
Research Article

Information and Communication Technology Integration and Early Childhood Experiences of Kindergarten Learners

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ABSTRACT

The integration of information and communication technology in kindergarten education has become a relevant instructional concern as schools increasingly adopt technology-supported approaches to enhance early childhood learning. This study examined the role of information and communication technology integration in developing the early childhood experiences of kindergarten learners in selected public elementary schools in the lowland areas of Subic District, Subic, Zambales. It focused on the extent to which technology-supported instruction relates to learners' engagement, participation, interaction, and overall classroom learning experiences. The study employed a quantitative, nonexperimental, descriptive-correlational research design. Kindergarten teachers served as respondents and were selected through total population sampling. Data were gathered using a validated modified-adopted questionnaire and were analyzed through appropriate descriptive and inferential statistical procedures. Findings revealed that information and communication technology integration was highly evident in kindergarten instruction, particularly in the appropriateness of technology-based activities. However, the availability of tools and resources emerged as the least evident dimension, indicating the need for improved access to digital infrastructure and instructional materials. Learners' early childhood experiences were also assessed as highly positive, especially in terms of engagement and learning experience. Results further showed that teacher age significantly influenced perceptions of ICT tool availability, while accessibility and utilization of technology, together with teacher competence, were significantly associated with learners' engagement, participation, and interaction. The study concludes that ICT integration becomes more meaningful in kindergarten instruction when digital tools are accessible, developmentally appropriate, regularly utilized, and effectively facilitated by competent teachers.

Keywords: *Information and communication technology integration, kindergarten instruction, early childhood experiences, teacher competence, descriptive-correlational research*

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Introduction

Information and communication technology (ICT) integration in kindergarten instruction has become an important area of interest in early childhood education, particularly in relation to the development of young learners' early classroom experiences. In kindergarten classrooms, technology is not intended to replace play-based, social, and teacher-guided learning; rather, it should serve as an instructional support that enhances children's engagement, participation, interaction, and overall learning experience. As digital tools become increasingly present in educational settings, there is a need to examine how these resources are made available, accessed, utilized, and applied in ways that are meaningful and developmentally appropriate for kindergarten learners.

The role of ICT in early childhood education is especially significant because young children learn best through concrete, visual, interactive, and meaningful experiences. When properly integrated, digital tools may support storytelling, songs, games, visual presentations, interactive activities, and other forms of instruction that capture learners' attention and encourage active involvement. Pullido and Espiritu (2026) emphasized that the implementation of multimedia presentations can enhance the phonetic and speaking abilities of kindergarten pupils, suggesting that technology-supported instruction may contribute to the development of foundational communication and literacy skills. This highlights the potential of multimedia and other ICT-based resources to enrich kindergarten learning when used purposefully and with appropriate teacher guidance.

However, the effectiveness of technology integration depends not only on the availability of devices but also on accessibility, the appropriateness of technology-based activities, and teachers' competence in using digital tools for instruction. ICT use in kindergarten must therefore be carefully planned, age-appropriate, and aligned with the developmental needs of young learners. Hence, this study focused on ICT integration in kindergarten instruction and its relationship with the early childhood experiences of kindergarten learners, particularly

in terms of engagement, participation, interaction, and overall classroom learning experience.

Literature Review

Existing literature indicates that information and communication technology (ICT) can contribute positively to early childhood education when it is integrated in a guided, meaningful, and developmentally appropriate manner. Su and Yang (2024) and Undheim (2022) emphasized that the educational value of technology in early learning does not depend solely on the availability of digital devices, but on how teachers intentionally use these tools to support children's learning experiences. When properly facilitated, ICT-based materials can stimulate young learners' curiosity, creativity, attention, and participation, particularly when digital activities are aligned with instructional objectives and suited to learners' developmental levels. This affirms the need for teachers to exercise sound pedagogical judgment in selecting and using technology as a supportive tool rather than as a replacement for meaningful teacher-child interaction.

In Southeast Asian contexts, studies have likewise revealed both the potential and limitations of ICT integration in early childhood classrooms. Aditya et al. (2022) found that teachers recognized the benefits of ICT in enriching classroom instruction, but they also experienced challenges related to training, competence, and actual implementation. These findings suggest that technology integration is shaped not only by the presence of digital resources but also by teachers' preparedness, confidence, and pedagogical competence. In relation to this, Espiritu (2021) emphasized that teacher awareness and competency are essential foundations for effective instructional practice, particularly in meeting professional standards and responding to learners' needs. Thus, even when schools have access to ICT tools, their effective classroom use may remain limited if teachers are not adequately equipped with the technical, pedagogical, and professional competencies needed to integrate technology meaningfully.

