MANAGEMENT OF INSTITUTIONS' TECHNOLOGY INITIATIVES ON TEACHER DEVELOPMENT AND PEDAGOGICAL PRACTICES ACROSS GENERATION COHORTS

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Abstract

The study titled *"Management of Institutions' Technology Initiatives on Teacher Development and Pedagogical Practices Across Generational Cohorts"* investigated how school technology programs influence teacher growth and classroom practices. It examined institutional initiatives such as ICT resources and access, policy support, capacity building, digital resources, and the integration of technology into pedagogy. The research aimed to determine the level of these initiatives, teacher development, and pedagogical practices across generational groups, as well as to identify significant differences and relationships among these factors.

Using a descriptive-correlational design, the study surveyed purposively selected 100 elementary teachers in Sta. Rosa City, Laguna. The survey instrument was validated by experts and pilot tested for reliability. Data analysis involved descriptive statistics to assess levels and correlation tests to explore relationships. The study was anchored on Fullan's Change Theory, Bandura's Self-Efficacy Theory, the TPACK framework, and the SAMR model, providing a strong theoretical foundation.

Findings show that institutions implement technology initiatives at a high to very high across all generational cohorts, particularly in providing ICT resources and policy support. Teachers from all generational cohorts demonstrate strong development in digital skills, professional learning, instructional innovation, collaboration, and ICT self efficacy. Pedagogical practices were also rated high to very high, highlighting technology enhance high to very high, highlighting technology enhance lesson planning, student centered learning, collaborative methods, creativity, and blended learning.

At the same time, some indicators of institutional initiatives and teacher development showed significant relationships, particularly when leadership-driven programs and structured support were present, while non-significant results appeared when limited to basic resource access, especially among older cohorts. Similarly, several indicators of institutional support and pedagogical practices showed significant relationships, such as training-driven initiatives and collaborative work, while non-significant results were observed when teaching relied only on simple digital resources, particularly among younger cohorts.

Therefore, it is concluded that institutional technology initiatives are essential drivers of teacher development and pedagogical innovation. Recommendations include generation sensitive professional development, digital hubs, mentoring, and stronger collaboration through professional learning communities.

Keywords: ICT integration; teacher development; pedagogical practices; generational cohorts; educational transformation

1. Main text

Introduction

The integration of technology in education has become essential in enhancing teaching and learning in today's digital age. Schools across the Philippines have implemented various technology initiatives such as providing ICT resources, developing digital content, and offering teacher training. These initiatives aim to make learning more engaging and aligned with 21st-century skills (UNESCO, 2023). However, their success depends not only on access to tools but also on how institutions manage, support, and sustain these programs. Poor planning, inconsistent implementation, and lack of teacher support often led to the underutilization of technology (Ertmer & Ottenbreit-Leftwich, 2020).

The Department of Education (DepEd) has established several policies to strengthen these efforts. DepEd Order (DO) No. 016, s. 2023 serves as the updated regulatory framework for the Department of Education's flagship technology initiative. The revised guidelines aim to ensure that the deployment of ICT packages is not just about dropping off hardware, but about creating a functional digital ecosystem. Likewise, DepEd Order No. 42, s. 2017, which introduced the Philippine Professional Standards for Teachers (PPST), emphasizes ICT integration in Domains 4 and 5 curriculum planning and technology-supported instruction. Additionally, DepEd Memorandum No. 89, s. 2021 promotes the use of learning management systems to sustain flexible learning. These policies reflect the government's recognition of technology as a vital component of teaching standards and professional growth.

Global research supports this concern. Rahman et al. (2020) in Malaysia also revealed that institutional support and ongoing training improved the quality and frequency of ICT use. In Europe, Tondeur et al. (2021) showed that digital resources coupled with pedagogical guidance helped teachers design more interactive learning experiences. These studies emphasize that the success of technology initiatives relies on both access and professional development.

In the Philippine context, Bautista and Ocampo (2022) reported that schools with structured ICT programs had more motivated teachers who were innovative in their pedagogy. However, UNESCO (2023) observed that equitable access to digital tools remains a major challenge, particularly in rural areas. The Asian Development Bank (2024) further highlighted the need for stronger institutional management to ensure inclusiveness and sustainability. These findings indicate that while significant progress has been made, gaps remain between policy implementation and classroom practice.

This study, titled "Management of Institutions' Technology Initiatives on Teacher Development and Pedagogy Across Generational Cohorts," examines how schools manage and support technology use and how these efforts contribute to teacher growth. The study aims to provide a clearer picture between technology, teacher development, and pedagogy in today's schools.

Background of Study

Technology has become a vital part of teaching and learning in the 21st century. In Philippine schools, digital tools such as laptops, tablets, online platforms, and mobile applications are increasingly used to support instruction. These institutional technology initiatives include providing access to devices, improving internet connectivity, developing digital learning materials, and offering training programs for teachers. The way schools manage these initiatives through planning, support, and sustained implementation determines how effectively teachers integrate technology into their classrooms.

The researcher's interest in this study stems from direct experiences in Sta. Rosa City, Laguna, where technology resources are available, but their use varies widely among teachers. Some educators confidently integrate digital tools into lessons, while others struggle due to limited training, inconsistent support, or generational differences in comfort with technology. These challenges highlight the importance of examining not only the availability of ICT resources but also how institutions manage and sustain initiatives that directly affect teacher development and pedagogy.

This study is anchored on Fullan's (2016) Change Theory, which posits that educational innovation succeeds when leadership, vision, and teacher capacity are interconnected. Teachers' growth in the digital era requires not just access to ICT resources but also ongoing support, collaboration, and opportunities for innovation. When institutions align policies with practice, they create environments that foster confidence, creativity, and adaptability among teachers, leading to improved student engagement and learning outcomes.

Moreover, effective management of technology initiatives ensures investments in ICT translate into classroom practices rather than isolated efforts.

Despite growing research on technology integration, gaps remain in understanding how institutional initiatives are managed across different generational cohorts of teachers. International studies emphasize the importance of access, training, and institutional support, but few have examined how these factors interact with generational differences in the Philippine context. Locally, schools in Sta. Rosa City have implemented ICT programs and training, yet disparities persist in how teachers adopt and sustain technology use.

This study evolved from the recognition of this gap. While policies such as the Philippine Professional Standards for Teachers (DepEd Order No. 42, s. 2017), and DepEd Memorandum No. 89, s. 2021 emphasize ICT integration, their implementation at the school level often varies. This study seeks to bridge the gap in

existing knowledge by investigating how institutions manage technology initiatives and how these efforts affect teacher development and pedagogical practices across different generations. By focusing on the local setting in Sta. Rosa City, Laguna, the research aims to provide insights into the practical and theoretical importance of technology management in education, highlighting strengths and areas for improvement.

Theoretical Framework

The integration of technology in educational settings has become increasingly essential in the development of both teaching practices and the broader pedagogical landscape.

In the 21st century, technology integration signifies the importance of education for effective teaching and learning (Wright & Akgunduz, 2018). One of the theories adopted in this paper is the extension of Social Cognitive Theory that is Bandura's Self-Efficacy Theory. It provides a strong foundation for understanding how teachers' beliefs about their own abilities influence their motivation and behavior in integrating technology. According to this, teacher's thinking, feelings in their own talents affect their motivation and behaviour (Karolčík & Čipková, 2017).

By applying Bandura's Self-Efficacy Theory, this study can examine how institutional initiatives influence teachers' confidence across generational cohorts and how that confidence translates into pedagogical transformation. The theory thus serves as a lens to understand the psychological dimension of technology integration, showing that successful adoption depends not only on access and training but also on teachers' belief in their ability to use technology meaningfully.

Teachers' self-efficacy views may have an influence on how eager they are to integrate technology into the classroom (Akturk & Ozturk, 2019; Njiku et al., 2022). Regarding the use of technology, self-efficacy is one of the

of both their career prospects and the successful integration of technologies into their regular teaching techniques. The teachers must be confident in their capacity to do so in order to accomplish this (Njiku et al., 2022; Wright & Akgunduz, 2018).

The Technological Pedagogical Content Knowledge TPACK framework, developed by Mishra and Koehler (2016), has been widely used to understand the complexities involved in integrating technology into teaching practices. The core idea of TPACK is that effective technology integration in education requires more than just technical know-how. It emphasizes the intersection of three critical domains: Content Knowledge (CK), Pedagogical Knowledge (PK), and Technological Knowledge (TK). Teachers must have an understanding of how to teach their subject (CK), the best strategies for delivering lessons (PK), and how to use technology tools in ways that enhance teaching and learning (TK).

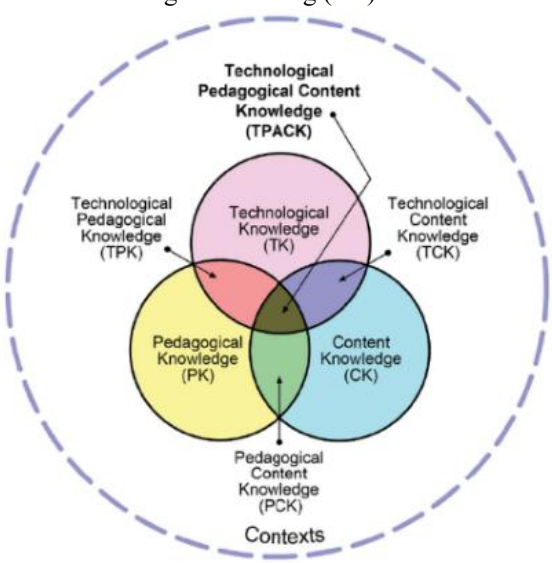

Figure 1: TPACK describes teachers' knowledge about content, pedagogy and technology and the overlaps between these types of knowledge that are necessary for teaching in any context.

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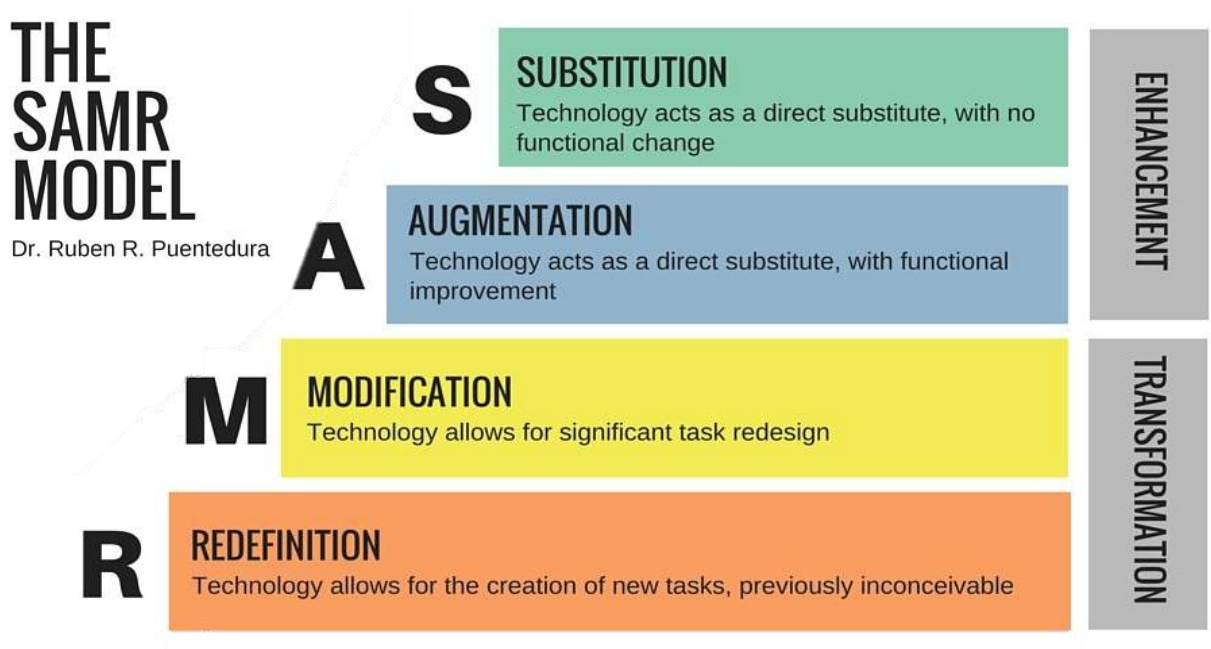
(TK).

TPACK guides this research in understanding the quality of technology integration. It ensures that the analysis captures not only whether teachers use digital tools, but whether they use them in ways that transform pedagogy and enrich subject learning. This makes the framework essential for evaluating how institutional management of technology initiatives contributes to teacher growth and pedagogical innovation across generational cohorts.

