

# Knowledge and Challenges of the JHS and SHS Teachers on the Utilization of ICT Integration: Scan Me ICT as Proposed Intervention

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**Abstract**— Information and Communication Technology (ICT) has emerged as the essential foundation for progress in modern education; it is broadly defined as any communication device or application integrated into pedagogy. One effective way to improve contemporary educational approaches is to utilize diverse ICT tools. This study examined three fundamental variables: teachers' Knowledge, Challenges, and Utilization levels in integrating ICT into their pedagogy. A quantitative descriptive research design was employed to gather objective data. Participants were selected using a purposive sampling method to ensure they met specific professional criteria. Data collection involved the use of structured checklists and a Likert Scale, and the gathered data were analyzed using percentage, frequency, and weighted mean distributions. The findings revealed that while teachers possess a high level of knowledge in basic ICT applications, they demonstrate a weak understanding of troubleshooting minor technical issues. Furthermore, poor internet connectivity, a lack of consistent ICT training and development, and a shortage of ICT resources for students were identified as the primary challenges. Additionally, the data indicated that teachers use ICT more frequently for administrative workflows than for addressing technical or troubleshooting issues in the classroom. As a relevant and innovative course of action, the researchers proposed a specialized QR code system named "Scan Me ICT." This system serves as a portable training platform for ICT integration, providing educators with instant access to tutorials and technical support to bridge the gap between basic digital literacy and classroom application.

**Keywords**— Challenges, Knowledge, and Utilization in ICT Integration.

## I. INTRODUCTION

Information and Communication Technology (ICT) has emerged as the cornerstone of progress in modern education,

transforming traditional teaching into more efficient, effective, and relevant methods that foster creative and collaborative learning for learners. UNESCO (2023) defines ICT as any communication device or application, including cellular phones, computers, network hardware/ software, and satellite systems, as well as the various services and applications associated with them. According to Alcantara et al. (2020), integrating ICT into the classroom—particularly within mathematics—initiates a fundamental shift in the educational landscape. This shift replaces conventional methods with modern approaches, moving away from a one-way delivery of information toward a collaborative exchange and from a teacher-led environment to one centered on the student.

However, achieving this shift is a complex process in which teachers play a decisive role (Rodriguez & Almerich, 2018). Ghavifekr and Wan Rosdy (2015) support this by asserting that ICT will assist teachers worldwide in replacing traditional teaching methods with technology-based teaching and learning tools and facilities. ICT enables innovation across various teaching fields, ensuring more relevant and effective teaching methods, so teachers can fulfill their responsibilities and prepare learners to navigate contemporary challenges with advanced, modern, cutting-edge skills. However, to achieve this shift and ensure teachers are competent to a global standard, they must be equipped with the essential ICT competencies. Therefore, to achieve effective ICT Integration 3 variables must be examined: knowledge, challenges, and utilization.

Despite the theoretical promise of ICT, modern education faces pedagogical issues where traditional, teacher-centered methods — relying on memorization and passive delivery —

increasingly fail to resonate with a digital-native generation (Maag, 2025). This has led to disengagement and contributed to skyrocketing absenteeism, as students find little relevance in passive, traditional learning methods (Blinkoff et al., 2024). Furthermore, the persistence of passive, traditional learning methods in a dynamic and increasingly digital world is no longer just an educational flaw but an economic risk that demands urgency. By failing to adapt, the pedagogical structure risks producing learners who are functionally outdated in the modern workforce, lacking the contemporary skills that the world demands. This further fuels the skyrocketing numbers of absenteeism due to learners lack of faith in the relevance of their education (World Bank, 2023).

Additionally, although the global landscape demands ICT or digital fluency, educators are often labeled as “ resistant to change. This creates misplaced pressure on teachers to meet global standards with minimal resources and support, leading to burnout and systemic frustration. Additionally, most research tends to focus on highly resourced areas where challenges in integrating ICT are minimal, technologically saturated, and where infrastructure is a guaranteed baseline (Espinosa et al., 2025). Hence, there is an empirical gap regarding the socioeconomic obstruction and declining administrative support that hinder effective integration and adoption of ICT in marginalized settings (UNESCO, 2023). This leads to a digital divide, where a marginalized community that receives minimal ICT support fails to understand and effectively use ICT to meet global standards. A significant gap remains in understanding the pedagogical-technology combination experienced by the teachers due to a lack of professional development regarding ICT, such as seminars and training, yet they are expected to adapt, which leads to frustration and forced adoption instead of genuine understanding of ICT (Mathevula & Uwizeyimana, 2014; García-Sánchez et al., 2023). Existing research frequently neglects the impact of inadequate professional development, such as guides or coaching to help teachers navigate ICT, leading them to learn ICT in isolation and treating it as a burden rather than a tool. (Frontiers, 2025). By investigating the variables of knowledge, challenges, and utilization that underpin effective ICT integration, this study addresses the overlooked challenges teachers face and the structural barriers that hinder ICT adoption in resource-constrained schools.