In the Philippine context, ICT integration has become increasingly relevant with the

continuing emphasis on learner-centered, responsive, and developmentally appropriate education. The MATATAG curriculum highlights meaningful learning experiences that address learners' developmental needs, making ICT a potentially useful support in strengthening classroom engagement and participation. Local studies further indicate that digital tools and screen-based learning resources may influence learners' academic experiences in both positive and challenging ways. For instance, Guerrero and Espiritu (2025) found that smartphone use may provide academic benefits while also presenting drawbacks when not properly guided. Similarly, Quintino and Espiritu (2025) highlighted the important role of screen time and digital literacy in student learning, suggesting that technology use must be balanced, purposeful, and supported by appropriate supervision.

Despite the growing body of research on ICT in education, previous studies have focused largely on teachers' competence, beliefs, digital literacy, access to technology, or learners' general academic performance. Limited attention has been given to how ICT integration is associated with the actual early childhood experiences of kindergarten learners, particularly in terms of engagement, participation, interaction, and overall classroom learning experience. This gap is significant because kindergarten education requires technology use that is not only instructional but also developmentally responsive, socially interactive, and emotionally supportive. Hence, the present study seeks to examine ICT integration in relation to the early childhood experiences of kindergarten learners, thereby contributing to a more contextualized understanding of how digital tools can support meaningful learning in early childhood classrooms.

Theoretical and Conceptual Framework

This research is fundamentally based on Vygotsky's Sociocultural Theory, supplemented by Piaget's Cognitive Development Theory, Bronfenbrenner's Ecological Systems Theory, and Mayer's Cognitive Theory of Multimedia Learning. This blend of theories highlight that young children learn best through discussion, hands-on, real-life, age-appropriate

experience, conducive environment, and engaging multimedia. Here, the use of ICT is regarded as a driving force that facilitates active, visual, and interactive learning supported by the teacher.

The results corroborate with Vygotsky's theoretical proposition as the strong links between the accessibility of ICT, its use, teachers' skills, and children's engagement, involvement, and interaction reveal that technology is given a meaning when it is a tool of social classroom processes by the teachers. Thus, ICT is a tool that mediates the communication, participation, and learner's scaffolded experiences.

On the other hand, the results also back up Piaget's views by highlighting the role of concrete and active learning experiences. As a matter of fact, even though activities using ICT were considered appropriate to the level of the children, their appropriateness did not significantly correlate with childhood experiences. Hence, the finding has shown the importance that digital materials provide opportunities for learners' active exploration, response, and interaction rather than only information retrieval.

Bronfenbrenner's Theory is apparent in how environmental and institutional factors impinge on the use of ICT. The less favorable rating for the availability of the ICT tool and the statistically significant difference in the availability of the tool based on teachers' age reveal that the provision of devices, connectivity, technical support, training, and educational leadership are influencing factors of technology use in the classroom.

Theories of Mayer hold that ICTs achieve maximum effect when multimedia presentations are lucid, interactive, age-appropriate and easy to process. This research underscores the necessity of competent teachers in converting digital media into meaningful educational opportunities.

Aim of the study was based on the Input, Process, Output framework where teachers' profile, ICT integration, and learners' early childhood experiences were considered as inputs; data gathering and analysis as the process; and recommendations as the output. Altogether, the research reveals that the integration of ICT in kindergarten is the most effective

if it is socially mediated, developmentally appropriate, institutionally supported, and pedagogically guided..

Significance of the Study

This study is significant as it provides empirical evidence on the relationship between information and communication technology integration and the early childhood experiences of kindergarten learners. Its findings may help improve engaging, participatory, interactive, and developmentally appropriate classroom activities. It may also guide kindergarten teachers in selecting appropriate digital tools, support school administrators in improving resources and training, and assist curriculum planners in developing child-centered technology integration policies. Furthermore, the study may serve as a reference for future researchers exploring technology-supported learning in early childhood education.

Objectives of the Study

This study aimed to determine the role of information and communication technology integration in developing the early childhood experiences of kindergarten learners in selected public elementary schools in the lowland areas of Subic District, Subic, Zambales, during Academic Year 2025–2026.

Specifically, the study sought to achieve the following objectives:

1. To determine the profile of the teacher-respondents in terms of age, sex, civil status, highest educational attainment, relevant information and communication technology seminars or trainings attended, length of service, and position or rank;
2. To evaluate information and communication technology integration in kindergarten instruction in terms of availability of tools and resources, accessibility and utilization, appropriateness of technology-based activities, and teacher competence;
3. To determine the level of early childhood experiences of kindergarten learners in terms of engagement, participation, interaction, and learning experience;
4. To compare information and communication technology integration when the

teacher-respondents are grouped according to their profile variables;

5. To investigate the relationship between information and communication technology integration and the early childhood experiences of kindergarten learners; and
6. To propose recommendations to enhance information and communication technology integration in developing the early childhood experiences of kindergarten learners.

