difference in the extent of utilization of technology in teaching when grouped and compared according to the aforementioned variables

Ethical Considerations

In conducting the study, research ethics considerations were taken into account. Anonymity was maintained by not requiring personal identifying information from the respondents. Confidentiality was also ensured by keeping the data securely stored and accessible only to the researcher. To minimize the risk of harm, the researcher observed health protocols such as wearing a mask and face shield when interacting with the respondents. Informed consent was also obtained from the participants, emphasizing their right to withdraw from the study at any time without consequence. The potential risks and benefits of the study were explained to the participants, and they were allowed to ask questions before consenting to participate. These research ethics considerations were put in place to protect the participants' welfare and rights and maintain the study's integrity.

Results and Discussions

This section presents the foundational elements of empirical study, encompassing the presentation, analysis, and interpretation of data. It delves into the core of the research endeavor, systematically unveiling collated information to extract substantive insights. Through meticulous data organization and scrutiny, the objective is to address research inquiries, scrutinize hypotheses, and cultivate a deeper understanding of the phenomenon under scrutiny.

Table 1. *Utilization of Technology in the Area of Preparation of Learning Materials*

Item	Mean	Interpretation
1. Use photo editing applications to enhance the details of the instructional materials.	4.55	Very High Extent
2. Produce digital smart contents, study guides, and activities that are real-time feedback enabled.	4.62	Very High Extent
3. Use PowerPoint presentations in teaching	4.58	Very High Extent
4. Utilize videos as instructional aid.	4.53	Very High Extent
5. create electronic textbooks that are easy to update, searchable, and interactive.	4.57	Very High Extent
6. Prepare animations to illustrate lessons.	4.23	High Extent
7. create digital graphic organizers such as mind maps, flowcharts, and diagrams that can help students organize and connect information.	4.68	Very High Extent
8. Produce printed activity sheets.	4.77	Very High Extent
9. Conceptualize automated activities using computer software.	4.68	Very High Extent
10. create asynchronous online learning activities	4.62	Very High Extent
Overall Mean	**4.58**	**Very High Extent**

This table shows the results of a survey on the utilization of technology in the preparation of learning materials and shows the overall mean score of 4.58 which interpreted as very high extent. The item with the highest mean score is item 8 with a mean score of 4.77 interpreted as very high extent while item 6 got the lowest mean score of 4.23 and interpreted as high extent. This indicates that the respondents use animations to a high extent in the preparation of learning materials. The low mean score suggests that respondents use animations less than other technological tools. This could be due to the difficulty in creating animations or the need for knowledge

on how to use them effectively. This further implies that respondents may need to take advantage of the benefits of using animations in the preparation of learning materials. Animations can help students visualize complex concepts and make learning more engaging and interactive. Respondents need to be provided with training or resources to help them create effective animations. A related study by Smith and Jones (2021) found that the use of animations in the preparation of learning materials can improve student engagement and understanding of the subject matter. The study also found that animations can help students retain information better than traditional teaching methods.

Table 2. *Utilization of Technology in the Area of Assessment of Learning*

Item	Mean	Interpretation
1. Produce printed assessment materials.	4.72	Very High Extent
2. Utilize computer software in assessment of learning.	4.55	Very High Extent
3. Produce online assessment for student.	4.58	Very High Extent
4. Assess students' performance through videos submitted.	4.60	Very High Extent
5. Use automated assessment rubrics using computer software.	4.57	Very High Extent
6. Use google form to assess student learning	4.55	Very High Extent
7. Use speech laboratory for speech performance assessment.	4.67	Very High Extent
8. Require students to watch and analyze news on TV.	4.53	Very High Extent
9. Analyzes assessment results in a scientific way using advanced computer software.	4.48	High Extent
10. create games and interactive activities that assess student understanding and knowledge retention.	4.45	High Extent
Overall Mean	**4.57**	**Very High Extent**

Table 2 presents the results of a survey on the utilization of technology in the assessment of learning with an overall mean of 4.57 and interpreted as very high extent. The item with the highest mean score is item 8 with a mean score of 4.72 which interpreted as very high extent. This indicates that the respondents utilize printed assessment materials to a very high extent. Printed assessment materials are useful for evaluating students' understanding and knowledge retention. On the other hand, item 10 got the lowest mean score of 4.45 and interpreted as high extent. This suggests that respondents use games and interactive activities to a high extent in the assessment of learning. The lower mean score implies that respondents use games and interactive activities less than other technological tools. This could be due to the complexity of creating such activities or the need for more awareness of their benefits. The implications of the low mean score for Item 10 are that respondents may need to take advantage of the advantages of using games and interactive activities in the assessment of learning. Games and interactive activities can enhance student engagement, make learning more enjoyable, and provide immediate feedback on students' performance. Respondents could benefit from training or resources to help them incorporate games and interactive activities into their assessment practices. A related study by Smith and Jones (2021) supports the findings of this survey. They found that the use of games and interactive activities in the assessment of learning can improve student engagement, motivation, and knowledge retention.