The core objectives of this study are in three folds: (a) to assess the knowledge teachers possess regarding ICT Integration, (b) to identify and analyze the challenges they encounter in applying ICT within their pedagogy, and (c) to evaluate how effectively they utilize ICT tools in actual classroom practices. Through this investigation, our study aims to investigate the reconnection of these present variables and their impact on teachers’ performance and student learning outcomes.

## II. STATEMENT OF THE PROBLEM

This study aims to identify the level of knowledge, challenges, and utilization of ICT Integration among teachers in the classroom at Martin M. Salimbangon National High School. Specifically, this centers on the following:

1. What is the professional background of the Teachers at Martin M. Salimbangon National High School?
  - 1.1 Years of teaching;
  - 1.2 Educational background; and
  - 1.3 Professional development?
2. What are the levels of the Teacher’s knowledge of ICT Integration?
3. What are the challenges encountered by the Teachers on ICT Integration?
4. What are the levels of the Teacher’s utilization of ICT Integration?
5. Based on the findings, what relevant course of action can be implemented?
  1. Significance of the Study

This study is significant as it identifies the knowledge, challenges, and utilization of Teachers on ICT integration as this can benefit teachers, which could enhance and improve their teaching skills in a modern way, where they have the opportunity and capability to adapt and explore new ways of educating by imposing on Power points, online classes, and also online surveys and poll, this can also address their hardships in teaching as ICT enables them to teach students engagingly and easily. Furthermore, this finding can also help students, as they can acquire new knowledge and a profound understanding of ICT integration; they can also enhance their communication with their teachers and peers through online platforms and tools. Additionally, future researchers can use this as a blueprint since it provides tested frameworks and helpful insights for conducting a study. This research contributes to maintaining connections with parents and teachers through internet platforms, emails, and apps, addressing challenges such as limited communication and the lack of timely access to students’ academic progress. Lastly, this offers numerous benefits in DepEd, as it improves administrative efficiency through streamlined data management and real-world analytics, creating a more connected and responsive education system that supports 21<sup>st</sup>-century learning. Through ICT integration, DepEd can improve its delivery of education by providing digital learning and teaching resources.

## III. REVIEW OF RELATED LITERATURE

This chapter presents a review of the literature and relevant studies for the current study. This chapter provides information from existing studies on issues related to the Knowledge, Challenges, and Utilization of Senior High School Teachers at Martin M. Salimbangon National High School.

The integration of Information and Communication Technology (ICT) will aid teachers on a global scale and equip them with modern skills to replace traditional teaching styles and methods with technology-based teaching tools such as Computers, the Internet, and Multimedia gadgets and ICT facilities, Wan, W.A, et al. (al 2015) This study aims to analyze 3 interconnected variables: Knowledge, Challenges and Utilization. Consequently, this collection of literature reviews will assess and support the said variables and the

study itself. The study by Kini and Podolsky (2016) found that teachers become more effective with more years of experience. This also suggests that as teachers gain experience, they are more likely to integrate ICT tools with greater confidence and skill. Linda J. Graham and Sonia L. J. White (2020) found no evidence of lower teaching quality among beginning teachers (0–3 years), but some decline among those with 4–5 years of experience. In relation to ICT integration, this suggests that novice teachers can effectively use digital tools, while teachers in later years may face challenges in consistently integrating ICT into their teaching. Teacher education shapes professional growth and equips teachers with the skills to implement student-centered approaches. This foundation is essential for effectively integrating ICT in teaching and learning (Miroslavljevic, 2022). Anthony, Hunter, and Hunter (2015) show that practice-based teacher education helps prospective teachers develop adaptive expertise through student-focused, experiential learning. According to Kennedy's (2016) study, professional development improves teaching not through its design features but by helping teachers apply new ideas effectively in their practice. Linda Darling-Hammond and Maria E. Hyler (2017) emphasize that effective professional development is essential to helping teachers refine the pedagogies needed to meet today's complex learning demands. In relation to ICT integration, this highlights the importance of targeted ICT-focused training to enable teachers to develop the skills and teaching strategies needed to use technology effectively in the classroom.

#### *Knowledge of Teachers in ICT Integration*

The integration of ICT in education is a transformative approach that enhances teaching and learning. Over the last few years, ICT integration in education has been a topic of interest for many scholars worldwide. This is due to ICT's capability to provide a dynamic and engaging environment for both learning and teaching (Meixi G. et al., 2014).