The SAMR Model, developed by Dr. Ruben Puentedura (2022), is a framework that categorizes four levels of technology integration into teaching and learning.



The SAMR model helps to see how schools' technology programs are helping teachers use technology in the classroom. By looking at how teachers are using these tools, this study will highlight what's working and where things might be falling short. It'll also suggest ways to improve these programs so teachers can really change how they teach. The goal is to figure out if these technology initiatives are helping teachers grow and adapt to the needs of today's digital world. It provides educators with a structured way to evaluate how effectively they are using technology to transform and enhance instruction.

Conceptual Framework

This study shows how technology initiatives in schools, teacher development, and teaching practices are all connected. It is designed to explore how technology in education helps teachers improve their skills and transform their teaching methods for the digital age.

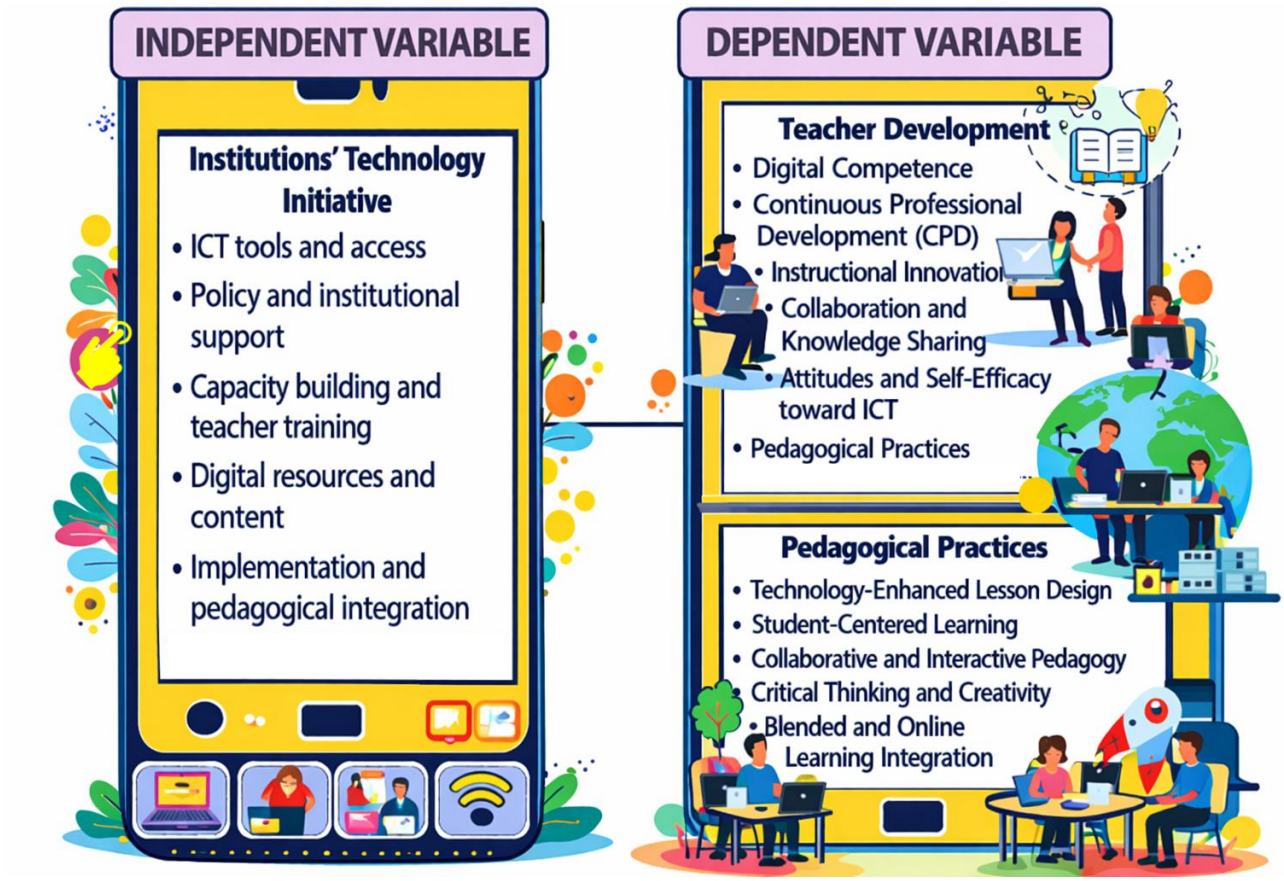


Figure 3 illustrates the relationship between Institutions' Technology Initiatives and the effects in terms of Teacher Development and Pedagogical Practices in the digital age. Institutions' Technology Initiatives represent the interventions, strategies, and resources schools provide to empower teachers.

ICT resources refer to the provision of reliable educational technology such as laptops, tablets, projectors, learning management systems (LMS), and subject-specific applications to support digital lesson design and delivery. While access encompasses internet connectivity, availability of hardware, licensed software, and technical support, all of which are essential for effective technology-enabled teaching.

Policy and institutional support highlight the role of leadership in fostering innovation by creating policies and systems that encourage, reward, and sustain technology integration.

Capacity building and teacher training include workshops, webinars, certifications, and mentoring opportunities that help teachers build digital competence and adapt their pedagogy to ensure teachers can confidently use digital tools without disruptions, sustaining their motivation to integrate technology in teaching.

Digital resources and content refer to the availability of online learning materials, multimedia resources, e-learning platforms, and subject-specific applications that support teaching and learning. In this study, this variable emphasizes the importance of providing teachers with not just devices but also relevant, high-quality, and curriculum-aligned digital materials.

Implementation and pedagogical integration pertain to the actual classroom use of ICT resources. This variable goes beyond the presence of tools and policies to examine whether teachers are truly incorporating technology into their pedagogy.

and Pedagogical Practices in the Digital Age. Teacher Development refers to teachers' professional growth, including improvements in digital competence, continuous professional learning, instructional innovation, collaboration, and self-efficacy. Meanwhile, Pedagogical Practices in the Digital Age describe how teaching

evolves as a result of institutional support and teacher development, reflected in technology-enhanced lesson design, student-centered approaches, and blended or online learning.

Together, these variables form the basis for assessing how institutional initiatives shape both the professional development of teachers and the transformation of classroom practices in today's rapidly evolving digital world.

Statement of the Problem

This study aimed to explore how institutional technology initiatives are supporting teachers in developing their digital skills and transforming their classroom practices.

Specifically, this study sought to answer the following questions:

1. What is the level of Institution's Technology Initiatives across generation cohort in terms of:

1.1 ICT resources and access;

1.2 Policy and institutional support;

1.3 Capacity building and teacher training;

1.4 Digital resources and content; and

1.5 Implementation and pedagogical integration?

2. What is the level of Teachers Development across generation cohort in terms of:

2.1 Digital Competence;

2.2 Continuous Professional Development (CPD);

2.3 Instructional Innovation;

2.4 Collaboration and Knowledge Sharing;

2.5 Attitudes and Self-Efficacy toward ICT; and

2.6 Impact on Pedagogical Practices?

3. What is the level of teacher Pedagogical Practices across generation cohort in terms of:

3.1 Technology-Enhanced Lesson Design;

3.2 Student-Centered Learning;

3.3 Collaborative and Interactive Pedagogy;

3.4 Critical Thinking and Creativity; and

3.5 Blended and Online Learning Integration?

4. Is there a significant relationship between institutions' technology initiatives in teacher development across generation cohorts?

5. Is there a significant relationship between teacher pedagogical practices across generation cohorts?

Research Methodology

The study uses a descriptive-correlational research design, which is deemed most appropriate in gathering the necessary data on how institutional technology initiatives relate to teacher development and pedagogical practices. Descriptive research provides a clear picture of the current conditions of teachers' experiences with technology initiatives, while correlational design determines the relationship between institutional support and

changes in teachers' professional growth and pedagogy (Creswell & Creswell, 2018).

This design was chosen because it allows the researcher to measure variables as they naturally occur without manipulation. The data gathered through surveys and document analysis were analyzed to determine patterns and relationships, making this design suitable for addressing the parameters of the study. Similar approaches have been recommended in recent educational technology research, particularly when examining the intersection of teacher practices, institutional policies, and digital integration (Cohen, Manion, & Morrison, 2018).

Moreover, the approach enabled the identification of both significant and institutional initiatives influence teacher development and pedagogical practices across generational cohorts.institutional initiatives influence teacher development and pedagogical practices across generational cohorts.

Respondents of the Study

The population of this study consisted of elementary teachers from selected large public schools in the Division of Sta. Rosa City, Laguna. The respondents were chosen using purposive sampling, a non randomized technique in which participants are intentionally selected based on predefined criteria relevant to the research problem. In educational research, purposive sampling is widely applied to obtain in depth information from individuals who are knowledgeable about or experienced with the phenomenon under investigation, rather than to achieve statistical representativeness of the entire population.

School Name	Number of Teachers	61–65 (Baby Boomers)	45–60 (Generation X)	29–44 (Millennials/ Gen Y)	21–28 (Generation Z)
Elementary School 1	148	3	2	5	3
Elementary School 2	125	2	2	4	3
Elementary School 3	100	1	3	4	1
Elementary School 4	90	1	2	2	1
Elementary School 5	86	1	2	3	1
Elementary School 6	72	1	2	2	1
Elementary School 7	68	1	1	2	1
Elementary School 8	66	1	1	1	1
Elementary School 9	62	0	1	2	0
Elementary School 10	60	1	1	3	1
Elementary School 11	59	1	1	2	1
Elementary School 12	59	1	1	1	1
Elementary School 13	54	1	1	2	1
Elementary School 14	52	1	1	2	1
Elementary School 15	46	0	1	2	0
Elementary School 16	33	1	0	2	1
Elementary School 17	30	0	1	1	0
Elementary School 18	27	0	1	1	0
Total	**1237**	**17**	**24**	**41**	**18**

A total sample size of 100 teachers was targeted. According to Gay, Mills, and Airasian (2019), purposive sampling is appropriate when the study aims to collect in-depth insights from a specific group who possess the needed characteristics.

The distribution of respondents across 18 elementary schools in Sta. Rosa City, categorized by generational age groups: Baby Boomers (61–65), Generation X (45–60), Millennials/Gen Y (29–44), and Generation Z (21–28). The table shows that Millennials/Gen Y comprise the largest group with 41 respondents, followed by Generation X with 24, Generation Z with 18, and Baby Boomers with 17.

Each school reflects varying generational compositions, with Southville 4 Elementary School and Pulong Sta. Cruz Elementary School recording the highest counts across multiple cohorts. The totals highlight a diverse generational representation among teachers, underscoring the relevance of examining how different age groups adopt and sustain ICT initiatives in their respective institutions.

The inclusion criteria were: (1) teachers currently employed in the identified schools, (2) active participation in institutional technology initiatives (e.g., training, digital tools, online teaching platforms), and (3) willingness to participate in the study. Teachers who were on extended leave or who had no exposure to technology-related programs were excluded. This ensured that the sample truly represented teachers experiencing the phenomenon under study.

Research Procedure

Data were collected following the standard operating procedures of research. After the researcher-made survey questionnaire was developed, it underwent internal consistency, reliability, and validity testing. The sequence of activities was carefully arranged to ensure systematic distribution and gathering of data.

In the validation stage, face validation ensured that the questionnaire was clear, grammatically correct, and visually appealing so that respondents would not feel intimidated or discouraged from answering. Content validation, on the other hand, focused on the sufficiency and appropriateness of the indicators, making sure that each item was relevant to the objectives of the study and capable of generating adequate data for statistical analysis. After revisions based on expert feedback, the instrument was subjected to pilot testing with a small group of respondents to confirm its reliability and consistency.

