IJAMS

Usage of ICT Tools in Secondary Public Schools in Pangasinan

MICHAEL V. MADRID
ANA PERLA B. DE GUZMAN
Amagbagan Integrated School
Benigno V. Aldana National High School
michael.madrid@deped.gov.ph

Abstract — This study investigates the proficiency of secondary school teachers in integrating Information and Communication Technology (ICT) tools in classroom settings. It aims to assess the effects of ICT integration on teaching methods and student learning outcomes. The research is based on a survey conducted with Technology and Livelihood Education (TLE) and Technical Vocational Education (TVE) teachers from multiple schools in the region. This study is significant in the context of increasing reliance on technology in education.

Methodologically, the study employed a quantitative approach using structured questionnaires. The respondents, aged between 20 and 59, were selected through a stratified sampling method. Data was analyzed using descriptive and inferential statistical techniques to identify trends in ICT adoption and usage across different age groups, professional experiences, and educational backgrounds.

Results indicate a moderate to high level of proficiency in using ICT tools among teachers, particularly in integrating multimedia and interactive resources into lessons. However, challenges related to infrastructure, training gaps, and time constraints were identified as barriers to full integration. Teachers with more experience showed greater comfort with traditional teaching methods, which sometimes hindered the effective use of ICT tools.

Conclusions drawn from the findings suggest that while many teachers can integrate ICT into their teaching, continued professional development and support are essential for overcoming existing barriers. The study underscores the need for enhanced training programs to improve ICT proficiency and support teachers in adopting modern teaching practices. Future research should explore the impact of ICT integration on student performance across various subjects.

Keywords — ICT Tools, Teacher Proficiency, Integration, Education Technology, Classroom Practices, Training Needs.

I. Introduction

Integrating ICT tools in the classroom can transform traditional pedagogies, creating more interactive, efficient, and personalized learning experiences (Cutumisu, 2020). For educators, proficiency in ICT is not merely an enhancement to their teaching toolkit; it is a fundamental skill necessary to meet the needs of today's learners (Hamid, 2020). As ICT becomes integral to curricula, there is an increasing need to evaluate the capabilities and preparedness of educators to use these tools effectively (Musokhonova, 2021). This proficiency involves operational skills and

pedagogical wisdom to align ICT with curriculum goals and student learning outcomes (Hasin & Nasir, 2021).

Various studies have highlighted the potential of ICT in improving educational outcomes and the challenges educators face in effectively implementing these tools (Branislava, 2022). While numerous governments and educational organizations invest in ICT infrastructure, teacher preparedness remains critical to ICT integration success (Henderson, 2020). Therefore, this study explores teachers' proficiency levels in integrating ICT tools within the classroom, shedding light on the existing competencies and areas that require further development. The global integration of ICT in education has accelerated, with UNESCO and other international organizations highlighting digital literacy's significance for teachers and students (Berkseth, 2023). Regions like Europe and North America have made substantial investments in teacher training programs to improve ICT skills (Bas, 2020). Programs like the European Commission's "Digital Education Action Plan" promote using digital tools in classrooms to support educators and students in a rapidly digitizing world (Hasin & Nasir, 2021)

Statement of the Problem

The study aims to assess the role of teachers' proficiency in integrating ICT tools in the classroom.

Specifically, the study sought to answer the following questions:

1. What is the profile of the respondents in terms of

   a. age;

   b. sex;

   c. highest educational attainment;

   d. current position;

   e. number of years in teaching;

   f. relevant training attended;

   g. school Profile (Small, Medium, Large, Mega); and

   h. technology tools (AI's or other Online and Offline Applications)?

2. What is the level of proficiency among teachers in technology ICT tools in the classroom?

   a. Content (AI/Using AI's);

   b. Knowledge (Process); and

    c. Pedagogy (Implementation)?