Limitations of the Study

This study was limited to 35 kindergarten teachers from selected public elementary schools in the lowland areas of Subic District, Subic, Zambales. Although total population sampling allowed the inclusion of all qualified respondents within the identified locale, the small sample size limits the generalizability of the findings to other districts, divisions, or educational contexts. The results should therefore be interpreted as reflective of the conditions of the selected schools rather than as a representation of all kindergarten classrooms.

The study was also limited by its quantitative, descriptive-correlational design. Since the data were gathered through a survey questionnaire, the findings were based on teachers' perceptions and self-reported experiences. The study did not include direct classroom observation, interviews with learners or parents, or documentary analysis of actual ICT materials used in instruction. These additional sources of data could have provided deeper evidence on how ICT-supported activities were implemented in actual classroom practice.

Furthermore, the study examined relationships between ICT integration and early childhood experiences but did not establish causal effects. The significant relationships found in the study should be interpreted as associations only. Future studies may employ mixed-methods designs, larger samples, classroom observations, and comparative analyses across different school settings to generate a more comprehensive understanding of ICT integration in early childhood education.

Methodology

Research Design

This study employed a quantitative, non-experimental, descriptive-correlational research design. This design was appropriate because the study examined existing conditions without manipulating any variable. Specifically, it described the profile of the teacher-respondents, assessed the level of information and communication technology integration in kindergarten instruction, determined the level of early childhood experiences of kindergarten learners, tested differences in information and communication technology integration when grouped according to teacher profile variables, and examined the relationship between information and communication technology integration and early childhood experiences. Since data were gathered at a single point in time, the study was also cross-sectional in nature.

Population and Locale

The respondents of the study were 35 kindergarten teachers from selected public elementary schools in the lowland areas of Subic District, Subic, Zambales, during Academic Year 2025–2026. Total population sampling was employed because the number of qualified kindergarten teachers in the identified locale was relatively small, clearly defined, and manageable for complete inclusion. Rather than selecting only a portion of the population, the researcher included all teachers who met the inclusion criteria to obtain a more complete representation of kindergarten teachers directly involved in ICT-assisted instruction within the selected schools.

The use of total population sampling was appropriate because the study focused on a specific group of teachers who were assigned to kindergarten classes and had direct experience with ICT integration in classroom teaching. This approach reduced sampling exclusion within the identified locale and allowed the researcher to describe the actual conditions of ICT integration among the available kindergarten teachers in the lowland areas of Subic District. However, the findings should be interpreted within the scope of this local context and should not be generalized broadly to all

kindergarten teachers outside the selected schools.

Instruments

The study used a modified-adopted survey questionnaire as the primary data-gathering tool. The instrument was developed from related literature and prior studies on information and communication technology integration in early childhood education, preschool teachers' digital competence, children's engagement with digital technology, and technology-supported learning experiences. It was modified to suit the local context of kindergarten instruction and to align with the objectives of the study.

The questionnaire consisted of three parts. Part I gathered the profile of the teacher-respondents in terms of sex, age, civil status, highest educational attainment, length of service, position or rank, and relevant information and communication technology-related training attended. Part II measured information and communication technology integration in kindergarten instruction in terms of availability of tools and resources, accessibility and utilization, appropriateness of technology-based activities, and teacher competence. Part III assessed the early childhood experiences of kindergarten learners in terms of engagement, participation, interaction, and learning experience. Parts II and III used a four-point Likert scale ranging from Strongly Agree to Strongly Disagree.

The instrument underwent expert validation by specialists in early childhood education, educational technology, and research methodology. Their comments and recommendations were used to revise and improve the clarity, relevance, and alignment of the questionnaire items. Pilot testing was conducted among respondents with characteristics similar to the actual participants but who were not included in the final sample. Reliability was determined using Cronbach's alpha. The results showed acceptable to excellent internal consistency for the dimensions of availability of tools and resources, accessibility and utilization, appropriateness of technology-based activities, teacher competence, engagement, participation,

interaction, and learning experience, with coefficients ranging from .767 to .941.

Data Gathering Procedure

Before the conduct of the study, the researcher secured approval from the research adviser and obtained the necessary endorsement from the Schools Division Office. After the endorsement was granted, formal request letters were submitted to the principals of the selected schools to seek permission for the administration of the survey questionnaire. Upon approval, coordination was made with the school heads and teacher-respondents regarding the appropriate schedule for data gathering.

The questionnaire was administered at a time approved by the school authorities to avoid disruption of classes and interference with the teachers' regular duties. Before answering the questionnaire, the respondents were informed about the purpose of the study, the voluntary nature of their participation, and the confidentiality of their responses. After the questionnaires were accomplished, they were retrieved, checked for completeness, organized, coded, and prepared for statistical analysis.