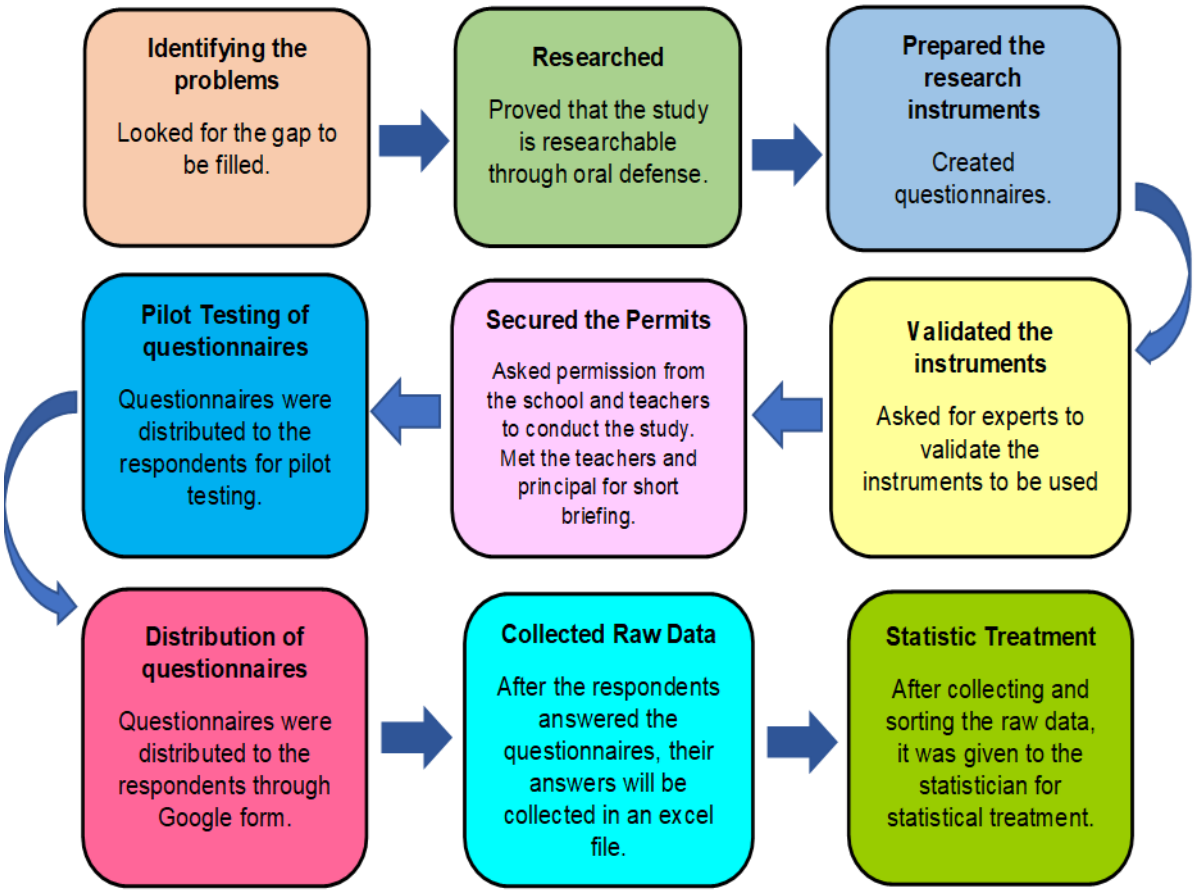


Figure 4. Research Procedure

This figure presents the sequential phases undertaken in the research process. The procedure began with identifying the research gap and presenting the study for feasibility. A researcher-made survey questionnaire was then prepared, validated through face and content validation, and pilot-tested for reliability.

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Once the instrument was finalized, the researcher secured the necessary permits, ethical clearance, and consent from the appropriate authorities. With approval granted, the validated questionnaire was distributed in both printed and digital formats to reach the target respondents effectively. Responses were systematically collected, encoded, and organized to maintain accuracy and integrity throughout the process.

The data gathered were then collated, tallied, and tabulated before being subjected to descriptive and inferential statistical analyses using SPSS. These analyses allowed the researcher to measure levels,

differences, and relationships among the variables, providing a solid basis for interpretation. The results were then connected to the theoretical and conceptual frameworks, leading to conclusions that addressed the research questions and hypotheses. Finally, recommendations were formulated based on the findings, offering practical insights for educators, administrators, and policymakers, as well as directions for future research.

Research Instrument

The primary research instrument of this study was a structured survey questionnaire, carefully designed to collect quantitative data on institutional technology initiatives, teacher development, and pedagogical practices. The first part was the Profile of Respondents, which gathered demographic and professional information such as age, gender, teaching level, years of service, and ICT-related training attended. The second part was Institutional Technology Initiatives, which measured the adequacy of digital tools, ICT infrastructure, training opportunities, administrative support, and technical assistance provided by schools.

The third part was Teacher Development, which assessed teachers' digital literacy, self-efficacy in technology use, confidence in lesson design, and participation in professional development programs. The fourth part was Pedagogical Practices in the Digital Age, which focused on the extent of technology integration in classroom instruction, strategies for student engagement, blended learning practices, and pedagogical innovation.

To capture nuanced perceptions, the questionnaire adopted a seven-point Likert scale, allowing respondents to express varying degrees of agreement or disagreement with each item.

In designing the instrument, the researcher drew from both theoretical frameworks and practical classroom realities, ensuring that each item reflected authentic experiences of teachers in Sta. Rosa City.

The validation process was an essential part of instrument development. Content validity was established through expert review by specialists in education and ICT, who examined the clarity, relevance, and alignment of items with the study's objectives. Their feedback led to revisions in wording and sequencing to improve reliability and contextual appropriateness.

A pilot test was then conducted with a small group of teachers to check consistency and ease of understanding, after which statistical reliability testing using Cronbach's Alpha confirmed the internal consistency of the instrument.

This combination of careful design experience and rigorous validation ensured that the questionnaire was credible, reliable, and responsive to the realities of Filipino teachers, making it suitable for generating accurate and meaningful data for the study.

Statistical Treatment of Data

To determine the profile of the respondents in terms of age, gender, teaching level, years of service, and ICT-related training, frequency and percentage were used.

To determine the level of Institutional Technology Initiatives in terms of access to digital tools, ICT infrastructure, professional development, administrative support, technical support, and institutional policies, mean and standard deviation were used.

To determine the level of Teacher Development in terms of digital literacy, self-efficacy, professional growth, confidence in lesson design, participation in learning communities, and ICT-related engagement, mean and standard deviation were used.

To determine the level of Pedagogical Practices in the Digital Age in terms of technology integration, student-centered activities, blended learning strategies, student engagement, SAMR transformation levels, and pedagogical innovation, mean and standard deviation were used.

To test the significant relationship between institutional technology initiatives and teacher development, and between institutional technology initiatives and pedagogical practices, Pearson correlation was used. Pearson correlation measures the strength and direction of the relationship between two variables. A positive correlation means that as institutional support increases, teacher development and pedagogical practices also increase.

To test the significant difference in teacher development and pedagogical practices when grouped according to profile variables with two groups (e.g., male vs. female, ICT-trained vs. not ICT-trained), a t-test was used. The t-test compares the average scores of two groups to determine if the difference is statistically significant.

To identify which institutional technology initiatives best predict teacher development and pedagogical practices, regression analysis was used. Regression determines the strongest predictors among the independent variables (e.g., ICT training, infrastructure, administrative support) that have the greatest effect on teacher outcomes.

Statement of the Problem	Statistical Test
Level of Institutions' Technology Initiatives Across Generation Cohorts	WM, SD
Level of Teacher Development Across Generation Cohorts	WM, SD
Level of Teacher Pedagogical Practices Across Generation Cohorts	WM, SD
Significant Relationship Between Institutions' Technology Initiatives in Teacher Development Across Generation Cohorts	Pearson's r
Significant Relationship Between Teacher Pedagogical Practices Across Generation Cohorts	Pearson's r

Results and Discussion

Level of Institutions' Technology Initiatives Across Generation Cohort

In this study, the level of Institution's Technology Initiatives across generation cohort refers to ICT resources and access, Policy and institutional support, Capacity building and teacher training, Digital resources and content**,** and Implementation and pedagogical integration.

The following tables show the statement, mean, standard deviation. remarks and verbal interpretation from the perspectives of respondents.

The results of Table 1 show that school heads across all generational cohorts commonly rated their institution's technology initiatives in terms of ICT resources and access as high to very high, reflecting a shared commitment to providing equitable and accessible digital tools for teaching and learning. This commonality indicates that all generations recognize the importance of ensuring ICT availability, stable connectivity, and inclusive access for teachers.

Table 1.
Level of Institution's Technology Initiatives Across Generation Cohort in Terms of ICT Resources and Access

Statements *The School Head…*	*Baby Boomers*	*Gen X*	*Gen Y*	*Gen Z*
…ensures that digital tools (e.g., laptops, televisions, tablets) are available for classroom instruction.	6.12	6.54	6.51	6.44
…provides stable internet connectivity to support lesson delivery and online activities.	6.00	6.38	6.46	6.22
…allocates ICT resources equitably among teachers, regardless of age or teaching experience.	5.71	6.21	6.51	6.44
…Provides ICT resources designed to support students with diverse learning needs.	5.65	6.08	6.29	6.33
…ensures that teachers with limited digital skills can still access and utilize ICT tools.	5.65	6.08	6.32	6.33
Weighted Mean	5.82	6.26	6.42	6.36
SD	0.60	0.59	0.59	0.66
Verbal Interpretation	High	Very High	Very High	Very High

Similarities across cohorts include consistent efforts to provide digital tools, allocate resources equitably, and support teachers with varying digital skills. The contrasts reveal that Gen Y (M = 6.42, SD = 0.59) and Gen X (M = 6.26, SD = 0.59) rated their practices very high, showing strong leadership in ICT implementation, while Baby Boomers (M = 5.82, SD = 0.60) rated high, reflecting more cautious engagement. Gen Z (M = 6.36, SD = 0.66) also rated

resources.

Overall, the weighted mean of 6.22 with standard deviation of 0.61 was verbally interpreted as very high, confirming strong institutional support for ICT resources across generations with younger teachers giving slightly higher scores than Baby Boomers.

This supports Rubach and Lazarides (2021), who noted that teachers' digital competence is shaped by institutional inputs, meaning that access to infrastructure and administrative support directly influences how confidently teachers integrate technology.

Similarly, Cabero-Almenara and Palacios-Rodríguez (2020) emphasized that systemic support and

equitable access foster confidence in technology use, highlighting that when schools provide consistent resources and training opportunities, teachers are more willing to experiment and innovate with ICT in their pedagogy.

The results also suggest that institutional investment in ICT not only ensures equitable access but also encourages innovation among younger cohorts who are more digitally fluent. At the same time, the cautious but steady engagement of Baby Boomers highlights the importance of mentoring and differentiated training to sustain inclusivity.

In conclusion, the results affirm that resource provision and equitable access are critical foundations for effective technology-enabled pedagogy, while generational differences point to the need for tailored support strategies that maximize strengths across cohorts.

The results of Table 2 show that school heads across all generational cohorts commonly rated policy and institutional support for technology initiatives as very high, reflecting a shared commitment to encouraging teachers, supporting digital integration, and promoting collaboration.

Table 2.
Level of Institutions' Technology Initiatives Across Generation Cohort in Terms of Policy and Institutional Support

Statements *The School Head…*	*Baby Boomers*	*Gen X*	*Gen Y*	*Gen Z*
…encourage teachers of all ages to integrate technology in teaching.	6.65	6.50	6.54	6.22
…support teachers in using digital tools through guidance and encouragement.	6.65	6.29	6.51	6.44
…technology-related initiative clearly explained and easy to follow.	6.59	6.25	6.29	6.39
…support the school when trying new digital strategies in my classroom.	6.53	6.33	6.54	6.50
…promote collaboration among teachers from different generation cohorts in using ICT.	6.47	6.46	6.37	6.39
Weighted Mean	6.58	6.37	6.45	6.39
SD	0.52	0.50	0.60	0.61
Verbal Interpretation	Very High	Very High	Very High	Very High

This commonality highlights that all generations recognize the importance of clear policies, guidance, and encouragement in sustaining ICT practices. Similarities across cohorts include consistent support for teachers in using digital tools, clarity of technology-related initiatives, and promotion of collaboration across generations.

The contrasts reveal that Baby Boomers (M = 6.58, SD = 0.52) reported the highest confidence, showing strong emphasis on encouragement and support, while Gen X (M = 6.37, SD = 0.50), Gen Y (M = 6.45, SD = 0.60), and Gen Z (M = 6.39, SD = 0.61) also rated very high but slightly lower, reflecting balanced yet varied engagement.

The overall weighted mean of 6.45 with standard deviation of 0.56 was verbally interpreted as very high, underscoring the critical role of institutional leadership in sustaining technology integration.

Table 2 shows that institutional support and policy initiatives for technology integration were rated very high across all generational cohorts, with Baby Boomers giving the highest scores. This supports Fullan (2016), who emphasized that strong leadership and clear policies drive educational innovation, and Bautista and Ocampo (2022), who noted that structured ICT policies motivate teachers to adopt new strategies.

In conclusion, the results affirm that effective leadership and clear communication are essential for sustaining technology integration and fostering collaboration across generations.
Moreover, the consistently high ratings across cohorts suggest that institutional policies are not only well-communicated but also perceived as equitable, bridging generational differences in digital competence. These findings highlight that policy clarity and leadership commitment create a culture of trust, where teachers feel supported to experiment with new technologies. Finally, the results point to the need for continuous policy reinforcement and monitoring, ensuring that institutional initiatives remain responsive to evolving classroom realities and technological advancements.