3. What are the challenges encountered by teachers in Content, Knowledge and Pedagogy?

4. Is there a significant difference in the level of proficiency of teachers across their profile variables?

5. What technology-based training plan can be proposed based on the findings of the study?

Literature Review

In the United States, federal and state governments have implemented initiatives like the "Future Ready Schools" framework, emphasizing technology integration across K-12 schools (Nasirdinova, 2021). Despite these advancements, research shows that teachers often face limited access to technology, a lack of training, and inadequate support, underscoring a global challenge in teacher ICT proficiency (Hasin & Nasir, 2021). Developing countries, however, face unique challenges in integrating ICT into education due to disparities in infrastructure and resources. For example, Sub-Saharan African and South Asia countries encounter issues related to insufficient funding, limited access to electricity, and inadequate teacher training (Berkseth, 2023). Recognizing this, UNESCO's "ICT Competency Framework for Teachers" was developed to assist educators in gaining both foundational and advanced digital skills, regardless of their location. This framework aims to establish a consistent understanding of ICT competencies among teachers globally (Branislava, 2022).

Meanwhile, East Asian nations, such as South Korea and Singapore, exemplify successful ICT integration due to strong governmental policies and a commitment to continuous professional development (Nawaila, 2020). These countries invest heavily in ICT infrastructure, and their education systems prioritize technology as a key component of teaching and learning. Singapore's Masterplan for ICT in Education, initiated in the 1990s, remains a significant reference for policymakers worldwide (Salazar, 2020).

In the Philippines, the integration of ICT in education has been part of the government's agenda, especially with the Department of Education's (DepEd) push to align educational practices with 21st-century competencies (Adarkwah, 2021). The Philippines' Republic Act No. 10844, or the "Department of Information and Communications Technology Act of 2015," underscores the importance of advancing ICT in various sectors, including education (McElroy, 2021). This act laid the foundation for initiatives to enhance ICT use across Filipino schools, particularly through digital literacy and resource accessibility (Afzal, 2023). Following this, DepEd launched the "DepEd ICT4E Strategic Plan," aimed at developing a comprehensive ICT environment within the education sector. DepEd has also issued several memoranda to guide ICT integration in public schools, such as the "DepEd Order No. 78, s. 2010," which focuses on strengthening ICT use in basic education (Perifanou, 2022). This policy was designed to develop ICT competencies among

students and educators, recognizing that teacher proficiency is fundamental to its success (Berkseth, 2023).

II. Methodology

Research Design and Strategy

A descriptive survey-correlation design will be employed. In quantitative research, scientists collect numerical data from individuals or groups and then use that data to conduct statistical analyses to identify patterns. Considering the purpose of the study, the researchers think that a descriptive method would be most appropriate. Descriptive approaches, as their name implies, explain the characteristics of a population or phenomenon without attempting to alter the variables. In the descriptive-correlational survey, the information gathered can be used for comparison and contrast, designed to estimate the extent to which the variables are related to each other in the population of interest. The section on research design covers the type of research design, study participants, instruments, and methodology. Next, every variable used in this study were defined in the data analysis section. Lastly, the validity section will address the overall validity and reliability of the research study, as well as the validity of the instruments themselves.

Population and Locale of the Study

The study's respondents will be secondary schools in Sison, Pozorrubio and Binalonan. Both Junior and Senior High School Teachers who are Teaching TLE (Technology and Livelihood Education) and Tech Voc. (Technical Vocational Courses).

Data Gathering Tools

The Teachers of Sison, Pozorrubio, and Binalonan will be surveyed using a questionnaire. With a total population of 50, the questionnaire will be sent to the Division office for approval prior to distribution.

The primary tool for collecting the necessary data will be the combination of the checklist and questionnaire. There are three (3) components to it. The respondents' demographic information—such as age, sex, marital status, number of years taught, and number of training sessions attended—is provided in Part I of the questionnaire. Part II of the survey lists teachers' attributes and proficiencies that support efficient technology use. The Part III questions will be answered using five 5-point Likert scales.

Data Gathering Procedure

In the Pre-Data Gathering phase, the researcher will begin by securing all necessary permissions from relevant educational authorities, including the Department of Education and the administrators of the secondary schools in Sison, Pozorrubio, and Binalonan. This step is essential

for ensuring access to the teachers of TLE and Tech-Voc courses, who are the study's primary respondents. The researcher will also conduct preliminary meetings with school administrators and ICT coordinators to establish rapport, explain the study's objectives, and discuss the logistical arrangements for data collection. Furthermore, during this phase, survey instruments and interview guides will be carefully designed and pre-tested to ensure clarity, reliability, and alignment with the study's objectives. Adjustments to the data collection tools will be made based on the pre-test feedback to ensure they effectively capture the teachers' ICT proficiency and integration practices.