Data Analysis

The data gathered were summarized, tabulated, and analyzed using appropriate descriptive and inferential statistical tools. Frequency and percentage were used to describe the profile of the teacher-respondents. Mean and standard deviation were used to determine the level of information and communication technology integration in kindergarten instruction and the level of early childhood experiences of kindergarten learners. Ranking was used to identify the highest and lowest indicators based on mean scores.

One-way analysis of variance was used to determine whether significant differences existed in information and communication technology integration when the teacher-respondents were grouped according to their profile variables. Pearson product-moment correlation coefficient was used to determine the relationship between information and communication technology integration and the early

childhood experiences of kindergarten learners. The level of significance was set at 0.05.

Ethical Considerations

The study observed ethical principles throughout the research process. Participation was voluntary, and the respondents were informed that they had the right to decline participation without penalty. Confidentiality was maintained by ensuring that the data gathered were used solely for research purposes. The identity of the respondents was protected, and no personal information was disclosed in the presentation of results. The questionnaire was administered in a manner that did not disrupt classes or interfere with regular school duties.

The respondents were selected based on clear and non-discriminatory criteria, specifically their assignment as kindergarten teachers and their direct involvement in information and communication technology-assisted instruction. The study posed minimal risk to the participants because it involved only the completion of a survey questionnaire. Data were handled with honesty, objectivity, and confidentiality. The findings of the study were intended to be shared with concerned stakeholders, including teachers, school administrators, curriculum planners, and future researchers, as basis for enhancing information and communication technology integration in kindergarten instruction.

Result and Discussion

Profile of the Teachers

Age

The age distribution indicates that the largest proportion of respondents belonged to the 26–30 years old bracket (37.1%), followed by those aged 31–35 and 36–40 years old, each accounting for 20.0%. Meanwhile, 17.1% were aged 41–45 years old, and only 5.7% were within the 46–50 years old bracket. The computed mean age of 34.6 years suggests that the respondents were generally young to middle-aged adults.

This finding implies that most teacher-respondents were in the early to middle stages of their professional careers, a period associated with developing instructional competence, professional confidence, and adaptability to

educational demands. Their relatively young profile may also indicate openness to pedagogical innovation, continuous learning, and technology integration. This is supported by Admiraal et al. (2023) and Jentsch and König (2022), who emphasized that teacher competence develops progressively through experience, training, and institutional support.

Sex

In terms of sex, the respondents were predominantly female, comprising 88.6% of the sample, while male respondents accounted for only 11.4%. This result demonstrates a marked female predominance among the teacher-respondents.

The predominance of female respondents reflects the continuing gendered composition of the teaching profession, particularly in basic education contexts where teaching is associated with care, nurturance, and learner support. This profile may influence school culture, collegial interaction, and professional relations. The finding is consistent with UNESCO (2023), which reported that women constitute the majority of teachers across primary and secondary education levels.

Civil Status

With respect to civil status, the majority of respondents were married, representing 65.7% of the sample. Single respondents comprised 28.6%, while widowed/widower respondents accounted for 5.7%. These findings indicate that most teacher-respondents had established family lives.

This profile suggests that many respondents may be managing both professional and family-related responsibilities. Married teachers often perform multiple roles as educators, spouses, and parents or caregivers, which may influence their work engagement, time management, and overall well-being. Aguilar-Delavin and Pogoy (2023) noted that married teachers often encounter overlapping work and family demands requiring coping and adaptive strategies.

Highest Educational Attainment

The data reveal that all respondents had pursued graduate education beyond the

baccalaureate level. Specifically, 77.1% held a Master's Degree, while 22.9% had earned units toward a Doctorate. This indicates a strong academic and professional profile among the teacher-respondents.

The respondents' educational attainment suggests advanced academic preparation and commitment to continuing professional growth. Graduate education may enhance content knowledge, pedagogical competence, reflective practice, and research-informed instruction. This supports Jentsch and König's (2022) assertion that teacher competence is central to educational quality and develops through formal training, professional learning, and accumulated experience.

Relevant ICT Seminars/Trainings Attended

In terms of ICT-related professional development, most respondents attended Virtual INSET 2.0 (77.1%), while 22.9% attended INSET. This finding indicates that the respondents had participated in training activities related to technology integration and digitally supported instruction.

The high participation in Virtual INSET 2.0 suggests exposure to flexible and technology-mediated professional development aimed at strengthening ICT competencies. It may also reflect institutional efforts to promote digital readiness and teachers' recognition of ICT as a tool for improving instruction, engagement, and assessment. Huang et al. (2024) emphasized that technology-enabled professional development contributes to teacher learning and professional growth.