The results of Table 3 show that school heads across all generational cohorts commonly rated capacity building and teacher training initiatives as very high, reflecting a shared belief that institutional support strengthens teachers' confidence and digital teaching practices. This commonality highlights that all generations value opportunities such as webinars, workshops, and follow-up support after ICT training.

Table 3.
Level of Institution's Technology Initiatives Across Generation Cohort in Terms of Capacity Building and Teacher Training

Statements *The School Head…*	*Baby Boomers*	*Gen X*	*Gen Y*	*Gen z*
…help improve my teaching practices.	6.53	6.42	6.27	6.17
…match the digital skill levels of teachers across age groups.	6.24	6.21	6.39	6.28
…offer opportunities to join webinars or workshops on digital teaching strategies.	6.06	6.21	6.27	6.33
…provide follow-up support after ICT training sessions.	6.00	6.38	6.54	6.44
…enables me to confidently apply what I learn from ICT training in my classroom.	6.24	6.42	6.44	6.44
Weighted Mean	6.21	6.33	6.38	6.33
SD	0.54	0.52	0.55	0.62
Verbal Interpretation	Very High	Very High	Very High	Very High

Similarities across cohorts include providing training that matches digital skill levels, offering opportunities for professional development, and enabling teachers to confidently apply ICT learnings in the classroom. The contrasts reveal that Gen Y (M = 6.38, SD = 0.55) reported the highest confidence, showing strong appreciation for follow-up support and application of training, while Baby Boomers (M = 6.21, SD = 0.54) rated slightly lower but still very high, reflecting steady engagement. Gen X (M = 6.33, SD = 0.52) and Gen Z (M = 6.33, SD = 0.62) aligned closely, showing balanced confidence in institutional training support.

Overall, the weighted mean of 6.31 with standard deviation of 0.56 was verbally interpreted as very high, confirming strong institutional support for capacity building and teacher training across generations.

Table 3 indicates that capacity building and teacher training were consistently rated very high, with Gen Y and Gen Z showing greater confidence in applying ICT training compared to Baby Boomers. This aligns with Ballová Mikušková and Verešová (2020), who stressed that professional development must be tailored to generational needs, and Tynjälä (2017), who advocated for work-integrated learning to embed digital skills into practice.

In conclusion, the findings affirm that sustained and adaptive training is essential to bridge generational gaps in ICT integration. Moreover, the results highlight that institutional training programs are

most effective when they combine technical skill-building with continuous mentoring and follow-up support. This suggests that schools must design training initiatives that are not only responsive to generational differences but also embedded in everyday teaching practice.

The evidence underscores that capacity building is a long-term process, requiring consistent reinforcement to ensure that digital innovations translate into lasting pedagogical change.

The results of Table 4 show that school heads across all generational cohorts commonly rated digital resources and content initiatives as very high, reflecting a shared commitment to providing accessible and appropriate digital materials for teaching and learning.

This commonality highlights that all generations recognize the importance of ensuring grade-level appropriate resources, encouraging teachers to create or adapt digital content, and providing access to online platforms. Similarities across cohorts include promoting collaboration in reviewing digital content and ensuring resources match lesson objectives.

Table 4.

Level of Institution's Technology Initiatives Across Generation Cohort in Terms of Digital Resources and Content

Statements *The School Head…*	*Baby Boomers*	*Gen X*	*Gen Y*	*Gen z*
…provides digital learning materials that are appropriate for learners' grade level.	6.53	6.38	6.37	6.28
…encourages teachers to create or adapt digital content for their lessons.	6.29	6.42	6.32	6.44
…provides access to online platforms that support teaching and learning.	6.18	6.50	6.24	6.39
…ensures that teachers can easily find digital resources that match lesson objectives.	6.59	6.67	6.32	6.39
…involves teachers from different age groups in reviewing or selecting digital content.	6.65	6.58	6.29	6.39
Weighted Mean	6.45	6.51	6.31	6.38
SD	0.55	0.50	0.58	0.53
Verbal Interpretation	Very High	Very High	Very High	Very High

The contrasts reveal that Gen X (M = 6.51, SD = 0.50) reported the highest confidence, showing strong emphasis on accessibility and clarity of digital resources, while Gen Y (M = 6.31, SD = 0.58) rated lowest but still very high, reflecting slightly more cautious engagement. Baby Boomers (M = 6.45, SD = 0.55) and Gen Z (M = 6.38, SD = 0.53) aligned closely, showing balanced confidence in digital resource initiatives. Overall, the weighted mean of 6.41 with standard deviation of 0.54 was verbally interpreted as very high, confirming strong institutional support for digital resource provision and content development across generations.

The results show that institutions actively provide digital resources and encourage teachers to adapt and collaborate in content creation, with consistently very high ratings across cohorts. This supports Redecker and Punie (2019), who emphasized that comprehensive digital competence frameworks ensure effective integration of technology, and Gogoulou and Grigoriadou (2021), who highlighted the importance of aligning digital resources with student-centered learning.

In conclusion, Table 4 affirms that equitable access to digital content and collaborative involvement across generations are essential foundations for meaningful technology-enabled pedagogy. The findings highlight that sustained collaboration in reviewing and refining digital content ensures alignment with student-centered learning goals. Institutional support serves as a key driver of pedagogical innovation by

fostering accessibility, clarity, and shared responsibility among teachers.

The results of Table 5 show that school heads across all generational cohorts commonly rated implementation and pedagogical integration of technology as very high, reflecting a shared commitment to promoting regular use of ICT, supporting teachers in lesson planning, and fostering collaboration.

This commonality highlights that all generations recognize the importance of making lessons interactive and adjusting strategies based on available digital tools.

Similarities across cohorts include consistent encouragement for ICT use and collaboration among colleagues to improve technology integration. The contrasts reveal that Gen Z (M = 6.50, SD = 0.50) reported the highest confidence, showing strong adaptability and emphasis on interactive pedagogy, while Gen Y (M = 6.33, SD = 0.51) rated lowest but still very high, reflecting slightly more cautious engagement. Baby Boomers (M = 6.42, SD = 0.59) and Gen X (M = 6.43, SD = 0.51) aligned closely, showing balanced confidence in technology implementation.

Table 5.
Level of Institution's Technology Initiatives Across Generation Cohort in Terms of Implementation and Pedagogical Integration

Statements *The School Head…*	*Baby Boomers*	*Gen X*	*Gen Y*	*Gen z*
…promotes regular use of digital tools in teaching different subjects.	6.47	6.42	6.27	6.33
…supports teachers in integrating technology into their lesson plans.	6.35	6.33	6.22	6.50
…encourages the use of ICT to make lessons more interactive and engaging.	6.47	6.50	6.37	6.61
…fosters collaboration among colleagues to improve technology use in teaching.	6.35	6.54	6.44	6.61
…enables teachers to adjust their teaching strategies based on available digital tools.	6.47	6.38	6.34	6.44
Weighted Mean	6.42	6.43	6.33	6.50
SD	0.59	0.51	0.51	0.50
Verbal Interpretation	Very High	Very High	Very High	Very High

Similarities across cohorts include consistent encouragement for ICT use and collaboration among colleagues to improve technology integration. The contrasts reveal that Gen Z (M = 6.50, SD = 0.50) reported the highest confidence, showing strong adaptability and emphasis on interactive pedagogy, while Gen Y (M = 6.33, SD = 0.51) rated lowest but still very high, reflecting slightly more cautious engagement. Baby Boomers (M = 6.42, SD = 0.59) and Gen X (M = 6.43, SD = 0.51) aligned closely, showing balanced confidence in technology implementation.

The overall weighted mean of 6.42 with SD = 0.53 was verbally interpreted as very high, confirming strong institutional support for pedagogical integration across generations.

Table 5 shows that implementation and pedagogical integration of technology were rated very high across all generational cohorts, with Gen Z giving the highest scores. This result supports Mishra and Koehler's (2023) TPACK framework, which explains that effective technology integration happens when teachers combine content, pedagogy, and technology knowledge in practice. Likewise, Ertmer and Ottenbreit-Leftwich (2020) pointed out that strong institutional support helps teachers move beyond simply substituting

technology for traditional methods, allowing them to transform lessons into more interactive and meaningful experiences.

In conclusion, the findings affirm that leadership-driven collaboration and clear pedagogical guidance are vital for sustaining technology-enabled teaching across generations. Younger cohorts demonstrate adaptability in interactive pedagogy, while older cohorts show steady engagement, illustrating how diverse strengths complement one another. Together, these generational contributions create balanced and sustainable technology integration in school.

Level of Teachers Development Across Generation Cohort

In this study, the level of Teachers Development across generation cohort refers to Digital Competence, Continuous Professional Development (CPD), Instructional Innovation, Collaboration and Knowledge Sharing, Attitudes and Self-Efficacy toward ICT, and Impact on Pedagogical Practices.

Teacher development is a critical dimension of educational transformation, particularly in the context of technology integration. As schools implement institutional initiatives to strengthen ICT use, the capacity of teachers to develop digital competence, sustain professional learning, and adapt pedagogical practices becomes central to achieving meaningful change. However, teachers belong to diverse generational cohorts Baby Boomers, Generation X, Millennials, and Generation Z, each with distinct experiences, attitudes, and levels of confidence in using digital tools. Understanding how teacher development varies across these cohorts provides valuable insights into the inclusivity and effectiveness of institutional programs, ensuring that no group is left behind in the digital transition.

This section therefore focuses on the level of teacher development across generational cohorts, with emphasis on digital competence as a key indicator of readiness for ICT integration. By analyzing how teachers from Baby Boomers, Generation X, Millennials, and Generation Z approach technology use in professional practice, the study aims to identify patterns that can inform generation-sensitive training and support systems. Such analysis is essential for guiding school leaders and policymakers in designing equitable and innovation.

The following tables show the statement, mean, standard deviation. remarks and verbal interpretation from the perspectives of respondents. The results of Table 6 show that teachers across all generational cohorts commonly rated their digital competence as high to very high, reflecting a shared confidence in using, adapting, and learning digital tools. This commonality highlights that all generations value openness to new technologies, troubleshooting across age groups, and adapting tools to diverse learners.

Similarities across cohorts include confidence in using digital tools appropriate for their generation and willingness to support colleagues. The contrasts reveal that Gen Z (M = 6.32, SD = 0.58) reported the highest confidence, showing strong adaptability and openness to new technologies, while Gen X (M = 6.11, SD = 0.48) rated lowest, interpreted as **high**, reflecting more cautious engagement. Baby Boomers (M = 6.18, SD = 0.44) and Gen Y (M = 6.26, SD = 0.56) rated very high, showing balanced confidence and adaptability.

Table 6.

Level of Teachers Development Across Generation Cohort in Terms of Digital Competence

Statements *The Teacher…*	*Baby Boomers*	*Gen X*	*Gen Y*	*Gen z*
…feels confident using digital tools appropriate for their generation cohort.	6.41	6.13	6.15	6.50
…can help colleagues from other age groups troubleshoot digital issues.	6.41	6.13	6.10	6.33
…knows which digital tools work best for their teaching style and age group.	6.06	6.04	6.37	6.22
…is open to learning new technologies even if they are unfamiliar.	6.00	6.04	6.44	6.22

...can adapt digital tools to suit learners from different backgrounds.	6.00	6.21	6.27	6.33
Weighted Mean	6.18	6.11	6.26	6.32
SD	0.44	0.48	0.56	0.58
Verbal Interpretation	Very High	High	Very High	Very High

Overall, the weighted mean of 6.22 with standard deviation of 0.52 was verbally interpreted as very high, confirming strong institutional support for technology initiatives and digital adaptability across generations.

The results shows that teachers across generations perceive themselves as digitally competent, with Gen Z leading in confidence and adaptability. This supports Rubach and Lazarides (2021), who emphasized that digital competence is shaped by institutional inputs, and Redecker (2020), who defined digital competence as a crucial set of skills and attitudes for thriving in a digital world.

In conclusion, the findings affirm that while all cohorts demonstrate high competence, younger teachers show greater fluency, highlighting the need for continuous support to strengthen older cohorts' confidence in ICT integration. It shows that differentiated professional development can maximize strengths while addressing generational differences. Sustained institutional leadership and collaboration will ensure that digital competence remains a lifelong developmental process, reinforcing innovation and inclusivity in technology-enhanced education.

The results of Table 7 show that teachers across all generational cohorts commonly valued continuous professional development (CPD), particularly in staying updated with technology and applying learnings to digital teaching practices. This commonality reflects a shared belief that CPD is essential for professional growth and digital innovation.