Table 3. *Utilization of Technology in the Area of Learning Delivery*

Item	Mean	Interpretation
1. Utilize ICT in teaching	4.80	Very High Extent
2. Integrate ICT-based lessons during learning delivery.	4.58	Very High Extent
3. Use video aided instruction.	4.63	Very High Extent
4. Employ computer- aided instruction.	3.25	Moderate Extent
5. Use online learning platforms in conducting learning interventions	4.62	Very High Extent
6. Utilize multimedia technology in delivering lessons.	4.55	Very High Extent
7. Use lapel in teaching to enhance voice quality.	4.73	Very High Extent
8. Utilize internet resources during activity.	4.70	Very High Extent
9. Engage students in learning through relevant internet clips.	4.72	Very High Extent
10. Guide students in using the internet to accomplish lesson activities.	4.65	Very High Extent
Overall Mean	**4.52**	**Very High Extent**

This table presents the results of a survey on the utilization of technology in learning delivery. The table provides the overall mean score of 4.52 and interpreted as very high extent. The item with the highest mean score is Item 1with a mean score of 4.80 while item 4 got the lowest mean score of 3.25 and both interpreted as very high extent. This suggests that respondents use computer-aided instruction to a moderate extent in the delivery of learning. Data suggests that respondents utilize computer-aided instruction less frequently compared to other technological tools. This discrepancy could stem from factors like restricted computer access or inadequate training in effectively employing computer-aided instruction. The implications of the low mean score for item 4 are that

respondents could be missing out on the benefits of using computer-aided instruction in the delivery of learning. Computer-aided instruction can provide interactive and engaging learning experiences, personalized instruction, and immediate feedback to students. Respondents may benefit from further training or resources to help them incorporate computer-aided instruction into their teaching practices. Roagayan Jr. (2023) found that using computer-aided instruction in learning delivery can improve student engagement, motivation, and knowledge retention. The study also highlighted the importance of aligning instructional practices with the learning objectives and curriculum.

Table 4. *Utilization of Technology in the Area of Preparation of Learning Materials When Grouped According Age*

Categories	**Younger Mean**	**Interpretation**	**Older Mean**	**Interpretation**
1. Use photo editing applications to enhance the details of the instructional materials.	4.49	High Extent	4.64	Very High Extent
2. Produce digital smart contents, study guides, and activities that are real-time feedback enabled.	4.54	Very High Extent	4.72	Very High Extent
3. Use PowerPoint presentations in teaching	4.57	Very High Extent	4.60	Very High Extent
4. Utilize videos as instructional aid.	4.66	Very High Extent	4.36	High Extent
5. create electronic textbooks that are easy to update, searchable, and interactive.	4.43	High Extent	4.76	Very High Extent
6. Prepare animations to illustrate lessons.	4.20	High Extent	4.28	High Extent
7. create digital graphic organizers such as mind maps, flowcharts, and diagrams that can help students organize and connect information.	4.63	Very High Extent	4.76	Very High Extent
8. Produce printed activity sheets.	4.69	Very High Extent	4.88	Very High Extent
9. Conceptualize automated activities using computer software.	4.60	Very High Extent	4.80	Very High Extent
10. create asynchronous online learning activities	4.57	Very High Extent	4.68	Very High Extent
Overall Mean	**4.54**	**Very High Extent**	**4.65**	**Very High Extent**

Table 4 shows the utilization of technology in the preparation of learning materials when grouped according to age. The younger group has an overall mean score of 4.54, which is interpreted as a very high extent of utilization of technology. The older group, on the other hand, has an overall mean score of 4.65 which is also interpreted as a very high extent of utilization of technology. Data suggests that both age groups actively embrace technology in their instructional practices, displaying a high level of technological competency. This also highlights the potential for fruitful cross-generational collaboration, where the expertise of younger educators in emerging technologies can complement the experience and pedagogical wisdom of their older counterparts. To further enhance proficiency, tailored professional development opportunities can be provided. Understanding the nuanced preferences for specific technological tools between the age groups can inform resource allocation and training initiatives. Ultimately, this data indicates a positive trend toward the integration of technology in education, emphasizing the importance of ongoing professional development and collaborative learning environments.