Length of Service

Regarding length of service, the largest proportion of respondents had been teaching for 8–11 years (37.1%), followed by those with 4–7 years (25.7%), 0–3 years (20.0%), and 12–15 years (17.1%). The distribution indicates that most respondents had moderate teaching experience.

This finding suggests that many teacher-respondents were beyond the novice stage and were in a period of professional consolidation. Teachers with moderate experience are generally expected to possess stronger classroom management skills, deeper familiarity with

curriculum implementation, and more stable instructional practices. Admiraal et al. (2023) and Jentsch and König (2022) emphasized that competence and confidence strengthen through experience and professional support.

Position/Rank

In terms of position or rank, the majority of respondents were Teacher 1, comprising 57.1% of the sample, followed by Teacher 3 at 31.4% and Teacher 2 at 11.4%. These results indicate that most respondents were in the entry-level teaching rank, although a considerable proportion had advanced to higher positions.

The predominance of Teacher 1 respondents may reflect the usual staffing composition in public basic education schools, where entry-level positions form a substantial part of the teaching workforce. Meanwhile, the presence of Teacher 2 and Teacher 3 respondents

indicates career progression based on qualifications, performance, and experience. This finding is consistent with Executive Order No. 174, s. 2022, which established the expanded career progression system for public school teachers to strengthen professional development, promotion, and career mobility.

Teachers' Description on ICT Integration in Kindergarten Instruction

Table 1 presents the summary of teachers' ICT integration in kindergarten instruction in terms of availability of ICT tools and resources, accessibility and utilization of ICT, appropriateness of ICT-based activities, and teacher competence in ICT integration. The overall weighted mean of 3.29 with a standard deviation of 0.51 was verbally interpreted as **Highly Integrated**, indicating that ICT was substantially incorporated into Kindergarten instructional practices.

Table 1

Summary of Teachers' ICT Integration in Kindergarten Instruction

ICT Integration in Kindergarten Instruction	Mean	SD	VI	Rank
1. Availability of ICT Tools and Resources	3.06	.52	Integrated	4
2. Accessibility and Utilization of ICT	3.35	.50	Highly Integrated	3
3. Appropriateness of ICT-based Activities	3.39	.57	Highly Integrated	1
4. Teacher Competence in IC Integration	3.36	.45	Highly Integrated	2
Overall Weighted Mean	3.29	0.51	Highly Integrated	

Among the indicators of ICT integration, ****Appropriateness of ICT-Based Activities**** obtained the highest mean of 3.39, followed by ****Teacher Competence in ICT Integration**** with a mean of 3.36 and ****Accessibility and Utilization of ICT**** with a mean of 3.35. Meanwhile, ****Availability of ICT Tools and Resources**** obtained the lowest mean of 3.06, although it was still interpreted as integrated. This indicates that kindergarten teachers were more effective in selecting and applying appropriate ICT-based activities than in ensuring the availability of ICT resources.

A noteworthy finding is the ****resource paradox**** in ICT integration. Although ICT

tools and resources were relatively limited, teachers still demonstrated competence in designing meaningful and developmentally appropriate ICT-supported activities. This suggests that teachers relied on creativity, resourcefulness, shared materials, improvised digital content, and careful use of available tools to support instruction.

This finding shows that effective ICT integration is not determined by technology availability alone. Teacher competence, pedagogical judgment, and collaborative school practices also play important roles in transforming limited resources into meaningful learning opportunities. From a sociological perspective,

teachers serve as mediators of digital access by ensuring that limited ICT resources are shared and used equitably in the classroom. However, stronger institutional support remains necessary to sustain ICT integration and reduce dependence on individual teacher effort.

Recent literature supports that meaningful ICT integration depends on accessible resources, competent teachers, and developmentally appropriate technology use. UNESCO (2023), OECD (2021), and Kontkanen et al. (2023) emphasized that technology becomes effective when it is relevant, accessible, and guided by sound pedagogy. Therefore, the findings indicate that teachers were able to use ICT as a supportive tool for enriching kindergarten

instruction despite limitations in resource availability.

Level of Early Childhood Experiences of Kindergarten Learners

Table 2 presents the summary of the level of early childhood experiences of Kindergarten learners in terms of engagement, participation, interaction, and learning experience. The overall weighted mean of 3.51 with a standard deviation of 0.46 was verbally interpreted as **Very High**, indicating that learners generally experienced highly positive and developmentally supportive early childhood learning conditions.