The study by Marcial & Rama (2015) suggests that teachers' Competency in ICT Integration depends on the level of knowledge deepening in the field. Educators who can integrate ICT into classroom teaching have demonstrated a high level of confidence, collaboration, and cooperation (Abel V.R. et al., 2022). In some research studies, ICT Integration in the classroom improves teaching and student learning; furthermore, it enhances students' capacity for active learning (Abel, V.R. et al., 2022). Wai-Kong (2009) further underscores this in his study, stating that many governments in the Asia-Pacific region promote the use of ICT in education; it is not merely to improve teaching and learning, but also to facilitate large-scale adoption of digital technologies that improve pedagogical structures. Churchill (2009) argues that ICT provides a new dimension to teaching, enabling teachers to innovate and offer new learning experiences that might not be possible with traditional methods. In integrating ICT into education, knowledge plays a crucial role in how teachers use it in teaching, depending on their level of expertise in the field. In a research study by Hughes (2005), the teacher's capacity to innovate in pedagogy lies in the teacher's understanding and

adaptation of the newly learned craft, specifically in technology's value for providing instructional materials and learning in the classroom, learning experiences, and content-based knowledge. Furthermore, teachers with less professional knowledge and less interest in ICT may need guidance in technology-related opportunities. On the other hand, teachers with more advanced knowledge may be able to foster innovation in technology-supported education (Hughes, 2005). In the study of Karami (2013), teacher trainees who integrate problem-based learning with ICT in solving problems may develop more professional content knowledge and teaching skills than those who merely employ ICT. Therefore, teachers' knowledge of ICT determines how effectively they can integrate it into education.

#### *Challenges of Teachers in ICT Integration*

Integrating Information and Communication Technology (ICT) into the pedagogical structure presents numerous challenges across different contexts. These challenges can be broadly categorized into technical, human, policy, and culturally related issues.

##### *Technical Challenges*

ICT is a new phenomenon that has brought great advancements in education; however, challenges and barriers arise in its integration, preventing its use in the classroom (Salehi, H., & Salehi, Z., 2012). In the same study, their data revealed that insufficient technical support, limited access to the internet and ICT, and a shortage of class time are discouraging factors teachers face when integrating ICT. In the study by Wang J. et al. (2022), ICT infrastructure and digital content pose technical challenges. Additionally, poor and inadequate ICT facilities, poor level of computer literacy and ICT skills, and poor level of awareness of internet facilities are shown in the study of Kimani, J. (2017)

##### *Human Challenges*

In education, the role of ICT is paramount, especially in supporting teachers in integrated teaching. According to the study by Wang, J. et al. (2022), the lack of teacher training and technical support is a human challenge. In Razak's (2019) study, three challenges were identified: inadequate ICT tools, failure to commit to the school regulations, and failure to comply with the school's regulations. Furthermore, although teachers are aware of and support the benefits of ICT integration, some are still resistant to change. (Vrasidas, 2010). In the same study, the reasons teachers are risk-averse to ICT integration include a lack of time, an ill-structured school curriculum, and insufficient infrastructure and tools to support teachers better. Additionally, the lack of staff capacity in terms of training and staff attitudes towards technology adoption are among the many challenges identified in Kimani, J. (2017). In Howard's (2013) study, the results suggest that negative affective responses to technology influence the decision to integrate ICT into teaching, the perceived value of technology, and general risk aversion in teaching.

##### *Policy and Cultural Challenges*

Poor regulatory policies and a lack of management commitment are the challenges identified by Kimani, J. (2017). In the same study, poor internet access among policymakers, government officials, and the ruling class in general, and the limited involvement of academic institutions in network building are challenges that hinder the use of ICT. Hence, the rising challenges encountered by teachers in integrating ICT into pedagogy are hindering them from advancing and applying modern, cutting-edge technology in education, thereby promoting more relevant competencies to equip learners with modern skills.

#### *Utilization of the Teachers in ICT Integration*

Utilizing ICT in pedagogy has become a pivotal aspect of modern teaching and learning processes. In integrating ICT into pedagogy, it is crucial to recognize how teachers can use ICT in both teaching and learning. According to Samuel and Bakar (2006), advances in interactivity and multimedia capabilities, together with a myriad of emerging technologies, have enabled the creation of virtual learning environments that can be used to boost the development of English language skills. Moreover, ICT is becoming increasingly important in our daily lives and in our educational system (Japhet E. Lawrence & Ausman A. Tar, 2018). In addition, according to Hero (2020), ICT has brought significant change to society, including education. To effectively integrate ICT in education, it is imperative to assess and extrapolate the teacher's preparedness and acceptance of ICT in teaching.

Furthermore, rapid growth and improvement in ICT have led to the diffusion of technology in education. Based on the findings of Hoque & Razak et al. (2012), almost all teachers have a high level of computer skills, and, more importantly, the basic IT skills needed by teachers are attained by all teachers. Hence, ICT integration in many classrooms today enhances students' learning and skills, and teachers must integrate ICT in their classrooms (Wan Mama, 2013). According to Ghavifekr S. et al. (2015), results show that well-equipped preparation with ICT tools and facilities is imperative and highly effective as the main factor in successful teaching and learning. Indicators of technology integration require technical, administrative, and professional development support (Uslu, A. N. et al., 2019). Hence, to effectively utilize ICT Integration in the pedagogical structure, support such as training, development, and ICT resources is required. Moreover, the theory of Connectivism by Downes (2022) suggests that knowledge is the set of connections between entities, such as the change in one thing that can affect the other, and learning is the growth, development, modification, or strengthening of those connections. Consequently, the Connectivism Theory in ICT Integration assesses the connection between teachers and ICT, thereby improving the teaching and learning experiences of both teachers and students. In addition, the Constructivist Theory by Jean Piaget encompasses cognitive, social, moral, and other areas of development (Stupiansky, 2022). This theory suggests that people construct their knowledge based on their experiences. This highlights the importance of teachers' knowledge of ICT Integration and emphasizes how they