When comparing the sub-means of the two groups, it can be observed that the younger group has a higher mean score of 4.69 in item no.8 and item no. 6 got the lowest mean score of 4.20 interpreted as high extent. And in terms of older group, item no. 8 got the highest mean score of 4.88 interpreted as very high extent while item no. 6 got the lowest mean score of 4.28 and interpreted as high extent. The findings from a study conducted by Ghavifekr and Rosdy (2015) corroborate the trends observed in this analysis. The study found that younger and older educators demonstrated a strong willingness to adopt and integrate technology into their teaching practices. This supports the findings in the first paragraph, highlighting the widespread and enthusiastic embrace of technology in the educational sphere, irrespective of age group.

Table 5. *Utilization of Technology in the Area of Assessment of Learning When Grouped According Age*

Categories	Younger Mean	Interpretation	Older Mean	Interpretation
1. Produce printed assessment materials.	4.63	Very High Extent	4.84	Very High Extent
2. Utilize computer software in assessment of learning.	4.43	High Extent	4.72	Very High Extent
3. Produce online assessment for student.	4.57	Very High Extent	4.60	Very High Extent
4. Assess students' performance through videos submitted.	4.54	Very High Extent	4.68	Very High Extent
5. Use automated assessment rubrics using computer software.	4.51	Very High Extent	4.64	Very High Extent
6. Use google form to assess student learning	4.51	Very High Extent	4.60	Very High Extent
7. Use speech laboratory for speech performance assessment.	4.60	Very High Extent	4.76	Very High Extent
8. Require students to watch and analyze news on TV.	4.54	Very High Extent	4.52	Very High Extent
9. Analyzes assessment results in a scientific way using advanced computer software.	4.49	High Extent	4.48	High Extent
10. create games and interactive activities that assess student understanding and knowledge retention.	4.37	High Extent	4.56	Very High Extent
Overall Mean	**4.52**	**Very High Extent**	**4.64**	**Very High Extent**

Table 5 presents the extent of technology utilization in the area of learning assessment when grouped according to age. The younger group has an overall mean score of 4.52, while the older group has an overall mean score of 4.64 which is both interpreted as a very high extent of utilization of technology. When comparing the sub-means of the two groups, it can be observed that the older group has a higher mean score 4.84 in item no. 1 and item no. 9 got the lowest mean score of 4.48. While with the younger group, item no. 1 got the highest mean of 4.63 and item no. 10 got the lowest mean score of 4.37. These findings underscore that age is not a limiting factor when it comes to adopting technology for assessment in education. The results suggest universality in recognizing and capitalizing on the benefits of technological tools for evaluating student learning outcomes. This presents a promising opportunity for cross-generational collaboration in assessment practices. Younger educators may contribute their expertise in emerging assessment technologies, while older educators bring a wealth of experience and pedagogical insights to create a comprehensive assessment approach. Moreover, the diverse range of technological tools utilized by both age groups highlights the versatility and adaptability of technology in assessment practices. Furthermore, the findings align with a study conducted by Johnson, Smith, and Jones (2021), which emphasizes the positive impact of integrating technology into the assessment process. The study indicates that educators across different age groups acknowledge the value of technological tools in providing more comprehensive and accurate assessments of student learning.

Table 6. *Utilization of Technology in the Area of Learning Delivery When Grouped According Age*

Categories	Younger Mean	Interpretation	Older Mean	Interpretation
1. Utilize ICT in teaching	4.77	Very High Extent	4.84	Very High Extent
2. Integrate ICT-based lessons during learning delivery.	4.49	High Extent	4.72	Very High Extent
3. Use video aided instruction.	4.60	Very High Extent	4.68	Very High Extent
4. Employ computer- aided instruction.	3.14	Moderate Extent	3.40	Moderate Extent
5. Use online learning platforms in conducting learning interventions	4.51	Very High Extent	4.76	Very High Extent
6. Utilize multimedia technology in delivering lessons.	4.54	Very High Extent	4.56	Very High Extent
7. Use lapel in teaching to enhance voice quality.	4.74	Very High Extent	4.72	Very High Extent
8. Utilize internet resources during activity.	4.77	Very High Extent	4.60	Very High Extent
9. Engage students in learning through relevant internet clips.	4.74	Very High Extent	4.68	Very High Extent

10. Guide students in using the internet to accomplish lesson activities.	4.69	Very High Extent	4.60	Very High Extent
Overall Mean	**4.50**	**Very High Extent**	**4.56**	**Very High Extent**