Similarities across cohorts include attending CPD activities suited to their skill level, seeking training to stay current with technology trends, and applying CPD learnings to improve teaching. The contrasts reveal that Gen Z (M = 6.28, SD = 0.67) and Gen X (M = 6.25, SD = 0.47) rated their practices as very high, showing stronger confidence and motivation to join CPD activities, while Baby Boomers (M = 6.04, SD = 0.44) and Gen Y (M = 6.07, SD = 0.56) rated lower, interpreted as high, reflecting more cautious but still positive engagement. Gen Z reported the highest mean, highlighting their adaptability and enthusiasm for CPD programs that promote digital innovation.

Table 7.

Level of Teachers Development Across Generation Cohort in Terms of Continuous Professional Development (CPD)

Statements *The Teacher…*	*Baby Boomers*	*Gen X*	*Gen Y*	*Gen z*
...attends CPD activities that match their digital skill level and generation.	6.35	6.25	5.88	6.39
...seeks out training that helps them stay updated with current technology trends.	6.18	6.25	6.05	6.33
...applies CPD learnings to improve their digital teaching practices.	6.00	6.21	6.07	6.22
...finds CPD programs inclusive of all generation cohorts.	5.76	6.29	6.17	6.17
...feels motivated to join CPD activities that promote digital innovation.	5.88	6.25	6.20	6.28
Weighted Mean	6.04	6.25	6.07	6.28
SD	0.44	0.47	0.56	0.67
Verbal Interpretation	High	Very High	High	Very High

Table 7 shows that teachers across generations actively engage in CPD, with Gen X and Gen Z rating their participation very high. This supports Annemann et al. (2025), who noted that participation in digitalization-related professional development fosters positive attitudes toward ICT integration. Likewise, Cabero-Almenara and Palacios-Rodríguez (2020) emphasized that structured frameworks such as DigCompEdu help ensure that teachers move beyond basic tool use toward meaningful integration of technology in their pedagogy.

In conclusion, the findings affirm that continuous professional development is a vital driver of digital competence across generations. The very high ratings show that teachers value CPD to stay updated, apply new strategies, and strengthen confidence in technology use. Generational differences highlight the enthusiasm of younger cohorts and the steady participation of older ones, illustrating that tailored and sustained CPD initiatives foster balanced growth. The results emphasize that institutional commitment to ongoing training ensures teachers remain adaptable and effective in technology-enhanced classrooms.

Moreover, CPD serves as a common ground that bridges generational gaps, fostering collaboration and shared learning among diverse age groups. individual growth but also about cultivating a collective culture of innovation in schools.

The results of Table 8 show that teachers across all generational cohorts commonly valued instructional innovation, with overall ratings ranging from high to very high. This commonality reflects a shared belief that experimenting with digital tools, adapting teaching styles, and collaborating across generations are essential for innovative teaching.

Similarities across cohorts include trying new digital strategies, using multimedia tools to engage learners, and exploring new methods with colleagues. The contrasts reveal that Gen Z (M = 6.41, SD = 0.56) reported the highest confidence, showing strong adaptability and willingness to experiment with digital tools, while Baby Boomers (M = 5.82, SD = 0.38) rated lowest, interpreted as high, reflecting more cautious adoption. Gen X (M = 6.11, SD = 0.45) and Gen Y (M = 6.16, SD = 0.57) rated very high, showing balanced engagement and openness to instructional innovation.

Table 8.

Level of Teachers Development Across Generation Cohort in Terms of Instructional Innovation

Statements *The Teacher…*	*Baby Boomers*	*Gen X*	*Gen Y*	*Gen z*
…tries new digital teaching strategies suited to their learners and generation.	6.00	6.13	6.15	6.28
…uses multimedia tools to make lessons more engaging for today's learners.	6.00	6.21	6.07	6.44
…adapts their teaching style to include more digital elements.	5.88	6.13	6.20	6.56
…collaborates with younger or older colleagues to explore new teaching methods.	5.59	6.04	6.17	6.44
…experiments with digital tools even if they are new to them.	5.65	6.04	6.20	6.33
Weighted Mean	5.82	6.11	6.16	6.41
SD	0.38	0.45	0.57	0.56
Verbal Interpretation	High	High	Very High	Very High

The results of Table 8 show that teachers across all generational cohorts commonly valued instructional innovation, with overall ratings ranging from high to very high. This commonality reflects a

shared belief that experimenting with digital tools, adapting teaching styles, and collaborating across generations are essential for innovative teaching.

Similarities across cohorts include trying new digital strategies, using multimedia tools to engage learners, and exploring new methods with colleagues. The contrasts reveal that Gen Z (M = 6.41, SD = 0.56) reported the highest confidence, showing strong adaptability and willingness to experiment with digital tools, while Baby Boomers (M = 5.82, SD = 0.38) rated lowest, interpreted as high, reflecting more cautious adoption. Gen X (M = 6.11, SD = 0.45) and Gen Y (M = 6.16, SD = 0.57) rated very high, showing balanced engagement and openness to instructional innovation.

The overall weighted mean of 6.13 with standard deviation of 0.49 was interpreted as very high, showing strong engagement in instructional innovation, with Gen Z leading in ratings and Baby Boomers reflecting the lowest scores.

Table 8 shows that teachers actively pursue instructional innovation, with Gen Y and Gen Z demonstrating very high engagement compared to older cohorts. This supports Ertmer and Ottenbreit-Leftwich (2017), who emphasized that institutional support enables teachers to move beyond substitution toward transformative digital practices. Likewise, this finding reflects Fullan (2016), who emphasized that true instructional innovation requires systemic change rather than isolated use of technology. The generation cohorts of the teacher show that innovation is sustained when institutional leadership provides equitable opportunities for experimentation, mentoring, and collaboration across age groups.

In conclusion, the findings affirm that instructional innovation is valued across generations, with younger cohorts showing greater confidence in experimenting with digital tools and older cohorts engaging more cautiously but consistently. The results highlight that innovation is strengthened when institutions provide supportive structures that encourage collaboration and adaptability. Together, these generational contributions foster balanced adaptability. Together, these generational contributions foster balanced approaches to instructional improvement and sustainable teaching practices.

Table 9.

Level of Teachers Development Across Generation Cohort in Terms of Collaboration and Knowledge Sharing

Statements *The Teacher…*	*Baby Boomers*	*Gen X*	*Gen Y*	*Gen z*
adaptability. Together, these generational contributions foster balanced				
colleagues from other generation cohorts.				
…learns from peers who have different levels of digital experience.	6.18	6.13	6.10	6.39
…joins communities of practice that include teachers of all ages.	6.29	6.04	6.15	6.39
…collaborates with others to design lessons using digital platforms.	6.35	6.04	6.12	6.44
…values intergenerational sharing of digital teaching strategies.	6.18	6.04	6.12	6.44
Weighted Mean	6.24	6.05	6.11	6.41
SD	0.53	0.48	0.45	0.49
Verbal Interpretation	Very High	High	High	Very High

The results of Table 9 show that teachers across all generational cohorts commonly valued collaboration and knowledge sharing, with overall ratings ranging from high to very high.

This commonality reflects a shared belief that intergenerational exchange of digital teaching strategies strengthens professional growth. Similarities across cohorts include sharing digital teaching tips, learning from peers with different levels of digital experience, and joining communities of practice that

include teachers of all ages.

highest confidence, showing strong engagement in collaborative practices, while Gen X (M = 6.05, SD = 0.48) and Gen Y (M = 6.11, SD = 0.45) rated lower, interpreted as high, indicating more moderate adoption. Baby Boomers (M = 6.24, SD = 0.53) also rated very high, aligning closely with Gen Z, suggesting strong appreciation for intergenerational sharing despite differences in digital fluency.

The overall weighted mean of 6.20 with standard deviation of 0.49 was interpreted as very high, showing strong collaboration and knowledge-sharing practices, with Gen Z and Baby Boomers leading in ratings.

Table 9 shows that collaboration and knowledge sharing are highly valued across generations, with Gen Z and Baby Boomers demonstrating the strongest engagement. This supports recent studies (Bond et al., 2021; Alammary, 2019) who confirm that collaborative digital practices enhance professional development and adaptability in blended learning environments. and Tynjälä (2017), who highlighted communities of practice as essential for professional growth.

In conclusion, the findings affirm that collaboration and knowledge sharing are highly valued across generations, with Gen Z and Baby Boomers showing the strongest engagement. The results highlight that intergenerational exchange of strategies strengthens professional growth and builds a culture of trust among teachers. Institutional encouragement and supportive communities of practice ensure that collaboration remains a cornerstone for sustaining meaningful instructional change. This demonstrates that collective learning

across age groups enhances adaptability and ensures continuity in innovative teaching practices.

The results of Table 10 show that teachers across all generational cohorts commonly rated their attitudes and self-efficacy toward ICT as very high, reflecting a shared confidence in using technology and supporting colleagues in digital integration.

This commonality highlights a collective belief that digital tools improve teaching across generations and that every educator can succeed with proper support. Similarities across cohorts include confidence in using technology

regardless of age, motivation to persist despite challenges, and willingness to assist peers who are less confident.

Table 10.

Level of Teachers Development Across Generation Cohort in Terms of Attitudes and Self-Efficacy Toward ICT

Statements *The Teacher…*	*Baby Boomers*	*Gen X*	*Gen Y*	*Gen z*
…feels confident using technology regardless of their age group.	6.41	6.17	6.20	6.44
…believes digital tools improve teaching for all generation cohorts.	6.24	6.21	6.24	6.33
…is motivated to use technology even if it's challenging at first.	6.18	6.29	6.32	6.39
…supports colleagues who are less confident with digital tools.	6.35	6.33	6.37	6.39
…believes every educator can succeed in digital teaching with proper support.	6.24	6.21	6.32	6.50
Weighted Mean	6.28	6.24	6.29	6.41
SD	0.50	0.45	0.50	0.49
Verbal Interpretation	Very High	Very High	Very High	Very High

The contrasts reveal that Gen Z (M = 6.41, SD = 0.49) reported the highest confidence, showing strong adaptability and motivation, while Gen X (M = 6.24, SD = 0.45) and Gen Y (M = 6.29, SD = 0.50) rated slightly lower but still very high. Baby Boomers (M = 6.28, SD = 0.50) aligned closely with younger cohorts, showing strong confidence despite generational differences.

The overall weighted mean of 6.31 with standard deviation of 0.49 was interpreted as very high, confirming strong self-efficacy and positive attitudes toward ICT across all generations.

Table 10 shows that teachers across generations demonstrate very high confidence and motivation in using ICT, with Gen Z leading slightly in ratings. This supports Rubach and Lazarides (2021), who noted that teachers' confidence in ICT use is shaped by institutional support and access to resources. Likewise, Ertmer and Ottenbreit-Leftwich (2017), who emphasized that institutional support enables teachers to transform lessons into meaningful digital experiences.

In conclusion, the findings affirm that positive attitudes and strong self-efficacy are consistent across cohorts, ensuring that teachers remain motivated to integrate ICT in teaching. The results highlight that confidence is reinforced by institutional support, enabling educators to persist despite challenges and assist peers in digital integration. These shared strengths across generations foster a collaborative culture that sustains effective ICT practices in schools. Moreover, the generational differences, though minimal, show that adaptability and steady engagement complement each other in building resilience. This underscores that cultivating self-efficacy through continuous support is essential for long-term success in digital pedagogy.

The results of Table 11 reveal that teachers across all generational cohorts share a common recognition of the positive effect of technology on pedagogical practices, consistently rating its influence as high to very high.

Table 11.
Level of Teachers Development Across Generation Cohort in Terms of Effect on Pedagogical Practices

Statements *The Teacher…*	*Baby Boomers*	*Gen X*	*Gen Y*	*Gen z*
has improved teaching through technology, regardless of their generation.	6.12	6.25	6.29	6.17
adjusts their strategies based on new digital tools available.	6.06	6.21	6.24	6.06
uses digital tools for both teaching and assessment.	6.12	6.33	6.15	6.39
sees positive changes in student engagement due to digital integration.	6.12	6.46	6.27	6.50
believes technology helps bridge generational gaps in teaching styles.	6.06	6.38	6.27	6.44
Weighted Mean	6.09	6.33	6.24	6.31
SD	0.40	0.47	0.61	0.57
Verbal Interpretation	High	Very High	Very High	Very High

This similarity underscores a collective belief that digital tools enhance teaching, support assessment, and improve student engagement regardless of age group. At the same time, there are notable contrasts: Gen X (M = 6.33, SD = 0.47) and Gen Z (M = 6.31, SD = 0.57) reported slightly stronger confidence in

technology's role, while Baby Boomers (M = 6.09, SD = 0.40) gave the lowest ratings, reflecting a more cautious stance. Gen Y (M = 6.24, SD = 0.61) aligned closely with younger cohorts but showed greater variability, suggesting diverse experiences within the group.