Table 2
Summary of Level of Early Childhood Experiences of Kindergarten Learners

Level of Early Childhood Experiences of Kindergarten Learners	Mean	SD	VI	Rank
1. Engagement	3.54	.47	Very High	1.5
2. Participation	3.44	.49	Very High	4
3. Interaction	3.51	.45	Very High	3
4. Learning Experience	3.54	.43	Very High	1.5
Overall Weighted Mean	3.51	0.46	Very High	

Among the indicators, **Engagement** and **Learning Experience** obtained the highest mean scores of 3.54 and shared Rank 1.5, both interpreted as **Very High**. This was followed by **Interaction**, with a mean of 3.51 and ranked third. Meanwhile, **Participation** obtained the lowest mean of 3.44 and ranked fourth, although it was still interpreted as **Very High**. These results show that all dimensions of early childhood experiences were strongly evident among the Kindergarten learners.

The findings suggest that the learners were actively involved in classroom activities, exposed to meaningful learning experiences, and supported through positive interaction with teachers and peers. The very high ratings may reflect the use of developmentally appropriate activities, supportive classroom routines, and engaging learning opportunities that promote curiosity, communication, cooperation, and social participation. Although participation ranked lowest, its very high rating still indicates that learners were generally willing

and able to take part in classroom tasks and group activities.

Recent literature supports the importance of engagement, interaction, and meaningful learning experiences in early childhood education. Ritoša et al. (2023) emphasized that child engagement is a key indicator of learning opportunity and educational quality in early childhood settings. Similarly, Diebold and Perren (2021) found that peer engagement contributes to young children's interaction, communication, and social development. OECD (2021) also highlighted that high-quality early childhood education is strongly shaped by children's daily interactions, learning experiences, and classroom processes. Thus, the very high level of early childhood experiences in the present study indicates that the Kindergarten learning environment supported children's holistic development, active engagement, and school readiness.

Analysis of Variance in ICT Integration When the Teacher-Respondents are Grouped According to Their Profile Variables

The table 3 presents the summary of ANOVA results on ICT integration in Kindergarten instruction when teacher-respondents were grouped according to profile variables. The analysis focused on four dimensions: availability of ICT tools and resources, accessibility and utilization of ICT, appropriateness of ICT-based activities, and teacher competence in ICT

integration. The results were tested at the 0.05 level of significance.

Findings revealed that **age** had a significant difference only in terms of **availability of ICT tools and resources**, as shown by the F-value of 6.121 and significance value of .001. This indicates that teachers' perceptions or experiences regarding ICT resource availability varied across age groups. However, age did not significantly affect accessibility and utilization, appropriateness of ICT-based activities, or teacher competence in ICT integration.

Table 3

Summary of ANOVA Results on ICT Integration When Teacher-Respondents Are Grouped According to Profile Variables

Profile Variables	Availability of ICT Tools and Resources F-value / Sig.	Interpretation	Accessibility and Utilization of ICT F-value / Sig.	Interpretation	Appropriateness of ICT-Based Activities F-value / Sig.	Interpretation	Teacher Competence in ICT Integration F-value / Sig.	Interpretation
Age	6.121 / .001*	Significant	1.248 / .312	Not Significant	1.766 / .162	Not Significant	1.058 / .394	Not Significant
Sex	.930 / .342	Not Significant	.411 / .526	Not Significant	.124 / .727	Not Significant	.421 / .521	Not Significant
Civil Status	2.403 / .107	Not Significant	.879 / .425	Not Significant	.366 / .696	Not Significant	.396 / .676	Not Significant
Highest Educational Attainment	1.751 / .195	Not Significant	1.734 / .197	Not Significant	.101 / .752	Not Significant	.207 / .652	Not Significant
Relevant ICT Seminars/Trainings Attended	.006 / .938	Not Significant	.028 / .867	Not Significant	.242 / .626	Not Significant	.005 / .945	Not Significant
Length of Service	.704 / .557	Not Significant	.304 / .822	Not Significant	1.902 / .150	Not Significant	.394 / .758	Not Significant

Profile Variables	Availability of ICT Tools and Resources F-value / Sig.	Interpretation F-ta-tion	Accessibility and Utilization of ICT F-value / Sig.	Interpretation	Appropriateness of ICT-Based Activities F-value / Sig.	Interpretation	Teacher Competence in ICT Integration F-value / Sig.	Interpretation F-ta-tion
Position/Rank	2.478 / .100	Not Significant	1.182 / .320	Not Significant	2.861 / .072	Not Significant	1.800 / .182	Not Significant

*Legend: Significant at the 0.05 level.

For the other profile variables, namely sex, civil status, highest educational attainment, relevant ICT seminars/trainings attended, length of service, and position/rank, no significant differences were found across all ICT integration dimensions. This suggests that ICT integration practices among Kindergarten teachers were generally comparable regardless of demographic and professional profile, except in the area of ICT resource availability by age.