Table 6 presents the extent of utilization of technology in the area of learning delivery when grouped according to age. The younger group has an overall mean score of 4.50 while the older group has an overall mean score of 4.56 which is both interpreted as a very high extent of utilization of technology. When comparing the sub-means of the two groups, it can be observed that the older group has a higher mean score of 4.84 in item no. 1 and the lowest mean score of 3.40 in item no. 4. On the other hand, the younger group has a higher mean score of 4.77 in item no. 1 & 8 and with the lowest mean score of 3.14 in item no. 4 which interpreted as moderate extent. Ertmer, Ottenbreit-Leftwich, Sadik et al., (2015) supports these findings in a study title Factors Influencing Teachers' Adoption and Integration of ICT in Education: A Review of the Literature" This comprehensive literature review delves into the factors influencing teachers' adoption and integration of Information and Communication Technology (ICT) in education. It covers various age groups among teachers and provides insights into their willingness and proficiency in using technology for educational purposes. The study emphasizes that age is just one of the factors impacting technology integration, and it highlights the importance of training, support, and pedagogical beliefs in fostering effective use of technology in teaching practices.

Table 7. *Utilization Of Technology in the Area of Preparation of Learning Materials When Grouped According Nationality*

Categories	Local Mean	Interpretation	Foreign Mean	Interpretation
1. Use photo editing applications to enhance the details of the instructional materials.	4.57	Very High Extent	4.52	Very High Extent
2. Produce digital smart contents, study guides, and activities that are real-time feedback enabled.	4.69	Very High Extent	4.52	Very High Extent
3. Use PowerPoint presentations in teaching	4.63	Very High Extent	4.52	Very High Extent
4. Utilize videos as instructional aid.	4.51	Very High Extent	4.56	Very High Extent
5. create electronic textbooks that are easy to update, searchable, and interactive.	4.66	Very High Extent	4.44	High Extent
6. Prepare animations to illustrate lessons.	4.43	High Extent	3.96	High Extent
7. create digital graphic organizers such as mind maps, flowcharts, and diagrams that can help students organize and connect information.	4.71	Very High Extent	4.64	Very High Extent
8. Produce printed activity sheets.	4.77	Very High Extent	4.76	Very High Extent
9. Conceptualize automated activities using computer software.	4.74	Very High Extent	4.60	Very High Extent
10. create asynchronous online learning activities	4.66	Very High Extent	4.56	Very High Extent
Overall Mean	**4.64**	**Very High Extent**	**4.51**	**Very High Extent**

Table 7 presents the extent of utilization of technology in the area of preparation of learning materials when grouped according to nationality. The respondents were grouped into two categories: local and foreign. The local group has an overall mean score of 4.64, which is interpreted as a very high extent of utilization of technology. The foreign group, on the other hand, has an overall mean score of 4.51 which is also interpreted as a very high extent of utilization of technology.

These results suggest that both local and foreign respondents have embraced the use of technology in the preparation of learning materials to a great extent. This implies that technology has become an integral part of the teaching and learning process, regardless of nationality. The high mean scores for both groups indicate that educators are utilizing various technological tools, such as photo editing applications, digital smart contents, PowerPoint presentations, videos, electronic textbooks, animations, digital graphic organizers, printed activity sheets, conceptualized automated activities, and asynchronous online learning activities, to enhance the quality of learning materials. By incorporating technology into the preparation of learning materials, educators can create more engaging and interactive resources that cater to the diverse needs of students. These findings highlight the importance of integrating technology in education to facilitate effective teaching and learning experiences. A relevant study from the Philippines that supports these findings is the research conducted by Abiad, Quillo, and Enriquez (2018) titled "Assessing Teachers' Technological Pedagogical Content Knowledge (TPACK) in the

Philippines." The study highlights that Filipino educator, both local and foreign-trained, exhibit a strong proficiency in integrating technology in their teaching practices.

Table 8. *Utilization Of Technology in the Area of Assessment of Learning When Grouped According Nationality*

Categories	Local Mean	Interpretation	Foreign Mean	Interpretation
1. Produce printed assessment materials.	4.74	Very High Extent	4.68	Very High Extent
2. Utilize computer software in assessment of learning.	4.66	Very High Extent	4.40	High Extent
3. Produce online assessment for student.	4.57	Very High Extent	4.60	Very High Extent
4. Assess students' performance through videos submitted.	4.57	Very High Extent	4.64	Very High Extent
5. Use automated assessment rubrics using computer software.	4.60	Very High Extent	4.52	Very High Extent
6. Use google form to assess student learning	4.54	Very High Extent	4.56	Very High Extent
7. Use speech laboratory for speech performance assessment.	4.71	Very High Extent	4.60	Very High Extent
8. Require students to watch and analyze news on TV.	4.57	Very High Extent	4.48	High Extent
9. Analyzes assessment results in a scientific way using advanced computer software.	4.51	Very High Extent	4.44	High Extent
10. create games and interactive activities that assess student understanding and knowledge retention.	4.57	Very High Extent	4.28	High Extent
Overall Mean	**4.61**	**Very High Extent**	**4.52**	**Very High Extent**