The overall weighted mean of 6.24 with standard deviation of 0.51 was interpreted as very high, confirming that technology integration has a strong positive effect on pedagogical practices across generations.

The common ground lies in acknowledging technology's benefits, while the differences highlight generational variations in confidence and adaptability toward digital integration in teaching.

Table 11 shows that while all generations recognize the positive impact of technology on pedagogy, younger cohorts (Gen X and Gen Z) express stronger confidence, whereas Baby Boomers remain more reserved. This supports Mishra and Koehler's (2016) TPACK framework, which emphasizes the integration of content, pedagogy, and technology, and Ertmer and Ottenbreit-Leftwich (2017), who noted that institutional support helps teachers move beyond substitution toward transformation.

In conclusion, the findings affirm that while all generations recognize the positive contribution of technology to pedagogy, confidence and adaptability vary across cohorts. Younger teachers show stronger assurance in integrating digital tools, while older cohorts remain more cautious but still engaged. These differences highlight the importance of institutional support in fostering balanced growth. The results emphasize that shared recognition of technology's benefits, combined with tailored guidance, ensures sustainable and meaningful pedagogical innovation across generations.

Level of Teacher Pedagogical Practices Across Generation Cohorts

In this study, the level of Teacher Pedagogical Practices Across Generation Cohorts refers to Technology-Enhanced Lesson Design, Student-Centered Learning, Collaborative and Interactive Pedagogy, Critical Thinking and Creativity, and Blended and Online Learning Integration.

Pedagogical practices represent the practical application of teachers' knowledge, skills, and values in the classroom. In the context of technology integration, these practices include designing lessons that incorporate digital tools, fostering student-centered learning, and adapting strategies to diverse learner needs. As schools continue to strengthen ICT initiatives, it becomes essential to examine how teachers from different generational cohorts translate institutional support into classroom innovation. Such analysis provides a clearer picture of whether technology integration leads to meaningful changes in teaching approaches across age groups.

This section therefore focuses on the level of pedagogical practices among Baby Boomers, Generation X, Millennials, and Generation Z teachers. By exploring how each cohort applies technology to lesson design, collaboration, and instructional innovation, the study aims to identify patterns that reflect both shared strengths and unique challenges. Understanding these variations is crucial for guiding professional development programs and remarks and verbal interpretation from the perspectives of respondents.

The following tables show the statement, mean, standard deviation, remarks and verbal interpretation from the perspectives of respondents.

The results of Table 12 show that teachers across all generational cohorts commonly recognize the importance of technology-enhanced lesson design, with overall ratings ranging from high to very high. This similarity reflects a shared belief that ICT strengthens lesson delivery, supports interactive learning, and aligns with student needs.

The contrasts, however, reveal that Gen Z (M = 6.42, SD = 0.58) and Gen Y (M = 6.28, SD = 0.58) rated their practices very high, showing stronger confidence in customizing and innovating lessons, while Gen X (M = 6.03, SD = 0.51) scored lowest, reflecting more cautious adoption. Baby Boomers (M = 6.19, SD = 0.52) also rated very high, suggesting strong engagement but slightly less emphasis on customization compared to younger cohorts.

Table 12.
Level of teacher Pedagogical Practices across generation cohort in terms of Technology-Enhanced Lesson Design

Statements *The Teacher…*	*Baby Boomers*	*Gen X*	*Gen Y*	*Gen z*
…uses technology to design interactive and engaging lessons.	6.12	6.21	6.27	6.39
…integrates multimedia and digital platforms into lesson plans.	6.06	6.08	6.17	6.28
…selects digital tools that match the learning objectives and student needs.	6.06	6.17	6.32	6.44
…customizes lesson content using available ICT resources.	6.24	5.75	6.34	6.50
…enhances lesson delivery through visual, audio, and interactive digital elements.	6.47	5.92	6.32	6.50
Weighted Mean	6.19	6.03	6.28	6.42
SD	0.52	0.51	0.58	0.58
Verbal Interpretation	Very High	High	Very High	Very High

Table 12 affirms that technology-enhanced lesson design is widely practiced across generations, with younger cohorts leading in customization and innovation. This supports Mishra and Koehler's (2023) TPACK framework, which emphasizes the integration of pedagogy, content, and technology, and Redecker & Punie (2017), who highlighted that effective lesson design requires aligning digital tools with learning objectives. This further indicates that differentiated training and mentoring can bridge generational differences, fostering innovation while maintaining consistency in lesson quality.

In conclusion, while all teachers value ICT in lesson planning, generational differences highlight that younger cohorts are more confident in tailoring lessons with technology, whereas older cohorts benefit from structured support to strengthen innovation.

The results of Table 13 show that teachers across all generational cohorts commonly rated student-centered learning practices as very high, reflecting a shared belief that technology fosters active engagement, learner autonomy, and creativity. Similarities across cohorts include the use of digital tools to support self-paced learning, differentiated activities to meet diverse needs, and empowerment of students to explore and create using digital platforms.

Table 13.
Level of teacher Pedagogical Practices across generation cohort in terms of Student-Centered Learning

Statements *The Teacher…*	*Baby Boomers*	*Gen X*	*Gen Y*	*Gen z*
…utilizes digital tools to foster active student engagement.	6.41	6.17	6.29	6.44
…encourages students to take ownership of their learning through the use of technology.	6.59	6.25	6.24	6.22
…provides differentiated digital activities to meet diverse learner needs.	6.41	6.17	6.37	6.56
…uses technology to support self-paced and independent learning.	6.47	6.25	6.46	6.50
…empowers students to explore and create using digital platforms.	6.35	6.17	6.51	6.56
Weighted Mean	6.45	6.20	6.38	6.46
SD	0.50	0.48	0.59	0.58
Verbal Interpretation	Very High	Very High	Very High	Very High

The contrasts reveal that Baby Boomers (M = 6.45, SD = 0.50) and Gen Z (M = 6.46, SD = 0.58) gave slightly higher ratings, showing strong confidence in applying student-centered approaches, while Gen X (M = 6.20, SD = 0.48) reflected more moderate ratings compared to other groups. Gen Y (M = 6.38, SD = 0.59) aligned closely with Gen Z but showed more variability, suggesting diverse experiences within the cohort.

The overall weighted mean of 6.37 with SD = 0.54 was interpreted as very high, confirming strong technology integration in student-centered learning across generations.

Table 13 affirms that student-centered learning through technology is consistently valued across generations, with both older and younger cohorts demonstrating strong engagement. This supports Redecker & Punie (2017), who emphasized that digital pedagogy fosters learner autonomy and creativity, and Mishra & Koehler's (2023) TPACK framework, which highlights the synergy of technology, pedagogy, and content in designing meaningful learning experiences.

In conclusion, while all teachers recognize the importance of student-centered approaches, generational differences highlight that Baby Boomers and Gen Z show slightly stronger confidence, whereas Gen X reflects more cautious adoption.

The results of Table 14 show that teachers across all generational cohorts commonly rated collaborative and interactive pedagogy as very high, reflecting a shared belief that technology strengthens teamwork, peer interaction, and communication. This commonality is evident in the consistent use of digital platforms for projects, online tools for peer-to-peer interaction, and group work supported by ICT.

In terms of similarities, all cohorts agreed on guiding students to communicate and share ideas through technology and integrating interactive activities to build cooperation. The contrasts reveal that Gen Z (M = 6.38, SD = 0.59) reported the highest confidence, showing strong engagement in collaborative practices, while Gen X (M = 6.16, SD = 0.41) scored lowest, indicating more cautious adoption. Baby Boomers (M = 6.27, SD = 0.50) and Gen Y (M = 6.26, SD = 0.52) rated very high, aligning closely with each other and showing balanced engagement.

Table 14.
Level of teacher Pedagogical Practices across generation cohort in terms of Collaborative and Interactive Pedagogy

Statements *The Teacher…*	*Baby Boomers*	*Gen X*	*Gen Y*	*Gen z*
…facilitates collaborative student projects using digital platforms.	6.24	6.04	6.22	6.22
…uses online tools to encourage peer-to-peer interaction.	6.29	6.04	6.17	6.33
…promotes group work supported by digital resources.	6.18	6.17	6.20	6.33
…guides students in using technology to communicate and share ideas.	6.35	6.29	6.39	6.50
…integrates interactive digital activities that build teamwork and cooperation.	6.29	6.25	6.34	6.50
Weighted Mean	6.27	6.16	6.26	6.38
SD	0.50	0.41	0.52	0.59
Verbal Interpretation	Very High	Very High	Very High	Very High

The results of Table 14 show that teachers across all generational cohorts commonly rated collaborative and interactive pedagogy as very high, reflecting a shared belief that technology strengthens teamwork, peer interaction, and communication. This commonality is evident in the consistent use of digital platforms for projects, online tools for peer-to-peer interaction, and group work supported by ICT.

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The overall weighted mean of 6.27 with standard deviation of 0.51 was interpreted as very high, confirming strong collaborative and interactive practices across generations.

Table 14 affirms that collaborative and interactive pedagogy through technology is consistently valued across generations, with younger cohorts, particularly Gen Z, leading in confidence. This supports Voogt et al. (2019), who emphasized collaboration as a driver of innovation, and Tynjälä (2017), who highlighted interactive communities of practice as essential for professional growth. The generation cohorts of the teacher show that institutional support and peer mentoring further enhance collaborative practices, ensuring that both younger and older teachers sustain engagement in technology-driven teamwork.

In conclusion, the findings affirm that collaborative and interactive pedagogy is highly valued across generations, with Gen Z showing the strongest confidence and Gen X reflecting more cautious adoption. These differences highlight the need for targeted support to ensure all cohorts fully benefit from digital collaboration. Fostering a culture of teamwork and peer interaction strengthens both professional growth and student engagement, making collaboration a cornerstone of effective teaching practice.

Table 15.
Level of teacher Pedagogical Practices Across Generation Cohort in Terms of Critical Thinking and Creativity

Statements *The Teacher…*	*Baby Boomers*	*Gen X*	*Gen Y*	*Gen z*
…designs activities that promote higher-order thinking using technology.	6.12	6.29	6.10	6.39
…uses digital tools to encourage students' creativity.	6.12	6.25	6.07	6.50
…guides learners in solving problems using digital strategies.	5.94	6.21	6.12	6.22
…integrates inquiry-based tasks supported by ICT.	6.06	6.33	6.27	6.28
…uses technology to help students analyze, evaluate, and create.	6.06	6.29	6.27	6.33
Weighted Mean	6.06	6.28	6.17	6.34
SD	0.45	0.50	0.56	0.56
Verbal Interpretation	High	Very High	Very High	Very High

The results of Table 15 show that teachers across all generational cohorts commonly recognized the role of technology in promoting critical thinking and creativity, with overall ratings ranging from high to very high. This commonality reflects a shared belief that digital tools help students analyze, evaluate, create, and solve problems through inquiry-based tasks.

Similarities across cohorts include designing higher-order thinking activities, encouraging creativity, and guiding learners in problem-solving using digital strategies. The contrasts reveal that Baby Boomers (M = 6.06, SD = 0.45) rated their practices lower, interpreted as high, while Gen X (M = 6.28, SD = 0.50), Gen Y (M = 6.17, SD = 0.56), and Gen Z (M = 6.34, SD = 0.56) rated very high, showing stronger confidence in integrating creativity and critical thinking through technology. Gen Z reported the highest mean, reflecting their stronger adaptability to digital tools, while Bab
y Boomers showed more cautious adoption.

The overall weighted mean of 6.21 with SD = 0.52 was interpreted as very high, confirming strong engagement in fostering critical thinking and creativity, with Gen Z leading slightly and Baby Boomers reflecting the lowest scores.

Table 15 affirms that fostering critical thinking and creativity through technology is consistently valued across generations, with younger cohorts demonstrating stronger confidence and engagement. This finding supports Redecker (2020), who identified creativity as a key digital competence for 21st-century education. Likewise, Halpern (2014), who defined critical thinking as purposeful and goal-directed, noting that ICT can strengthen these skills through simulations and problem-solving tasks.

In conclusion, the findings affirm that fostering critical thinking and creativity through digital strategies is valued across generations, with younger cohorts showing stronger confidence and Baby Boomers reflecting more cautious adoption. These differences highlight the importance of continuous support to ensure all teachers can design inquiry-based and problem-solving tasks effectively. Cultivating creativity and critical thinking across age groups strengthens classroom innovation and prepares learners for the demands of 21st-century education.