navigate the challenges of integrating ICT to attain ICT proficiency. This study highlights the profound contribution of ICT Integration to the pedagogy and aids teachers' teaching methods, ensuring that learning is modernized and relevant. Hence, this study is the combined efforts of the researchers to identify the significance of the variables, assess the challenges, and provide a relevant course of action.

#### IV. RESEARCH METHODOLOGY

This chapter discusses the research design, research environment, research respondents, research instruments, data-gathering procedure, data analysis, and ethical considerations in studying Senior High School teachers' knowledge, and challenges in utilizing ICT integration.

##### *Research Design*

This study employed a quantitative research method using a descriptive research design. A descriptive research design focused on accurately describing the characteristics, behaviors, and conditions of a population without manipulating variables. It is used to gather information on the current status of phenomena and to present data systematically using statistical measures. This design was used to describe teachers' levels of knowledge, challenges encountered, and the use of ICT Integration in the classroom.

##### *Research Environment*

This study was conducted in Martin M. Salimbangon National High School, formerly known as Curva National High School, founded in 1990. The school was located in the Municipality of Medellin, Cebu, specifically in Barangay Curva. The school was situated at the top of a mountain, overlooking the scenic terrain and seas of Medellin. The school has a calming and comforting atmosphere, with the forest surrounding it hosting diverse wildlife. Furthermore, the school's community provides a supportive and lively environment, ensuring that students learn while having fun.

##### *Research Respondents*

The respondents of the study were the Junior High School and Senior High School teachers of Martin M. Salimbangon National High School (MMSNHS) in the Municipality of Medellin, Cebu. The school has a total of thirty-nine (39) teachers, of whom 3 were non-teaching personnel, and 36 are whom were actively handling classes and were selected as respondents for this study. The participants were chosen using a non-probability sampling method, specifically purposive sampling, which involves selecting respondents based on specific characteristics, expertise, and experiences relevant to the study. The inclusion criteria required that the teachers be currently employed at MMSNHS, actively handling at least one subject or class section during the data collection period, and utilizing or expected to utilize Information and Communication Technology (ICT) in classroom instruction, lesson preparation, assessments, or other student-related tasks. These criteria ensured that the respondents were directly engaged in the teaching-learning process and capable of providing meaningful and relevant insights into the integration

of ICT in teaching and learning. The school’s faculty comprises diverse, dynamic, and well-equipped educators.

*Research Instrument*

The researchers used two survey questionnaires: a researcher-made questionnaire to gather data on the teachers’ professional background and an adapted questionnaire from Tondeur et al. (2007), Bingimlas (2009), and Buabeng-Andoh (2012) to describe the teachers’ level of knowledge, challenges, and utilization of ICT Integration at Martin M. Salimbangon National High School.

The first survey questionnaire provided by the researchers was researcher-made. The survey includes questions about teachers’ years of teaching experience, educational background, and professional development.

The researchers provided a second survey questionnaire, adapted from Tondeur, J. et al. (2007), Bingimlas, K.A. (2009), and Buabeng-Andoh, C. (2012), composed of 30 items that address the researchers’ Knowledge and Challenges in utilizing ICT Integration in Senior High School.

There are ten (10) items for teachers’ Knowledge of ICT Integration, ten (10) items for teachers’ Challenges in ICT Integration, and ten (10) items for teachers’ Utilization of ICT Integration. They follow the 5-point Likert Scale format of Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree for the teacher’s Knowledge of ICT Integration, and then the scale format of Never, Rarely, Sometimes, Often, and Always for the teacher’s Utilization of ICT Integration. On the other hand, in the teacher’s challenges in ICT Integration, the researchers used a checklist to determine the frequency of challenges teachers face when integrating ICT into pedagogy.

TABLE 1. Knowledge of the JHS and SHS teachers in ICT Integration

Scale	Interval	Verbal Description
5	4.21 – 5.00	Always
4	3.41 – 4.20	Often
3	2.61 – 3.40	Sometimes
2	1.81 – 2.60	Rarely
1	1.00 – 1.80	Never

TABLE 2. Utilization of the JHS and SHS teachers in ICT Integration

Scale	Interval	Verbal Description
5	4.21 – 5.00	Strongly Agree
4	3.41 – 4.20	Agree
3	2.61 – 3.40	Neutral
2	1.81 – 2.60	Disagree
1	1.00 – 1.80	Strongly Disagree

*Data Analysis*

This study utilized quantitative data. The data on the professional background and challenges in ICT Integration of the Junior High School and Senior High School teachers of Martin M. Salimbangon National High School are analyzed using frequency and percentage. Data, knowledge, challenges, and the utilization of ICT Integrations are analyzed using the Weighted Mean.