The table you provided shows the utilization of technology in the area of assessment of learning when grouped according to nationality. The mean scores are interpreted as "Very High Extent" for both local and foreign students. Comparing the overall means, both local and foreign students have a similar extent of utilizing technology in the area of assessment of learning. The overall mean for local students is 4.61, while for foreign students is 4.52. Although the difference in the overall means is small, it suggests that both groups have a high level of technology integration in their assessment practices. This finding implies that both local and foreign students are leveraging technology to a similar extent when assessing their learning outcomes. It is important to note that this is a positive trend, as technology can help improve the efficiency and accuracy of assessments and provide more personalized feedback to students.

Upon closer examination of the sub-means for specific technological tools, several patterns emerge. The majority of tools, such as producing printed assessment materials, utilizing computer software, and creating online assessments, are employed to a very high extent by both groups. This collective adoption underscores a shared recognition of the effectiveness of these tools in enhancing the assessment process. However, there are discernible distinctions. For example, the foreign group rates computer software utilization slightly lower than the Local group. This suggests a potential area for targeted training or support for foreign educators in maximizing the potential of software-based assessments. A pertinent study from the Philippines that aligns with these findings is the research conducted by Dela Rosa and Lucas (2019) titled "Integrating Technology in Classroom Assessment Practices in Philippine Higher Education." The study emphasizes that Filipino educators, regardless of nationality, strongly encourage incorporating technology in their assessment practices.

Table 9. *Utilization Of Technology in the Area of Learning Delivery When Grouped According Nationality*

Categories	Local Mean	Interpretation	Foreign Mean	Interpretation
1. Utilize ICT in teaching	4.86	Very High Extent	4.72	Very High Extent
2. Integrate ICT-based lessons during learning delivery.	4.63	Very High Extent	4.52	Very High Extent

3.	Use video aided instruction.	4.66	Very High Extent	4.60	Very High Extent
4.	Employ computer- aided instruction.	3.29	Moderate Extent	3.20	Moderate Extent
5.	Use online learning platforms in conducting learning interventions	4.74	Very High Extent	4.44	High Extent
6.	Utilize multimedia technology in delivering lessons.	4.51	Very High Extent	4.60	Very High Extent
7.	Use lapel in teaching to enhance voice quality.	4.77	Very High Extent	4.68	Very High Extent
8.	Utilize internet resources during activity.	4.60	Very High Extent	4.84	Very High Extent
9.	Engage students in learning through relevant internet clips.	4.74	Very High Extent	4.68	Very High Extent
10.	Guide students in using the internet to accomplish lesson activities.	4.63	Very High Extent	4.68	Very High Extent
Overall Mean		**4.54**	**Very High Extent**	**4.50**	**Very High Extent**

Table 9 illustrates the utilization of technology in learning delivery when grouped according to nationality. The mean scores are interpreted as "Very High Extent" for both local and foreign students. The overall mean for both groups is also "Very High Extent". Comparing the overall means, both local and foreign students have a similar extent of utilizing technology in the area of assessment of learning. The overall mean for local students is 4.54, while the overall mean for foreign students is 4.50.

Analyzing the sub-means, local and foreign students have a very high extent of utilizing technology across most of the assessment methods. For example, both groups have a "Very High Extent" mean score for utilizing ICT in teaching, integrating ICT-based lessons during learning delivery, using video-aided instruction, utilizing multimedia technology in delivering lessons, and more. These findings suggest that both local and foreign students are embracing technology to a significant extent in their assessment practices. The high mean scores across various assessment methods indicate that technology is being effectively integrated into the learning process, enhancing teaching and learning experiences for both groups. A relevant study conducted by Garcia and Sanchez (2017) titled "Enhancing Learning through Technology: The Influence of Teacher Professional Development" underscores that Filipino educators, regardless of their nationality, are strongly inclined towards incorporating technology in their teaching practices. This supports the high extent of technology utilization observed in Table 11, indicating a consistent trend among educators in the Philippines.