Table 16.
Level of teacher Pedagogical Practices across generation cohort in terms of Blended and Online Learning Integration

Statements *The Teacher…*	*Baby Boomers*	*Gen X*	*Gen Y*	*Gen z*
…integrates both face-to-face and online learning in teaching.	5.94	6.00	6.22	6.50
…is capable of managing fully online or hybrid classes.	5.88	6.00	6.17	6.28
…uses digital platforms to extend learning beyond the classroom.	6.00	6.17	6.27	6.28
…adapts instructional strategies for online learning.	5.94	6.08	6.32	6.39
…ensures that online learning activities are engaging and accessible to all students.				
Weighted Mean	5.94	6.04	6.24	6.39
SD	0.42	0.46	0.55	0.63
Verbal Interpretation	High	High	Very High	Very High

Similarities across cohorts include the consistent use of digital platforms

The results of Table 16 show that teachers across all generational cohorts commonly acknowledged the importance of blended and online learning integration, with overall ratings ranging from high to very high. This commonality reflects a shared belief that integrating face-to-face and online learning, managing hybrid classes, and ensuring accessibility are essential pedagogical practices.

Similarities across cohorts include the consistent use of digital platforms to extend learning beyond the classroom and adapting instructional strategies for blended settings. The contrasts reveal that Baby Boomers (M = 5.94, SD = 0.42) and Gen X (M = 6.04, SD = 0.46) rated their practices as high, showing more cautious adoption, while Gen Y (M = 6.24, SD = 0.55) and Gen Z (M = 6.39, SD = 0.63) rated very high, reflecting stronger confidence and proficiency in blended and online learning. Gen Z reported the highest mean, highlighting their adaptability and comfort with digital integration.

The overall weighted mean of 6.15 with SD = 0.52 was interpreted as very high, showing strong engagement in blended and online learning, with Gen Z leading and Baby Boomers reflecting the lowest scores. This variation in results further indicates that while blended learning is valued across generations, its effectiveness depends on the depth of institutional support and training provided to teachers.

Table 16 affirms that blended and online learning integration is consistently valued across generations, with younger cohorts demonstrating stronger proficiency and confidence. This finding supports Garrison and Vaughan (2017), who emphasized that blended learning strengthens both teaching presence and student engagement when properly supported by digital platforms. Likewise, the DepEd Learning Continuity Plan (2020) highlighted the importance of combining face-to-face and online modalities to sustain learning during transitions, ensuring inclusivity across different generations of teachers and learners.

In conclusion, the findings affirm that blended and online learning is valued across generations, with younger cohorts showing stronger confidence and older cohorts adopting more cautiously but positively. These differences highlight the importance of institutional support and training to ensure all teachers can manage hybrid classes effectively.

Test of Relationship Between the Institutions' Technology Initiatives Across Generation Cohorts of Teachers

Institutions invest in technology initiatives to strengthen teacher competence and transform classroom practices. These initiatives include ICT tools and access, policy and institutional support, capacity building and training, digital resources, and pedagogical integration. Understanding how these efforts connect with teacher development is essential, as teachers from different generational cohorts may respond differently to institutional programs. Examining these relationships provides evidence of whether institutional management strategies effectively foster digital competence, professional growth, and innovation across diverse age groups.

Such analysis also clarifies which initiatives have the strongest effect on teacher development, offering a basis for prioritizing resources and refining strategies. It further highlights how generational perspectives shape the effectiveness of institutional programs, ensuring that interventions remain inclusive and responsive to diverse teaching contexts.

This section presents the statistical results on the significant relationship between institutional technology initiatives and teacher development across Baby Boomers, Generation X, Millennials, and Generation Z. By analyzing correlation values, the study identifies how institutional support influences aspects such as continuous professional development, collaboration, instructional innovation, and self-efficacy toward ICT. These findings highlight the extent to which institutional initiatives drive teacher growth across generations, offering insights for refining policies and professional development programs that sustain equitable and transformative ICT integration.

Table 17.

Significant Relationship Between the Institutions' Technology Initiatives and Teacher Development Across Generation Cohorts

Institution's Technology Initiatives		Digital Competence		Continuous Professional Development		Instructional Innovation		Collaboration and Knowledge Sharing		Attitudes and Self-Efficacy toward ICT		Impact on Pedagogical Practices	
		r	p	r	p	r	p	r	p	r	p	r	p
ICT Tools and Access	Baby boomers	0.344	0.176	0.338	0.184	0.451	0.069	0.234	0.367	0.053	0.839	0.099	0.707
	Generation X	0.333	0.112	.484*	0.016	0.134	0.533	0.083	0.699	0.197	0.355	-0.11	0.608
	Generation Y	0.166	0.300	.317*	0.043	-0.247	0.120	-0.133	0.409	0.127	0.427	-0.021	0.896
	Generation Z	0.018	0.945	0.060	0.812	-0.240	0.337	0.029	0.910	-0.274	0.272	-0.096	0.705
Policy and Institutional Support	Baby boomers	.484*	0.049	0.300	0.241	0.322	0.207	0.232	0.371	0.366	0.149	0.461	0.063
	Generation X	.576**	0.003	.722**	0.000	.455*	0.025	0.104	0.628	0.403	0.051	0.048	0.823
	Generation Y	0.292	0.064	0.308	0.050	-0.113	0.482	0.013	0.934	-0.056	0.730	-0.024	0.883
	Generation Z	.886**	0.000	.570*	0.014	.643**	0.004	.714**	0.001	0.115	0.649	0.248	0.321
Capacity building and teacher training	Baby boomers	.584*	0.014	0.413	0.099	0.363	0.152	.554*	0.021	0.419	0.094	.628**	0.007
	Generation X	.629**	0.001	.698**	0.000	.597**	0.002	0.212	0.319	0.273	0.197	0.076	0.726
	Generation Y	0.187	0.242	.408**	0.008	-0.267	0.092	0.026	0.870	-0.079	0.622	0.003	0.984
	Generation Z	.883**	0.000	0.424	0.080	.558*	0.016	.702**	0.001	0.238	0.342	0.287	0.248
Digital resources and content	Baby boomers	.633**	0.006	0.171	0.513	.575*	0.016	.504*	0.039	.502*	0.04	.744**	0.001
	Generation X	.510*	0.011	.418*	0.042	0.271	0.200	-0.063	0.772	-0.016	0.940	-0.242	0.254
	Generation Y	0.056	0.729	0.191	0.231	-0.160	0.318	0.012	0.940	-0.055	0.732	-0.129	0.423
	Generation Z	.771**	0.000	.560*	0.016	.642**	0.004	.647**	0.004	0.219	0.383	0.308	0.214
Implementation and pedagogical integration	Baby boomers	.927**	0.000	0.411	0.101	.793**	0.000	.558*	0.020	0.367	0.147	.539*	0.026
	Generation X	.742**	0.000	.606**	0.002	.568**	0.004	0.281	0.184	0.251	0.238	0.099	0.644
	Generation Y	.508**	0.001	-0.042	0.796	0.296	0.060	0.147	0.359	.344*	0.028	.448**	0.003
	Generation Z	.688**	0.002	0.400	0.100	.724**	0.001	.516*	0.028	0.120	0.637	0.029	0.908

The result of the correlation analysis revealed that there are significant relationships between the institution's technology initiatives and teacher development across generational cohorts. In terms of ICT resources and access, significant correlations were found for Generation X ($r = .484$, $p = .016$) and Generation Y ($r = .317$, $p = .043$) with continuous professional development, indicating that access to ICT tools supports training engagement for these cohorts. However, no significant relationships were observed for Generation Z, suggesting that access alone does not strongly influence their development.

The results further indicate that policy and institutional support showed strong and significant correlations, particularly for Generation Z ($r = .886$, $p = .000$ with digital competence; $r = .714$, $p = .001$ with collaboration and knowledge sharing) and Generation X ($r = .722$, $p = .000$ with CPD; $r = .576$, $p = .003$ with digital competence). This implies that clear institutional policies and support mechanisms enhance teacher competence and collaboration, especially among younger cohorts.

In terms of capacity building and teacher training, significant positive correlations were observed across multiple cohorts. Baby Boomers ($r = .584$, $p = .014$ with digital competence; $r = .628$, $p = .007$ with pedagogical practices), Generation X ($r = .698$, $p = .000$ with CPD; $r = .597$, $p = .002$ with instructional innovation), and Generation Z ($r = .883$, $p = .000$ with digital competence; $r = .702$, $p = .001$ with collaboration) all showed strong associations, confirming that training initiatives strengthen competence and innovation across generations.

For digital resources and content, Baby Boomers ($r = .633$, $p = .006$ with digital competence; $r = .744$, $p = .001$ with pedagogical practices) and Generation Z ($r = .771$, $p = .000$ with digital competence; $r = .642$, $p = .004$ with instructional innovation) demonstrated significant correlations, suggesting that access to quality digital content enhances competence and innovation for both older and younger cohorts.

Finally, implementation and pedagogical integration showed strong correlations across all cohorts, especially Baby Boomers ($r = .927$, $p = .000$ with digital competence; $r = .793$, $p = .000$ with instructional innovation) and Generation Z ($r = .724$, $p = .001$ with instructional innovation). Generation X and Y also demonstrated significant but slightly weaker associations, indicating that effective integration of ICT into

that training initiatives strengthen competence and innovation across generations.

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development across generations, with generational differences most evident in ICT access and resource use. Baby Boomers benefit most from implementation and digital resources, Generation X and Y show stronger links with ICT access and training opportunities, while Generation Z demonstrates the strongest correlations with policy support and collaboration. This confirms that institutional initiatives particularly policy support, capacity building, and pedagogical integration play a critical role in enhancing teacher development across cohorts, with differences arising mainly in perceptions of ICT access.

Institutional support ensures that teachers can adapt to evolving digital demands by aligning resources with professional growth. Access to ICT tools motivates mid-career teachers to engage in continuous training. Baby Boomers, though more cautious, show significant improvement when guided by clear implementation strategies and resource provision. Training and capacity-building programs consistently strengthen competence and creativity across all generations. These findings highlight those tailoring initiatives to generational needs fosters inclusivity, resilience, and innovation in teaching practice.

Test of Relationship Between the Teacher Development Across Generation Cohorts

Pedagogical practices represent the way teachers apply knowledge, skills, and values in the classroom to enhance student learning. In the context of technology integration, these practices include lesson design, student-centered approaches, collaboration, creativity, and blended learning strategies. Since teachers belong to different generational cohorts, their pedagogical choices may be shaped by varying levels of confidence, experience, and adaptability in using digital tools. Examining the relationship between these practices across generations provides important insights into how teaching approaches evolve and how institutional support can be tailored to meet diverse needs.

This section presents the statistical results on the significant relationship between teacher pedagogical practices across Baby Boomers, Generation X, Millennials, and Generation Z. By analyzing correlations, the study identifies how generational perspectives influence technology-enhanced lesson design, student-centered learning, collaborative pedagogy, critical thinking and creativity, and blended or online integration. These findings highlight the extent to which generational differences affect classroom innovation,

offering guidance for designing professional development programs guidance for designing professional development programs and institutional strategies that sustain equitable and transformative teaching practices.

Table 18.

Significant Relationship Between Teacher Pedagogical Practices Across Generation Cohorts

Institution's Technology Initiatives		Technology-Enhanced Lesson Design		Student-Centered Learning		Collaborative and Interactive Pedagogy		Critical Thinking and Creativity		Blended and Online Learning Integration	
		r	p	r	p	r	p	r	p	r	p
ICT Tools and Access	Baby boomers	0.003	0.991	0.154	0.554	0.136	0.602	0.463	0.061	.646**	0.005
	Generation X	0.150	0.483	-0.135	0.528	0.039	0.858	0.088	0.684	-0.073	0.735
	Generation Y	0.179	0.262	0.012	0.942	-0.014	0.929	-0.037	0.817	0.006	0.969
	Generation Z	-0.353	0.151	-0.338	0.17	0.006	0.98	-0.37	0.131	-0.391	0.109
Policy and Institutional Support	Baby boomers	0.458	0.064	0.454	0.067	.578*	0.015	0.183	0.482	0.091	0.728
	Generation X	-0.056	0.795	0.277	0.190	0.308	0.143	0.376	0.070	-0.002	0.991
	Generation Y	0.024	0.880	0.088	0.586	0.124	0.440	-0.009	0.957	-0.007	0.968
	Generation Z	0.268	0.283	0.426	0.078	0.413	0.088	0.316	0.201	0.198	0.431
Capacity building and teacher training	Baby boomers	.708**	0.001	.653**	0.004	.607**	0.010	0.285	0.267	-0.015	0.953
	Generation X	-0.025	0.906	0.210	0.325	0.105	0.624	0.187	0.383	-0.137	0.523
	Generation Y	-0.010	0.953	0.058	0.718	0.039	0.807	-0.111	0.488	-0.032	0.842
	Generation Z	0.279	0.262	0.366	0.135	0.34	0.167	0.167	0.507	0.036	0.888
Digital resources and content	Baby boomers	.636**	0.006	.522*	0.031	.606**	0.010	0.411	0.101	0.105	0.688
	Generation X	-0.391	0.059	-0.181	0.397	-.420*	0.041	-0.258	0.224	-.654**	0.001
	Generation Y	-0.111	0.490	0.031	0.846	0.000	0.999	-0.169	0.291	-0.033	0.839
	Generation Z	0.421	0.082	0.428	0.076	0.329	0.183	0.374	0.126	0.218	0.384
Implementation and pedagogical integration	Baby boomers	0.441	0.076	0.247	0.339	0.419	0.094	0.462	0.062	0.157	0.548
	Generation X	0.053	0.807	0.328	0.118	0.092	0.669	0.309	0.142	-0.039	0.858
	Generation Y	.344*	0.028	.373*	0.016	.418*	0.006	.372*	0.017	.389*	0.012
	Generation Z	0.397	0.103	0.333	0.178	0.294	0.237	.474*	0.047	0.443	0.066

The correlation analysis revealed that institutional technology initiatives are significantly related to teachers' pedagogical practices across generational cohorts, though the strength and direction of these relationships vary. In terms of ICT tools and access, Baby Boomers showed a significant correlation with blended and online learning integration ($r = .646$, $p = .005$), indicating that older teachers who have access to ICT resources tend to integrate technology more effectively in their lessons. However, no significant relationships were observed among Generation X, Y, and Z, suggesting that access alone does not strongly influence their pedagogical practices.