Overall, the ANOVA results indicate that ICT integration was relatively consistent across most teacher profiles. The significant result for age and ICT resource availability may imply that age groups differ in their access to, exposure to, or perception of available digital resources. This is supported by Saqri and Ouchaouka (2023), who found that teachers' ICT competence may be associated with variables such as age, gender, training, and teaching experience. Similarly, Antonietti et al. (2022)

Table 4

Pearson Product - Moment Correlation of ICT integration and early childhood experiences of kindergarten learners

		Engage-ment	Participa-tion	Interac-tion	Learning Experience
Availability of ICT Tools and Resources	Pearson Correlation	.289	.446**	.143	.097
	Sig. (2-tailed)	.092	.007	.413	.581
	N	35	35	35	35
Accessibility and Utiliza-tion of ICT		Not Signifi-cant	Significant	Not Signifi-cant	Not Signifi-cant
	Pearson Correlation	.561**	.673**	.454**	.177
	Sig. (2-tailed)	.000	.000	.006	.310

emphasized that teachers' digital competence beliefs influence their acceptance and intended use of technology, while Artacho et al. (2020) highlighted the role of digital competence in promoting teaching innovation. Thus, the findings suggest that while teacher profiles may not strongly differentiate ICT integration overall, age-related differences in ICT resource availability remain a relevant consideration for institutional support and resource planning.

Relationship between ICT Integration and Early Childhood Experiences of Kindergarten Learners

Table 4 presents the Pearson product-moment correlation between teachers' ICT integration and the early childhood experiences of Kindergarten learners in terms of engagement, participation, interaction, and learning experience.

	N	35	35	35	35
		Significant	Significant	Significant	Not Significant
Appropriateness of ICT-Based Activities	Pearson Correlation	.104	.177	.015	.101
	Sig. (2-tailed)	.553	.310	.932	.564
	N	35	35	35	35
		Not Significant	Not Significant	Not Significant	Not Significant
Teacher Competence in ICT Integration	Pearson Correlation	.469**	.678**	.423*	.233
	Sig. (2-tailed)	.004	.000	.011	.177
	N	35	35	35	35
		Significant	Significant	Significant	Not Significant

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

The results show varying degrees of relationship across the ICT integration indicators, with some dimensions demonstrating significant associations with learners' classroom experiences. For availability of ICT tools and resources, a significant positive relationship was found only with participation ($r = .446$, $p = .007$), while its relationships with engagement, interaction, and learning experience were not significant. This indicates that the availability of ICT resources may support learners' participation, but access to tools alone may not be sufficient to improve all dimensions of early childhood experiences.

For accessibility and utilization of ICT, significant positive relationships were found with engagement ($r = .561$, $p < .01$), participation ($r = .673$, $p < .01$), and interaction ($r = .454$, $p = .006$). However, its relationship with learning experience was not significant. These results suggest that when ICT is accessible and actively utilized, learners are more likely to become engaged, participate in classroom activities, and interact with teachers and peers.

For appropriateness of ICT-based activities, no significant relationship was found with any dimension of early childhood experiences. Although ICT-based activities may have been perceived as suitable, the results imply that appropriateness alone may not directly influence

learners' engagement, participation, interaction, or learning experience unless supported by effective implementation, accessibility, and teacher facilitation.

For teacher competence in ICT integration, significant positive relationships were found with engagement ($r = .469$, $p = .004$), participation ($r = .678$, $p < .01$), and interaction ($r = .423$, $p = .011$), while its relationship with learning experience was not significant. This suggests that teachers' ICT competence plays an important role in promoting active learner involvement and interaction, particularly when digital tools are used purposefully in classroom instruction.

Overall, the findings indicate that ICT integration is most strongly associated with learners' participation, particularly in relation to accessibility and utilization of ICT and teacher competence. The results imply that ICT contributes more effectively to early childhood experiences when teachers are competent in using technology and when digital tools are accessible and actively utilized. Recent studies support this finding, noting that young children's meaningful engagement with digital technologies is strengthened when teachers guide technology use, facilitate interaction, and align digital tools with classroom activities (Undheim, 2022; Torres et al., 2021). Thus, ICT

integration in Kindergarten instruction should emphasize purposeful use, teacher facilitation, and learner-centered digital activities rather than mere availability of technology.

Proposed Action Plan

The proposed action plan was developed as a practical response to the major findings of the study on ICT integration and the early childhood experiences of Kindergarten learners. Although ICT integration in Kindergarten instruction was generally evident, some areas still require reinforcement to ensure more consistent and effective implementation. In particular, the availability of ICT tools and resources emerged as a relatively weaker dimension, indicating the need to improve access to devices, digital materials, and classroom-based technological support. Likewise, some aspects of learner participation and interaction appeared less pronounced, suggesting the need to make ICT-supported instruction more participatory, collaborative, and developmentally appropriate. These findings justify the formulation of an action plan that addresses identified gaps, sustains existing strengths, and promotes a more supportive environment for meaningful ICT integration in Kindergarten education.