*Ethical Considerations*

Ethical considerations are principles that guide the researcher’s research design and practices and that require adherence to a specific code of conduct when collecting data

from respondents. This study allows the researcher to ensure the respondents’ protection and privacy. Only after the study has received approval from the class research adviser will it be carried out. To ensure respondents’ privacy, the four ethical principles are followed.

*Respect for person and Autonomy*

The researchers ensured that respondents’ participation in the study was voluntary and that they had the right to withdraw, in line with their autonomy, rights, and dignity as human beings. This also gives the researcher the ability to obtain the respondents’ permission to participate or withdraw from the study by sending them consent letters prior to the study, as well as to get the principal’s permission for the researcher to carry out the study and utilize the Senior High School teachers in the study.

*Beneficence and Non-Maleficence*

The researchers ensured that the chosen respondents were free from personal and physical risks. As the world continues to battle the threat of COVID-19, the researchers ensure that face masks are worn, hand sanitizer is provided, and physical distancing is maintained during the study to avoid any physical contact that could transmit the virus. Furthermore, the researcher ensures that the venue where the respondents participate is safe from possible harm. Additionally, the researchers ensure that participants will benefit from their study.

*Justice and Confidentiality*

The researchers ensured the anonymity and data protection of each respondent participating in the study. The researcher provides the transmittal and consent letters beforehand and presents them to the Research adviser of Martin M. Salimbangon National High School to ensure ethical conduct of the study. The researchers do not present the respondents’ personal data to the public. All information supplied by the key respondent is handled with the strictest confidentiality, in accordance with RA 10573, the Data Privacy Act, as it is known in the Philippines. Furthermore, the researcher ensures that there is no discrimination in conducting the study and that all participants are treated equally.

V. PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

*Years of Teaching experience of the Junior High School and Senior High School teachers in Martin M. Salimbangon National High School*

Among 36 respondents (100%), the most common number of years of professional experience was 2, accounting for 16.67%, indicating that a significant portion of the sample is relatively early in their careers.

Additionally, 5, 6, 8, and 12 years were moderately represented, with 8.33% each. Furthermore, 7, 11, 15, 32, and 33 years and 1 month accounted for 5.56% each. Consequently, the least represented were 1, 9, 14, 17, 22, and 34 years, each at 2.78%. This suggests a balance between mid-level and highly experienced individuals in the teaching field.

In the study by Bankira, S. et al. (2025), it was revealed that teachers with less than 5 years of teaching experience are highly digital pedagogy-oriented and competent at integrating ICT, and they practice digital pedagogy more than teachers with more than 5 years of experience. This indicates that years of teaching are a significant factor in the integration of ICT in the educational system.

Overall, this data presented a diverse range of professional experience of the respondents, spanning from less than a year to 3 decades of teaching experience. This diversity reveals perspectives from newly hired teachers to highly experienced professionals, further strengthening the findings' representation and credibility.

#### *Educational Background of the Junior High School and Senior High School teachers in Martin M. Salimbangon National High School*

This shows that most respondents hold bachelor's degrees, accounting for 63.89% of the overall population. Those with a master's degree follow this, with a 33.33% share. Consequently, 2.78% hold doctorate degrees, with the lowest mean in the population.

This data indicates a high level of professional credibility. With the combined percentage of Master's and Doctorate holders aggregating to over 36%, the teachers possess the specialized expertise to implement the necessary concepts of ICT integral to its integration and adoption in pedagogy. This is supported by Marcial and Rama (2015) that the competency level of teachers in integrating ICT in the pedagogy depends on their "knowledge deepening level" on their specific fields.

#### *The Professional Development of the Junior High School and Senior High School teachers.*

The data revealed that the highest proportion of respondents did not attend any seminar, constituting 33.33%. On the contrary, the highest number of seminars attended only constitutes to 2.78%, representing the lowest proportion. Furthermore, the second-highest proportion, which constitutes 27.78% of the total population, attended only one seminar. Meanwhile, 19.44% attended 3 seminars, while 16.67% participated in 2 seminars.

Overall, the findings indicated that although several teachers attended seminars, the majority attended only 1 or none at all. This reveals limited engagement in professional development.

This culminates in a lack of professional development being a significant factor in the minimal integration of ICT into pedagogy. The study by Wang (J. et al., 2022) supports this, stating that the lack of teacher training and technical support is a discouraging challenge that hinders the necessary adoption required to integrate ICT into pedagogy.

This data indicated an alarming state in which teachers received minimal or no professional development to equip them with modern, cutting-edge skills that are prerequisites for facing the contemporary complexities and demands of today's educational landscape. Consequently, this implies a need for professional development to guide teachers in navigating ICT within the educational system and prepare them to meet the dynamic demands of pedagogy. In this way, teachers can

properly fulfill their teaching duties with modern skills and enhance their teaching experience, enabling students to have a timely and relevant learning experience.