During the Data Gathering phase, the researcher will administer surveys and conduct interviews with TLE and Tech-Voc teachers across the selected schools in Sison, Pozorrubio, and Binalonan. The surveys will primarily assess teachers' proficiency levels, access to ICT resources, and challenges in integrating ICT tools in the classroom. Meanwhile, semi-structured interviews will provide qualitative insights into teachers' personal experiences, training needs, and attitudes toward ICT integration. Data collection will occur during mutually agreed-upon time slots to minimize disruption to teachers' schedules. Additionally, the researcher may conduct on-site observations in selected classrooms, with teachers' consent, to observe firsthand how ICT tools are currently being utilized. All data collection activities will adhere to ethical research standards, including informed consent, confidentiality, and the right to withdraw.

In the Post-Data Gathering phase, the researcher will organize and analyze the collected data. Quantitative data from surveys will be coded and analyzed statistically to identify patterns, while qualitative data from interviews and observations will be transcribed, coded, and thematically analyzed. This dual approach will allow for a comprehensive understanding of the teachers' ICT proficiency levels and integration challenges. The researcher will then compile the findings, highlighting key insights and implications relevant to teacher ICT development. Finally, the results will be shared with the participating schools and stakeholders, along with recommendations to support further ICT integration in the selected schools and potentially in similar educational contexts.

III. Results and Discussion

1. Survey data revealed that many challenges are encountered by teachers in the teaching field in terms of Content, Knowledge, and Pedagogy. These include limited ICT resources, Limited training on digital teaching strategies, Lack of training on data privacy and security, Lack of technical backgrounds, Limited ability to enhance AI to personalized learning, as well as limited access to devices capable of running AI applications that include from lack of support from the government from modern devices that can access AI-driven resources, and also students varying levels of ICT skills that makes challenging to ensure equitable learning outcomes.

2. The study also reveals that there is no statistically significant difference in levels of agreement across sex, highest educational attainment, current position, and school size profile variables. Hence, the considerable difference only varies through the Number of years of Teaching. This proves that experience is also the best teacher in this matter, as it equips them with more Knowledge about exploring and implementing ICT based on their teaching experience, which enables them to be more flexible in implementation or pedagogy.

3. A mean proficiency level of 3.82 under content indicates that teachers consider the ethical implications of using AI in lessons, suggesting that they are aware of the potential risks and impact of AI in education. At the same time, a 4.30 mean from Knowledge shows a complete understanding of teachers in involving ICT and integrating it into their teaching practices. In Pedagogy, a 4.22 mean is indicated to balance traditional teaching methods with the use of ICT. This demonstrates that teachers can adapt their teaching methods in an orderly manner to facilitate a mixed approach, depending on the classroom situation. Furthermore, a lower mean score of 3.78 is achieved, suggesting that teachers are less proficient or knowledgeable enough to use AI tools in the personalized learning process.

4. The respondent's profile analysis reveals that 96% are classroom teachers with ICT integration being implemented directly at the classroom level. While 40% of those with 6–10 years of teaching experience possess a solid foundation in pedagogical practices, this indicates that experienced teachers have a strong ICT foundation in terms of implementation. Moreover, 49 respondents use an offline ICT tool named Microsoft Office, which they are most likely familiar with and always have access to, rather than online applications.

IV. Conclusion

Based on the findings from the data analysis, several key conclusions can be drawn regarding teachers' proficiency in using ICT tools in their classrooms and the factors that influence their perceived levels of proficiency. Overall, teachers report encountering challenges in utilizing ICT tools effectively, particularly in content, knowledge, and pedagogy. While these challenges are often present, teachers generally perceive themselves as moderately proficient in using these tools for their teaching tasks. The analysis also reveals that age does not significantly impact teachers' proficiency in utilizing ICT tools in terms of content or knowledge. However, a significant difference is observed in pedagogy, indicating that younger and older teachers may approach the integration of ICT into pedagogical strategies differently. This may be due to factors such as familiarity with technology or generational differences in teaching approaches.