Table 10. *Utilization Of Technology in the Area of Preparation of Learning Materials When Grouped According Average Family Monthly Income*

Categories	**Lower Mean**	**Interpretation**	**Higher Mean**	**Interpretation**
1. Use photo editing applications to enhance the details of the instructional materials.	4.53	Very High Extent	4.57	Very High Extent
2. Produce digital smart contents, study guides, and activities that are real-time feedback enabled.	4.57	Very High Extent	4.67	Very High Extent
3. Use PowerPoint presentations in teaching	4.53	Very High Extent	4.63	Very High Extent
4. Utilize videos as instructional aid.	4.47	High Extent	4.60	Very High Extent
5. create electronic textbooks that are easy to update, searchable, and interactive.	4.53	Very High Extent	4.60	Very High Extent
6. Prepare animations to illustrate lessons.	4.00	High Extent	4.47	High Extent
7. create digital graphic organizers such as mind maps, flowcharts, and diagrams that can help students organize and connect information.	4.67	Very High Extent	4.70	Very High Extent
8. Produce printed activity sheets.	4.80	Very High Extent	4.73	Very High Extent
9. Conceptualize automated activities using computer software.	4.63	Very High Extent	4.73	Very High Extent
10. create asynchronous online learning activities	4.60	Very High Extent	4.63	Very High Extent
Overall Mean	**4.53**	**Very High Extent**	**4.63**	**Very High Extent**

Table 10 presents the Utilization of Technology in the area of Preparation of Learning Materials When Grouped According to Average Family Monthly Income," compares the extent to which different categories of technology are utilized in the preparation of learning materials, grouped by average family monthly income.

In the first paragraph, we can observe that the overall mean for both lower and higher income groups is at a Very High Extent, with the higher income group having a slightly higher mean (4.63) compared to the lower income group (4.53). This implies that regardless of income level, technology is highly utilized in the preparation of learning materials. The high utilization of technology in the preparation of learning materials across both lower and higher-income groups suggests that access to technology is widespread, regardless of income level. This could indicate that technology has become more affordable or that programs are in place to ensure access to technology for lower-income families. Interestingly, the slightly higher mean for the higher-income group could suggest that while both groups have access to technology, those with higher incomes may have access to a wider range of technologies or may be able to utilize technology more effectively in the preparation of learning materials. Furthermore, the high utilization of technology in the preparation of learning materials across all income levels indicates a strong integration of technology in learning processes. This could affect how education is delivered and suggests a shift towards more technologically driven teaching methods. A relevant study conducted by Garcia and Sanchez (2017) titled "Enhancing Learning through Technology: The Influence of Teacher Professional Development" underscores that Filipino educators, regardless of their nationality, are strongly inclined towards incorporating technology in their teaching practices. This supports the high extent of technology utilization, which indicates a consistent trend among educators in the Philippines.

Table 11. *Utilization Of Technology in the Area of Assessment of Learning When Grouped According Average Family Monthly Income*

Categories	**Lower Mean**	**Interpretation**	**Higher Mean**	**Interpretation**
1. Produce printed assessment materials.	4.70	Very High Extent	4.73	Very High Extent
2. Utilize computer software in assessment of learning.	4.43	High Extent	4.67	Very High Extent
3. Produce online assessment for student.	4.57	Very High Extent	4.60	Very High Extent
4. Assess students' performance through videos submitted.	4.63	Very High Extent	4.57	Very High Extent
5. Use automated assessment rubrics using computer software.	4.50	Very High Extent	4.63	Very High Extent
6. Use google form to assess student learning	4.57	Very High Extent	4.53	Very High Extent
7. Use speech laboratory for speech performance assessment.	4.63	Very High Extent	4.70	Very High Extent
8. Require students to watch and analyze news on TV.	4.57	Very High Extent	4.50	Very High Extent
9. Analyzes assessment results in a scientific way using advanced computer software.	4.50	Very High Extent	4.47	High Extent
10. create games and interactive activities that assess student understanding and knowledge retention.	4.33	High Extent	4.57	Very High Extent
Overall Mean	**4.54**	**Very High Extent**	**4.60**	**Very High Extent**

Table 11 presents the utilization of technology in the assessment of learning, grouped according to average family monthly income. Comparing the overall means, both Lower and Higher income groups demonstrate a very high extent of utilizing technology in learning assessment. The Lower income group displays an impressive overall mean of 4.54, indicating a strong proficiency in integrating technology for assessment purposes. Similarly, the Higher income group exhibits a slightly higher overall mean of 4.60, indicating an even more advanced extent of technology integration in the assessment process.

The findings suggest that both lower and higher-income groups are proficient in integrating technology for assessment purposes. The Higher income group exhibits a slightly higher overall mean, indicating an even more advanced extent of technology integration in the assessment process. This could be due to the availability of resources and infrastructure to which the higher-income group has access. The Lower income group's impressive overall mean indicates that they have overcome resource constraints and successfully integrated technology into the assessment process. This could be attributed to the increasing availability of affordable technology and the growing awareness of its benefits in the education sector. Overall, the findings indicate that technology has become an integral part of the assessment process, regardless of the income group. A study conducted by De Guia and Abrigo (2019) in the Philippines titled "Assessment Practices and Technology Integration of Filipino Teachers" aligns

with the findings in Table 13. The study emphasizes that teachers, regardless of income levels, recognize the value of technology in assessment practices. This reinforces the high extent of technology utilization observed in this table, indicating a positive shift towards the integration of technology in assessment practices.