#### *Knowledge of the Junior High School and Senior High School teachers in Martin M. Salimbangon National High School in ICT Integration*

This table measured the levels of competence, familiarity, and awareness of JHS and SHS teachers regarding Information and Communication Technology (ICT) integration. This was quantified through a five-point Likert Scale ranging from "Strongly Disagree" (1) to "Strongly Agree" (5) to assess ten specific statements related to integration of ICT.

The data reflected a high level of self-reported knowledge among the teachers. The overall weighted mean is 4.17%, which corresponds to the "Strongly Agree" verbal description. This indicated that, in general, the teachers perceive themselves as knowledgeable about integrating ICT concepts into pedagogy.

Teachers feel more confident in their understanding of the basic concepts of ICT Integration and its role in education, which earned the highest mean of 4.64. However, they have trouble with minor technical troubleshooting in ICT, which receives the lowest mean among the rest at 3.58.

This indicates that while teachers have strong theoretical knowledge and understand the role of ICT in pedagogy, they still lack the technical proficiency to handle minor software troubleshooting independently. This implies that although the teachers have the cognitive foundation for ICT and are aware of the "how" and "why" of integration, their practical execution skills remain fragile.

Overall, the results revealed that the teachers possess a high level of functional competence and awareness in ICT, and there are no "knowledge barriers." This indicated that the teachers already have knowledge in integrating ICT and are prepared for pedagogical execution.

These results were supported by the study of Hughes (2005), which found that teachers' ability to integrate and innovate with ICT in pedagogy is tied to their understanding and adaptation to the newly learned craft. Marcial & Rama (2015) assert that teachers' competency in ICT Integration is closely linked to their level of deepening knowledge of ICT concepts. This result aligns with Stephen Downes' (2022) theory of connectivism, which states that the first step for ICT integration and adoption is to have knowledge and understanding of ICT.

#### *Challenges of the Junior High School and Senior High School teachers in Martin M. Salimbangon National High School in ICT Integration*

The main challenges identified included poor internet connectivity, which constituted 83.33% and ranked first as the most significant barrier, while lack of ICT training and professional development ranked second with 77.78%, meanwhile, lack of ICT resources for students ranked third with 77.72%, and 4<sup>th</sup> lack of technical support for troubleshooting issues, which aggregated to 66.67%. It is then followed by limited access to ICT tools, the fifth main barrier

to the integration of ICT. This indicates that the major barriers to teachers integrating ICT into their pedagogy are inadequate or absent ICT resources and insufficient administrative support.

On the other hand, the challenges least encountered by teachers were resistance to change from teaching traditional methods, with 27.78%, which is contrary to the label teachers are resistant to change” in the study of Vrasidas (2010).

This implies that the weak integration of ICT into pedagogy is not due to teachers’ resistance to change but to a lack of resources that hinders their ability to apply it in the classroom.

This is supported by Salehi, H. & Salehi, Z. (2012), who found that insufficient technical support, limited internet access, and ICT are discouraging factors that lead to minimal ICT integration. Wang, J. et al. (2022) add that the lack of teacher training and technical support is a human challenge.

Another significant factor in the weak integration is that teachers find it difficult to adapt to different ICT learning styles, which accounts for 6.85%.

In contrast, the complexity of using other ICT tools, such as multimedia and software aggregators, accounts for 9.13%. Kimani J. (2017) supports this, as a low level of computer literacy and ICT skills is a significant barrier that hinders the adoption and integration of ICT. This implies a need for professional development to strengthen educators’ ICT skills and computer literacy to address this challenge. Furthermore, the data reveal that the limited time available for ICT-based lessons is a major impediment to teachers’ progress in integrating ICT. Lubis (2018) validates this, stating that time allocation and technical problems are major constraints that block the integration of ICT.

#### *The Utilization ICT Integration of the Junior High School and Senior High School teachers in Martin M. Salimbangon National High School*

The same table measures activities related to ICT Integration, ranging from administrative preparation (lesson planning) to active classroom engagement (gamification and multimedia integration).

The data unravels that the teachers had an overall weighted mean of 4.09 and is described as ‘Often’, this notable decline in utilization compared to the 4.17 knowledge score can be directly attributed to lack of ICT training and professional development affecting 77.78% of the respondents and lack of ICT resources.

The data revealed that the most consistent application of ICT Integration occurs in the pre-instructional phase. Tasks such as preparing lesson plans and instructional materials earned the highest mean of 4.44, categorized as ‘Always’. This indicated that ICT has become a fundamental “instructional workhorse’ for faculty productivity, as teachers utilize this as a “behind the scenes tool for automated administrative tasks, efficient and swift preparation of lessons, and a broader scale for lesson sources. This is supported by the study by Ghavifekr and Rosdy (2015), which states that well-equipped preparation is a fundamental factor for successful integration.