There is no statistically significant difference between male and female teachers in terms of their perceived proficiency in using ICT tools across content, knowledge, and pedagogy. This suggests that gender does not significantly influence how teachers perceive their ability to integrate ICT tools into their teaching practices. The analysis also reveals no significant differences in the

proficiency of teachers in using ICT tools when categorized by their highest educational attainment. Advanced educational qualifications may not necessarily correlate with greater perceived proficiency in using ICT tools in the classroom. Teachers with varying years of teaching experience do report differences in their proficiency in using ICT tools. The more experienced teachers report higher proficiency in content, knowledge, and pedagogy, suggesting that experience may enhance a teacher's ability to integrate technology into their teaching. Across various demographic factors, the results indicate that teachers need more consistent training and support, particularly in integrating ICT tools for pedagogical purposes. Therefore, schools should invest more in professional development programs that focus on integrating ICT tools with existing teaching strategies, as well as providing practical guidelines and resources.

REFERENCES

[1] Adarkwah, M. (2021). "I'm not against online teaching, but what about us?": ICT in Ghana post Covid-19. Retrieved from Springer: https://link.springer.com/article/10.1007/s10639-020-10331-z

[2] Afzal. (2023). Addressing the Digital Divide: Access and Use of Technology in Education. Retrieved from https://www.researchgate.net/publication/371575436_Addressing_the_Digital_Divide_Access_and_Use_of_Technology_in_Education

[3] Branislava. (2022). Teachers' Self-efficacy for Using Information and Communication Technology: The Interaction Effect of Gender and Age. Retrieved from https://files.eric.ed.gov/fulltext/EJ1347702.pdf

[4] Berkseth. (2023). The Effectiveness of Manipulativeness in the Elementary School Classroom. Retrieved from https://digitalcommons.wayne.edu/cgi/viewcontent.cgi?article=1010&context=honorstheses

[5] Bas, C. (2020). Use of Gamification Applications in Science Education . Retrieved from Cloudfront: https://d1wqtxts1xzle7.cloudfront.net/70776337/5388-libre.pdf?1635824011=&response-content-disposition=inline%3B+filename%3DUse_of_Gamification_Applications_in_Scie.pdf&Expires=1699839044&Signature=fsR2adCwIUDU2ZLC7YuaMqD1acgwPxWr5tu3-6ho4UtMj0L3tzvaSg5cp

[6] Hasin, I., & Nasir, M. (2021). The Effectiveness of the Use of Information and Communication Technology (ICT) in Rural Secondary Schools in Malaysia. Retrieved from ERIC: https://eric.ed.gov/?id=EJ1289656

[7] Henderson, D. (2020). Benefits of ICT in Education. Retrieved from International Digital Organization for Scientific Research: https://www.idosr.org/wp-content/uploads/2020/02/IDOSR-JAM-51-51-57-2020.-1.pdf

[8] McElroy. (2021). Addressing The Digital Divide In Education: Technology And Internet Access For Students In Underserved Communities. Retrieved from https://www.forbes.com/sites/forbestechcouncil/2021/12/03/addressing-the-digital-divide-in-education-technology-and-internet-access-for-students-in-underserved-communities/?sh=47318df5cec3

[9] Nasirdinova. (2021). APPLICATION OF ICT IN EDUCATION AND TEACHING TECHNOLOGIES. Retrieved from Cyberleninka: https://cyberleninka.ru/article/n/application-of-ict-in-education-and-teaching-technologies

[10] Nawaila, M. B. (2020). Technology and English Language Teaching and Learning: A Content Analysis. Retrieved from Journal of Learning and Teaching in Digital Age: https://dergipark.org.tr/en/download/article-file/1175700

[11] Salazar, K. (2020, May 25). Why Videos are Important in Education. Retrieved from Next Thought Studios: https://www.nextthoughtstudios.com/video-production-blog/2017/1/31/why-videos-are-important-in-education