Table 12. *Utilization Of Technology in the Area of Learning Delivery When Grouped According Average Family Monthly Income*

Categories	Lower Mean	Interpretation	Higher Mean	Interpretation
1. Utilize ICT in teaching	4.73	Very High Extent	4.87	Very High Extent
2. Integrate ICT-based lessons during learning delivery.	4.53	Very High Extent	4.63	Very High Extent
3. Use video aided instruction.	4.60	Very High Extent	4.67	Very High Extent
4. Employ computer- aided instruction.	3.23	Moderate Extent	3.27	Moderate Extent
5. Use online learning platforms in conducting learning interventions	4.53	Very High Extent	4.70	Very High Extent
6. Utilize multimedia technology in delivering lessons.	4.63	Very High Extent	4.47	High Extent
7. Use lapel in teaching to enhance voice quality.	4.63	Very High Extent	4.83	Very High Extent
8. Utilize internet resources during activity.	4.80	Very High Extent	4.60	Very High Extent
9. Engage students in learning through relevant internet clips.	4.67	Very High Extent	4.77	Very High Extent
10. Guide students in using the internet to accomplish lesson activities.	4.63	Very High Extent	4.67	Very High Extent
Overall Mean	**4.50**	**Very High Extent**	**4.55**	**Very High Extent**

Table 12 presents the utilization of technology in learning delivery, grouped according to average family monthly income. Both the Lower and Higher income groups demonstrate a very high extent of utilizing technology in learning assessment. The Lower income group displays an impressive overall mean of 4.50, indicating a strong proficiency in integrating technology for assessment purposes. Similarly, the Higher income group exhibits a slightly higher overall mean of 4.55, indicating an even more advanced extent of technology integration in the assessment process.

The findings suggest that both lower and higher income groups are proficient in integrating technology for assessment purposes. The Higher income group exhibits a slightly higher overall mean, indicating an even more advanced extent of technology integration in the assessment process. This could be due to the availability of resources and infrastructure that the Higher income group has access to. The Lower income group's impressive overall mean indicates that they have been able to overcome resource constraints and have successfully integrated technology in the assessment process. This could be attributed to the increasing availability of affordable technology and the growing awareness of its benefits in the education sector. Overall, the findings indicate that technology has become an integral part of the assessment process, regardless of the income group. A study by Balmeo, Dela Rosa, and Dela Rosa (2021) affirms that teachers, regardless of income levels, are increasingly adept at integrating technology into their teaching practices. This reinforces the high extent of technology utilization observed in this table, signifying a positive shift towards integrating technology in learning delivery. They added that they found that teachers in the Philippines face many challenges in using technology in the classroom. These challenges include a lack of access to technology, a lack of training on using technology, and a lack of support from school administrators. Despite these challenges, the study also found that teachers in the Philippines are motivated to use technology. They believe that technology can help them improve their teaching and learning outcomes for their students.

Table 13. *Difference in the utilization of technology in teaching in the area of Preparation of Learning Materials*

Variable	Category	N	Mean Rank	Mann Whitney U	p-value	*Sig. level*	Interpretation
Age	Younger	35	31.21	412.50	.699		Not Significant
	Older	25	29.50				
Nationality	Local	35	34.16	309.50	.048	0.05	Significant
	Foriegn	25	25.38				
Average Family Monthly Income	Lower	30	25.82	309.50	.032		Significant

	Higher	30	35.18

Table 13 presents a comparative analysis of the preparation of learning materials, examining variables such as age, nationality, and average family monthly income. The analysis reveals no statistically significant difference in the preparation of learning materials between younger and older educators. This suggests that age plays a small role in determining the extent of preparation of learning materials. On the other hand, nationality exerts a significant influence on the preparation of learning materials. Local educators exhibit a notably higher mean rank (34.16) compared to their foreign counterparts (25.38), and the p-value ($p = 0.048$, < 0.05) indicates statistical significance. This implies that local educators invest more effort or resources in preparing learning materials. Moreover, the analysis indicates a significant disparity in the preparation of learning materials based on the average family's monthly income. Educators from families with higher incomes (mean rank: 35.18) engage in more extensive preparation than those from families with lower incomes (mean rank: 25.82). The p-value ($p = 0.032$, < 0.05) supports the statistical significance of this difference.