The results further indicate that policy and institutional support showed a significant relationship for Baby Boomers ($r = .578$, $p = .015$) with collaborative and interactive pedagogy, implying that clear institutional policies enhance interactive teaching practices among older cohorts. Meanwhile, Generation X, Y, and Z showed no significant correlations, suggesting similar perceptions of institutional support regardless of age group.

In terms of capacity building and teacher training, significant relationships were found among Baby Boomers ($r = .708$, $p = .001$ with technology-enhanced lesson design; $r = .653$, $p = .004$ with student-centered learning; $r = .607$, $p = .010$ with collaborative and interactive pedagogy), indicating that training programs strongly influence their ability to design technology-enhanced and interactive lessons. No significant relationships were found with critical thinking and creativity, nor among Generation X, Y, and Z, implying that training initiatives may have a more pronounced impact on older teachers in collaborative practices rather than creative pedagogy.

For digital resources and content, Baby Boomers exhibited significant correlations ($r = .636$, $p = .006$ with technology-enhanced lesson design;
$r=.606$, $p = .010$ with collaborative and interactive pedagogy), showing that access to quality digital materials enhances their instructional creativity and collaboration. Generation X, however, showed negative significant correlations ($r = –.420$, $p = .041$ with collaborative and interactive pedagogy; $r = –.654$, $p = .001$ with blended and online learning integration), suggesting that younger cohorts may perceive digital resources differently, possibly due to varying levels of familiarity or institutional support.

Finally, implementation and pedagogical integration revealed significant relationships among Generation Y ($r = .344$, $p = .028$ with technology-enhanced lesson design; $r = .373$, $p = .016$ with student-centered learning; $r = .418$, $p = .006$ with collaborative and interactive pedagogy; $r = .372$, $p = .017$ with critical thinking and creativity; $r = .389$, $p = .012$ with blended and online learning integration) and Generation Z ($r = .474$, $p = .047$ with collaborative pedagogy), indicating that younger teachers are more responsive to integrating technology into interactive and creative teaching practices.

The findings revealed that institutional technology initiatives are significantly linked to teachers' pedagogical practices across generations. Baby Boomers show stronger correlations in training and resource utilization, while Generation Y and Z demonstrate higher engagement in technology integration, collaboration, and creative pedagogy. Generational differences lie mainly in
pedagogical practice remain relatively consistent across cohorts.

Summary

The dissertation entitled "Management of Institutions' Technology Initiatives on Teacher Development and Pedagogical Practices Across Generational Cohorts" investigated how schools' efforts in providing technology resources, training, and support influence teachers' professional growth and classroom practices. Specifically, it examined the level of institutional initiatives in terms of ICT resources and access, policy and institutional support, capacity building and teacher training, digital resources and content, and implementation and pedagogical integration. It also assessed teacher development in terms of digital competence, continuous professional development, instructional innovation, collaboration and knowledge sharing, attitudes and self efficacy toward ICT, and impact on pedagogical practices. Finally, it analyzed pedagogical practices in terms of technology enhanced lesson design, student centered learning, collaborative and interactive pedagogy, critical thinking and creativity, and blended and online learning integration.
relationships among institutional initiatives, teacher development, and pedagogical practices. The study utilized purposive sampling, with survey questionnaires administered to a selected group of 100 elementary teachers in Sta. Rosa City, Laguna. The research instrument was a structured questionnaire validated by experts and pilot tested for reliability. Data were analyzed using descriptive statistics (mean, standard

deviation, and verbal interpretation) to measure levels, and correlation tests (Pearson r with significance values) to determine relationships.

The school heads' efforts across all generational cohorts demonstrated high to very high levels of institutional technology initiatives, showing a unified and equitable commitment to supporting educators regardless of age. Baby Boomers rated these initiatives as high to very high, reflecting empowerment through administrative encouragement, while Generation X and Generation Y reported very high ratings, highlighting strong leadership in managing digital tools. Generation Z expressed very high confidence, showcasing adaptability within the school's digital environment. It implies that institutions have effectively bridged the digital divide, leading to a rejection of the null hypothesis regarding significant differences among cohorts, since support was consistently perceived across groups.

Teacher development across all generational cohorts also demonstrated high to very high levels, meaning educators of all ages are successfully enhancing their digital skills and professional practices. Baby Boomers rated their development as high to very high, showing success in collaborating with younger peers and staying motivated to use new tools. Generation X and Generation Y reported high to very high levels, reflecting balanced ability to combine long term teaching experience with steady professional training. Generation Z expressed very high confidence, highlighting ease and enthusiasm in leading interactive digital methods. This implies that the generational gap is closing, resulting in a rejection of the null hypothesis since all groups show consistent and strong development.

The level of teacher pedagogical practices across all generational cohorts was likewise high to very high, meaning educators are effectively transforming digital skills into classroom methods that improve student learning. Baby Boomers, Generation X, and Generation Y demonstrated high to very high levels of practice, showing that experienced and mid career educators are equally capable of blending traditional teaching with creative digital activities and student centered methods. Generation Z expressed very high confidence, highlighting their ease in customizing digital content and managing online or hybrid classes. It implies that the gap in classroom innovation is closing, leading to a rejection of the null hypothesis because all age groups consistently show strong performance.

Some indicators of Institutions' Technology Initiatives show significant relationship on Teacher Development Across Generation Cohorts. Generation Z showed the most consistent influence, while Generation X and Generation Y also demonstrated major gains in competence when backed by strong policies, thereby supporting the hypothesis that institutional investment drives advancement. A non significant relationship was found regarding basic resource access for Baby Boomers and Generation Y, showing that hardware provision alone is ineffective without human support. Baby Boomers showed the fewest significant links, suggesting that infrastructure cannot change professional mindsets on its own. This implies a rejection of the hypothesis for basic resource access among older cohorts, while affirming it for leadership driven initiatives that empower younger teachers.

Several indicators of Teacher Pedagogical Practices show significant relationship. Generation Y illustrated this most dynamically, showing consistent progress whenever institutional implementation was strong, while Baby Boomers demonstrated that specialized training significantly improves student centered lesson design, supporting the hypothesis that structured backing drives advancement. In contrast, a non significant relationship appeared for Generation X, whose teaching did not improve through standard digital resources alone. Generation Z showed a significant link only in collaborative work, suggesting their existing skills make them less dependent on basic institutional access. It implies a rejection of the hypothesis for simple resource access among younger cohorts but affirms it for training driven initiatives that empower each generation uniquely.

Conclusion

Based on the findings, several conclusions were drawn.

The study confirmed that there is no significant difference in the level of institutions' technology initiatives across generational cohorts of teachers. This finding indicates that institutional support through ICT resources, policy, training, and digital content is consistently implemented and equitably distributed among teachers regardless of age group. Such consistency reflects strong leadership and management strategies that ensure all teachers benefit from the same level of institutional initiatives. This shows no significant differences among cohorts, resulting to the rejection of the null hypothesis. Therefore, it is concluded that

schools have effectively bridged the digital divide, sustaining inclusivity and innovation across generations.

Similarly, there is no significant difference in the level of teacher development across generational cohorts. Teachers from Baby Boomers to Generation Z reported comparable growth in digital competence, continuous professional learning, instructional innovation, collaboration, and self efficacy toward ICT. This implies that institutional programs are effective in fostering teacher development across age groups, allowing all cohorts to adapt and thrive in technology enhanced educational environments. This shows no relationship on significant differences in teacher development, resulting to the rejection of the null hypothesis. Therefore, it is concluded that professional growth is equitably fostered across cohorts, ensuring balanced advancement in technology enhanced education.

The study also revealed no significant difference in the level of teacher pedagogical practices across generational cohorts. Pedagogical transformation, characterized by technology enhanced lesson design, student centered learning, collaborative strategies, creativity, and blended learning integration, was evident across all generations. This demonstrates that teachers, regardless of age, are capable of integrating ICT into their classroom practices, contributing to a collective culture of innovation.

On the other hand, a significant relationship was found between institutions' technology initiatives and teacher development. This result affirms that strong institutional programs directly foster teacher growth, enhancing digital competence, professional learning, collaboration, and instructional innovation resulting to the rejection of the hypothesis. Therefore, it is concluded that investment in mentoring and structured support, not infrastructure alone, ensures lasting professional growth across generations.

Finally, a significant relationship was also established between institutions' technology initiatives and teacher pedagogical practices. This finding demonstrates that institutional support directly enhances classroom innovation, enabling teachers to design engaging lessons, adopt student centered approaches, and integrate collaborative and creative strategies resulting to the rejection of the hypothesis. Therefore, it is concluded that structured support empowers each generation uniquely, sustaining collaboration, adaptability, and innovation in classroom pedagogy.

Recommendations

Considering these conclusions, several recommendations are proposed:

1. Curriculum developers and instructional leaders should promote instructional innovation by establishing innovation hubs or digital labs where teachers can experiment with new tools and strategies and by fostering cross generational mentoring that balances technological fluency with pedagogical wisdom.
2. School administrators and policy makers should strengthen continuous professional development by developing generation sensitive training modules that address varying digital fluency levels and by implementing work integrated learning models where teachers directly apply ICT skills in classroom contexts.
3. School leaders and ICT coordinators should sustain pedagogical transformations by aligning ICT initiatives with frameworks such as TPACK and SAMR to ensure technology use progresses beyond substitution toward transformation and by encouraging student centered approaches through project based learning, gamification, and inquiry driven tasks supported by ICT.
4.-Baby Boomers may be provided with continuous ICT training using simplified modules and hands on demonstrations to build digital confidence. Their integration into peer support systems, where younger colleagues assist in technology adoption, will help ease transitions while valuing their pedagogical wisdom. At the same time, they should be engaged in mentoring roles that highlight their classroom experience, ensuring their expertise is preserved while gradually incorporating digital tools.

-Generation X teachers may benefit from blended professional development programs that combine traditional workshops with online learning platforms, allowing them to adapt at their own pace. They should be encouraged to take leadership roles in ICT initiatives, as they often serve as a bridge between older and younger generations. Practical tools and strategies that enhance efficiency and classroom management through technology will further strengthen their capacity to lead and innovate.

-Millennials/Gen Y may offer advanced ICT training that emphasizes innovation, digital pedagogy, and emerging technologies. Their natural inclination toward experimentation makes them ideal leaders in digital labs or innovation hubs, where they can test new strategies and share best practices with colleagues. Collaboration can be further enhanced by institutionalizing professional learning communities, giving them platforms to exchange lesson plans, digital content, and effective approaches to ICT integration.

-Generation Z teachers, with their strong digital fluency, may be guided toward student centered approaches by aligning ICT use with frameworks such as TPACK and SAMR. Their adaptability and creativity make them suitable participants in pilot projects for new technologies, allowing schools to leverage their skills in testing innovative tools. Pairing them with senior teachers in cross generational mentoring will balance their technological expertise with pedagogical depth, ensuring holistic professional growth.
5. Future researchers may conduct longitudinal studies to examine the long term effects of ICT initiatives on teacher development and explore qualitative insights into generational experiences with ICT to complement quantitative findings.

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