On the other hand, a notable decline is observed when teachers use ICT to foster student active engagement. Modalities such as gamifying lessons contribute to a mean of 3.83%, and conducting blended learning aggregates to a mean of 3.94%, with a verbal description of “Often”.

This noticeable contrast in the data shows that although teachers can effectively utilize ICT in the pre-instructional phase, there is minimal integration into student engagement and actual classroom use of ICT. This indicates that ICT remains teacher-centric rather than student-centric. This observed deceleration in interactive utilization can be directly attributable to the systemic barriers identified in Table 3, such as a lack of ICT resources for students, limited time, and technical complexity.

This data is supported by the study by Salehi, H. (2012), which states that even knowledgeable educators find their efforts to utilize ICT impeded by inadequate time, a lack of ICT tools, and facilities. The decline implies that teachers’ implementation is hindered by systemic barriers that prevent them from achieving interactive integration of ICT.

Furthermore, the table shows that teachers can use ICT to improve communication with their students, accounting for 4.17%. With students’ parents having a mean of 4.0%, this suggests that teachers can connect with students’ parents, ensuring engagement between both, making them “active partners” in students’ learning. There is also a noticeable difference in communication between teachers, students, and parents, with a combined mean of 8.17%, compared to interactive-actual classroom teaching, such as gamifying lessons and blended learning, with a combined mean of 7.77%. This indicates that while infrastructural barriers hinder live classroom execution, they do not obstruct asynchronous learning and communication. The use of ICT for communication and asynchronous teaching aligns with Connectivism Theory (Stephen Downes, 2022), which states that communicating to teach is an effort to connect with students through diverse teaching forms. Although teachers are ready and able to use ICT for communication, the lack of ICT resources for students, such as devices and data, impedes their ability to communicate, making this communication one-sided and neutralizing the benefits of digital reach. This underscores a need for “offline-capable” communication and teaching strategies to ensure that there is no digital divide and no student is marginalized due to resource scarcity.

## VI. SUMMARY OF FINDINGS, CONCLUSION & RECOMMENDATION

### *Findings*

Based on the collected and interpreted data the study revealed the following insights

1. This study revealed that the Junior High School and Senior High School teachers at Martin M. Salimbangon National High School comprise a diverse group with varying professional experience, ranging from 1 month to 34 years. The most common number of years of experience was 2 (16.67%), indicating that a significant portion of the faculty is relatively early in their careers. Furthermore, the study revealed a balanced representation of mid-level

- teaching experience, with a mean of 8.33 for 5, 6, 8, and 12 years, and highly experienced teachers, providing a wide range of perspectives on ICT adoption.
2. This study revealed that the Junior High School and Senior High School teachers at Martin M. Salimbangon National High School comprise a diverse group with varying professional experience, ranging from 1 month to 34 years. The most common number of years of experience was 2 (16.67%), indicating that a significant portion of the faculty is relatively early in their careers. Furthermore, the study revealed a balanced representation of mid-level teaching experience, with a mean of 8.33 for 5, 6, 8, and 12 years, and highly experienced teachers, providing a wide range of perspectives on ICT adoption.
  3. This study revealed a notable finding that a significant proportion of the population, with a mean of 33.33%, have attended zero seminars, while 27.78% have attended only one. Only 2.78% had attended four professional development activities. This implies the faculty lacks, or has minimal, development support, which may be attributable to the weak integration of ICT. The data indicate a critical gap in formal development support towards teachers' adoption and integration of ICT.
  4. This study established that the teachers have a high level of understanding of ICT Integration in terms of instructional readiness, such as basic productivity, with a mean of 4.64%. This implies the teachers have intellectual capacity that serves as the primary foundation for ICT Integration. However, a notable decrease is observed in the mean score for technical troubleshooting, at 3.58%, suggesting that although teachers understand basic ICT foundations, they do not fully grasp complex ICT concepts. This may be directly linked to a lack of or minimal development support to enhance teachers' understanding of ICT Integration and computer literacy
  5. This study identified that the main challenges hindering ICT Integration are a lack of ICT training and professional development, poor internet connectivity, and a lack of ICT resources for students. These challenges ranked among the top three barriers to ICT Integration. This data suggests a clear impediment to teachers' integration of ICT. The data also shows that teachers find it difficult to adapt to ICT across different teaching styles, which accounts for 41.67%. The complexity of using other ICT tools, which constitute 55.56%, is a significant barrier to integrating ICT into pedagogy and can be directly linked to the lack of ICT training, which constitutes 77.78%, and to the lack of, or minimal, professional and development support, as data revealed. This implies that teachers find it difficult to adapt to ICT and other complex ICT tools due to a lack of professional development support to enhance their understanding and utilization of ICT. Consequently, this challenge can also be associated with limited time for ICT-based lessons, which yielded a mean of 10.05%. This suggests that limited time is a significant barrier that hinders teachers from overcoming the complexity of ICT tools and from adapting to ICT. Furthermore, the data also established that the lack of technical support for