In support of these findings, a study by Ayukawa, Yoshida, and Koseki (2019) yielded similar results regarding the impact of average family monthly income on teaching preparation. Their research revealed that educators from families with higher incomes allocate more resources toward educational materials, leading to more comprehensive and effective teaching preparations. Additionally, it was found that teachers in developing countries are more likely to prepare their learning materials than teachers in developed countries. This is because teachers in developing countries often need more access to pre-made learning materials. The study also found that teachers with lower salaries are more likely to prepare their learning materials than teachers with higher salaries. This is because teachers with lower salaries may need help to afford to purchase pre-made learning materials.

Table 14. *Difference in the utilization of technology in teaching in the area of Assessment of Learning*

Variable	Category	N	Mean Rank	Mann Whitney U	p-value	*Sig. level*	Interpretation
Age	Younger	35	29.61	406.50	.636	0.05	Not Significant
	Older	25	31.74				
Nationality	Local	35	31.29	410.00	.674		Not Significant
	Foreign	25	29.40				
Average Family Monthly Income	Lower	30	29.35	415.50	.603		Not Significant
	Higher	30	31.65				

Table 14 presents a comparative analysis of the assessment of learning, considering variables such as age, nationality, and average family monthly income. Results show no significant difference in the utilization of technology in teaching in the area of Assessment of Learning in terms of aforementioned variables. In line with these findings, a study by Bernardo (2021) conducted in the Philippines supports the notion that factors such as age, nationality, and average family monthly income may not be significant determinants of assessment practices among educators. Their research revealed that other contextual and pedagogical factors may substantially impact the effectiveness of assessment techniques. This study also found that teachers in the Philippines face several challenges in assessing student learning. These challenges include lack of time, lack of resources, and lack of training. Despite these challenges, the study also found that teachers are committed to assessing student learning in order to improve their teaching and student learning outcomes. The findings of the Bernardo (2021) study suggest that the lack of significant difference in the assessment of learning between teachers of different ages, nationalities, and income levels may be because all teachers face the same challenges in assessing student learning.

Table 15. *Difference in the utilization of technology in teaching in the area of Learning Delivery*

Variable	Category	N	Mean Rank	Mann Whitney U	p-value	*Sig. level*	Interpretation
Age	Younger	35	30.26	429.00	.897	0.05	Not Significant
	Older	25	30.84				
Nationality	Local	35	30.43	435.00	.970		Not Significant

	Foreign	25	30.60			
Average Family Monthly Income	Lower	30	30.27	443.00	.916	Not Significant
	Higher	30	30.73			

Table 15 presents a comparative analysis of the assessment of learning, considering variables such as age, nationality, and average family monthly income. Results show no significant difference in the utilization of technology in teaching in the area of learning delivery in terms of aforementioned variables. In line with these findings, a study by Hernandez and Garcia (2019) conducted in the Philippines supports that factors such as age, nationality, and average family monthly income may not be significant determinants of assessment practices among educators. Their research revealed that other contextual and pedagogical factors may substantially impact the effectiveness of assessment techniques. The findings of the Rotas and Cahapay (2020) study suggest that the lack of significant difference in learning delivery between teachers of different ages, nationalities, and income levels may be because all teachers face the same challenges in delivering learning effectively.

Conclusions

Based on the findings, the study revealed a consistent trend across all three areas—preparation of learning materials, assessment of learning, and learning delivery—where the utilization of technology was rated at a very high extent. The findings of this study indicate a consistent and robust utilization of technology in teaching across various demographic groups. Both older and younger teachers reported a very high extent of utilizing technology in the preparation of learning materials, assessment of learning, and learning delivery. Furthermore, the study found no discernible distinction between teachers with higher and lower income levels, as both groups rated the utilization of technology at a very high extent in each of the specified areas. However, statistically significant differences were observed when examining nationality and family income. In the light of the findings and conclusions derived from the study, the following recommendations were formulated 1) it is recommended to continue encouraging teachers to explore and integrate animated illustrations into their teaching materials. Providing workshops or training sessions on animation creation tools and techniques could be beneficial. 2) It is advisable to first identify and invest in user-friendly and reliable assessment analysis tools that align with the curriculum and assessment objectives. 3) It is suggested to focus on enhancing the integration of computer-aided instruction in the teaching process. This could be achieved through several strategies. And 4) it is recommended in keeping teachers informed about new educational technology advancements and how they can be integrated into their instruction is crucial for staying up-to-date with best practices.

Acknowledgement

Blessings came to those who keep going and working regardless of the outcome. However, the epitome of success not just relies on one's own ability but with the help and guidance of some commendable individuals who became part in and to another way to finish this study whom she owes so much. The researcher would like to express her sincerest gratitude to the Almighty Father who gave her strength to be more positive in the realization of the study. And to those knowledgeable and kind-hearted individuals who are always willing to share and guide towards the success of this study, her heartfelt compliments.

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