The proposed program, titled **“Strengthening ICT Integration in Kindergarten Instruction to Enhance Early Childhood Learning Experiences,”** aims to improve the quality and consistency of ICT use in Kindergarten classrooms through organized, responsive, and attainable interventions. Specifically, the program seeks to enhance the availability and accessibility of ICT tools and digital resources, strengthen teachers’ competence in selecting and using developmentally appropriate technologies, increase the regular integration of ICT in classroom instruction, and promote greater learner engagement, participation, and interaction during ICT-supported activities. The primary beneficiaries are Kindergarten teachers and learners, while school heads, ICT coordinators, and other education personnel shall serve as key implementers and support units.

The action plan may include ICT resource assessment, organization and provision of digital learning materials, teacher capability-

building sessions, demonstration teaching, collaborative lesson planning, classroom-based monitoring, and periodic evaluation. These components are intended to ensure that ICT integration is systematic, responsive to school realities, and aligned with the developmental and instructional needs of young learners. Through these interventions, teachers may be better supported in using ICT not merely as a supplementary tool, but as a meaningful resource for enriching classroom instruction.

Once implemented, the proposed program is expected to strengthen ICT-supported Kindergarten instruction by addressing areas needing improvement and sustaining effective practices already observed in the classroom. It may result in improved access to appropriate technological resources, increased teacher confidence and competence, and more consistent use of digital tools in daily instruction. Moreover, the program is expected to enrich learners’ classroom experiences by encouraging active participation, meaningful interaction, and deeper engagement in learning tasks. Beyond its immediate benefits, the action plan may serve as a practical guide for school leaders and stakeholders in planning, implementing, and monitoring ICT-related interventions in early childhood education.

Conclusions and Recommendations

Based on the findings of the study, the researcher concluded that the teacher-respondents were generally young to middle-aged, predominantly female, mostly married, academically prepared through graduate education, exposed to ICT-related training, moderately experienced, and mostly holding Teacher 1 positions. This profile suggests that the respondents possessed the professional background and readiness needed for ICT-integrated Kindergarten instruction. Hence, it is recommended that schools continue providing professional development opportunities that strengthen teachers’ capacity to use ICT effectively, particularly through seminars, workshops, Learning Action Cell sessions, peer mentoring, and collaborative lesson planning.

The study further concluded that ICT integration in Kindergarten instruction was generally highly integrated, particularly in terms of

the appropriateness of ICT-based activities, teacher competence, and accessibility and utilization of ICT. However, the availability of ICT tools and resources obtained the lowest rating, indicating that access to devices, connectivity, and digital learning materials still needs improvement. In this regard, school heads and administrators are encouraged to prioritize the provision of functional ICT equipment, reliable internet access, offline digital resources, and developmentally appropriate digital materials for Kindergarten classrooms.

The early childhood experiences of Kindergarten learners were found to be at a very high level, especially in terms of engagement and learning experience, followed by interaction and participation. This indicates that ICT-supported instruction contributed positively to learners' interest, involvement, interaction, and meaningful classroom experiences. Therefore, Kindergarten teachers are encouraged to design ICT-supported activities that promote active participation, communication, collaboration, and guided interaction among learners, ensuring that technology is used not merely for presentation but as a meaningful tool for child-centered learning.

The findings also revealed that age was the only profile variable that showed a significant difference in relation to the availability of ICT tools and resources, while sex, civil status, educational attainment, ICT training, length of service, and position/rank did not significantly influence ICT integration. This suggests that ICT integration was generally consistent across most teacher groups. Thus, school-based ICT support should be inclusive and responsive to teachers' varying needs, particularly in ensuring equitable access to ICT resources regardless of demographic or professional profile.

The correlation results showed that ICT integration was significantly related to selected dimensions of early childhood experiences. Accessibility and utilization of ICT, as well as teacher competence in ICT integration, were positively associated with learners' engagement, participation, and interaction. These findings imply that ICT becomes more effective when it is accessible, regularly used, and facilitated by competent teachers. It is therefore recommended that schools establish a

systematic ICT support mechanism that includes regular inventory of ICT tools, preparation of offline learning resources, technical assistance, classroom monitoring, and sharing of best practices among Kindergarten teachers.

Finally, the researcher concluded that the proposed program for strengthening ICT integration in Kindergarten instruction is necessary and relevant. The program may address identified needs in ICT resource availability, teacher competence, learner participation, and classroom interaction. Its adoption and implementation may help create more engaging, interactive, and developmentally appropriate learning experiences for Kindergarten learners. Future researchers may conduct related studies using a larger sample, broader locale, and additional variables such as parental support, school funding, administrative support, home technology access, and learner readiness. Mixed-methods approaches, classroom observations, and interviews may also be used to provide deeper insights into ICT integration and early childhood learning experiences.

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