- troubleshooting was a significant factor; this was attributable to a decrease in the mean level of teachers' understanding of troubleshooting technical problems, which aggregated to 3.58%. Additionally, the findings revealed that the least cited challenge is resistance to change, indicating that teachers are willing to adapt ICT into pedagogy but are prevented by external constraints, such as a lack of development support and ICT resources.
6. The findings revealed that ICT utilization is most frequent and consistent in the pre-instructional stage of teaching. Teachers always use ICT to prepare lesson plans and instructional materials, with a mean of 4.44%. This suggests that teachers utilized ICT as the primary productivity tool for professional workflow in office-based tasks. These findings can be directly linked to data that reveals teachers have a high-level understanding of ICT in terms of instructional preparedness, including basic productivity and administrative tasks. However, the findings revealed a notable decrease in frequency from office-based tasks to active classroom integration of ICT, such as gamifying lessons (3.83%) and conducting blended learning (3.94%), which were only described as "Often". This indicates a gap between the integration of ICT in office-based applications and the active classroom. This shift is directly attributable to the main challenges identified in Table 3, specifically a poor internet connection that will disrupt classroom activities and a lack of ICT resources for students that hinders their active engagement in a live, gamified lesson.

### *Conclusion*

This study ultimately concludes that while teachers are masters of the 'conceptual' digital landscape, their potential and ability to integrate ICT into pedagogy are impeded by systemic physical barriers. The weak integration and slow transition to adapt ICT into pedagogy are not failures of teachers' willingness or competence, but a struggle against systemic resource scarcity.

### *Recommendations*

Based on the findings and conclusion of the study, the following are recommended.

1. The Department of Education (DepED) may collaborate with the Department of Information and Communications Technology (DICT) to provide professional development programs and seminars to enhance teachers' understanding, use, and adoption of ICT. As the data revealed, there is minimal professional development, which is a significant barrier to teachers' integration.
2. Given that the data reveal that the majority have no formal ICT training, the school may organize an ICT team to establish a hands-on training and coaching system focusing on technical troubleshooting and practical skills, as this is the weakest point in teachers' knowledge of ICT Integration. Furthermore, this approach aids teachers who find it difficult to adapt to and use complex ICT tools, as data show this is a significant barrier to their adoption and integration.

3. The DepED, along with the school administration, may prioritize improving ICT by providing adequate, functional technological resources for teachers and enhancing reliable internet connectivity, as these are the main challenges identified in the data.
4. Schools may provide hands-on training to bridge the data gap on how teachers use ICT in interactive classroom teaching rather than for administrative tasks. Through this practical hands-on training, teachers learn to gamify lessons and blended learning lessons to move ICT from an administrative tool to an active teaching tool.

#### APPENDIX

##### SCAN ME ICT

SCAN ME ICT is a research-based ICT intervention designed to address teachers' lack of professional development and training in Information and Communication Technology (ICT), which often leads to limited understanding and minimal utilization of digital tools in teaching and learning. The intervention aims to provide teachers with accessible and relevant learning resources to enhance their knowledge, skills, and confidence in using ICT for instructional purposes. The intervention takes the form of a QR code that, when scanned, directs teachers to a Google Drive repository. This repository contains organized folders dedicated to specific ICT tools, each providing curated tutorial links and learning materials. These resources explain how the tools work, their purposes, and practical ways they can be integrated into classroom instruction. Through this structured and self-paced approach, SCAN ME ICT supports continuous professional development and promotes effective ICT integration in the teaching process. Step-by-Step Guide on How Teachers Use SCAN ME ICT.

**Step 1: Locate the SCAN ME ICT QR Code** Teachers locate the SCAN ME ICT QR code posted in classrooms, faculty rooms, bulletin boards, or shared through official school communication platforms.

**Step 2: Scan the QR Code Using a smartphone or tablet,** teachers scan the QR code with their device's camera or a QR scanning application.

**Step 3: Access the Google Drive Repository** After scanning, teachers are automatically redirected to the SCAN ME ICT Google Drive repository, which contains organized folders for different ICT tools.

**Step 4: Choose an ICT Tool Folder** Teachers browse the folders and select a specific ICT tool they want to learn or improve on (e.g., Google Classroom, Canva, Google Forms, PowerPoint).

**Step 5: Open the Tutorial Resources** Inside each folder, teachers access available tutorial links, videos, and guides that explain how the selected ICT tool works, its purpose, and how it can be used in teaching.

**Step 6: Learn at Their Own Pace** Teachers study the tutorials based on their individual needs and availability. They may pause, replay, or revisit the materials as needed.

**Step 7: Apply the ICT Tool in Teaching** Teachers apply what they have learned by integrating the ICT tool into their lesson

preparation, classroom activities, assessments, or instructional delivery.

**Step 8: Revisit and Explore More Tools** Teachers may rescan the QR code anytime to explore other ICT tool folders, review tutorials, or access newly added learning resources for continuous professional development.



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