

EFFECTIVENESS OF USING ICT IN CLASSROOM INSTRUCTION AMONG THE TEACHING STAFF OF ARITAO II DISTRICT ELEMENTARY SCHOOLS

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Abstract: Information and Communication Technology (ICT) has become a crucial element in contemporary education, enhancing instruction delivery, boosting student involvement, and facilitating meaningful learning experiences. Gaining insight into teachers' views on ICT integration is vital for bolstering technology-driven teaching and pinpointing areas that need institutional backing. This study explored the attitudes of elementary school teachers towards ICT integration and its efficacy in classroom teaching within the Aritao II District Elementary Schools. A descriptive research approach was used, with 100 teaching staff participating as respondents. Data were collected using a validated survey questionnaire, and analysis was performed using frequency, percentage, weighted mean, independent samples t-test, and Kruskal–Wallis H-test. The results indicated that teachers held a very positive view of ICT integration, with an overall mean score of 3.59, reflecting strong confidence in utilizing technology and acknowledging its role in enhancing teaching and learning. Teachers also concurred that ICT integration was effective in classroom instruction, achieving an overall mean score of 2.77. Inferential analysis revealed no significant differences in teachers' perceptions and perceived effectiveness of ICT integration when categorized by age, gender, years of teaching experience, and area of specialization. These results imply that teachers generally maintain positive attitudes towards ICT, irrespective of their demographic backgrounds. This study underscores the necessity of maintaining ICT integration through ongoing professional development, sufficient technological resources, and institutional support. Enhancing teachers' digital skills and improving access to ICT facilities could further elevate the quality of instruction and foster more effective technology integration in elementary education.

Keywords: *Information and Communication Technology (ICT), ICT integration, teachers' perception, classroom instruction, elementary education*

INTRODUCTION

Information and Communication Technology (ICT) have revolutionized education worldwide. It is now a key component of teaching and learning in the 21st century. Big organizations such as UNESCO are focused on using ICT to boost teaching quality, get students more involved, encourage teamwork, and build digital skills. They push for teachers to become better at using digital tools to improve education in different settings, ensuring that it fits real classroom situations (Sartor Harada et al., 2022). In addition, both the OECD and UNESCO highlight the importance of skills such as computational thinking and digital literacy, which is why they are pushing for strong ICT integration in school

curriculums everywhere (Whitney-Smith, 2023). Research shows that when ICT is used effectively, it helps students think critically, be more creative, and makes teaching more effective, which leads to more active learning and better student results (Olugbade et al., 2025). However, teachers around the world still face hurdles such as not having enough resources, different skill levels, and not enough support from their schools, which makes it tough to fully tap into the benefits of ICT in classrooms (Sartor Harada et al., 2022).

In the Philippines, the Department of Education is pushing for ICT integration through programs such as the MATATAG Agenda and Digital Education. They are also focusing on ongoing professional development for teachers. This has sped up the use of digital learning platforms, multimedia resources, and online teaching tools in schools. However, there are still some gaps, such as differences in teachers' ICT skills, access to resources, internet connectivity, and support from institutions, which all impact how technology is used in classrooms. Local research shows that factors such as a teacher's age, experience, field of expertise, and ICT training play a significant role in how they integrate technology. This points to the need for customized professional development and policy support (Sartor Harada et al., 2022). Therefore, it is important to continuously evaluate teachers' views and the effects of ICT integration to shape policies and improve teaching programs in the Philippines. In the Aritao II District, elementary schools have been using various tech tools to boost classroom teaching. Teachers use ICT for lesson delivery, classroom management, assessments, and communication. However, it is not entirely clear how positively teachers view ICT and how effective they think it is for teaching. Factors such as age, gender, teaching experience, and field specialization might affect their views and use of ICT. Understanding these factors is key to creating targeted interventions, professional development, and resource distribution in the district.

Research shows that teachers have a wide range of opinions about integrating information and communication technology (ICT) into their teaching, and these views are shaped by both global and local factors. Generally, when teachers have a positive attitude towards technology, they tend to use it more effectively in their teaching methods (Abel et al., 2022; Zeichner, 2021). When teachers feel good about using technology, it often leads to better teaching, more motivation, and more engaged students. On the flip side, negative attitudes can come from not having the right skills, not enough resources, or just being resistant to change. This highlights why professional development and support are important (Akram et al., 2022; Ngao et al., 2022). Research also points out that a teacher's confidence in their abilities and the availability of ICT resources are important factors in how much technology is used in the classroom. This shows how personal confidence and access to resources work together (Momčilović & Ninković, 2024). Although many studies on ICT integration have been conducted worldwide and, in the Philippines, little research has focused on the Aritao II District. Specifically, few studies have examined teachers' views and the effectiveness of ICT integration while considering demographic factors. Filling this research gap is key to giving school administrators and policymakers the evidence they need to improve ICT use and boost teaching and learning outcomes in the district.

RESEARCH QUESTIONS

This study aimed to determine the effectiveness of using information and communication technology (ICT) in classroom instruction among the teaching staff of the Aritao II District Elementary Schools. Specifically, this study sought to answer the following questions:

- What is the profile of the respondents in terms of: Age, Sex, Years in teaching; and Field of specialization
- What is teachers' perception of ICT integration in classroom instruction?
- What is teachers' perception of the effectiveness of ICT integration in classroom instruction?
- Is there a significant difference in teachers' perceptions toward ICT integration when grouped according to their profile variables?
- Is there a significant difference in teachers' perception of the effectiveness of ICT integration in classroom instruction when grouped according to their profile variables?

METHODS

Research Design

This study employed a descriptive research design to determine teachers' perceptions of ICT integration and the perceived effectiveness of ICT in classroom instruction among the teaching staff of Aritao II District Elementary Schools. The descriptive design was appropriate because it systematically described the status of ICT integration and examined whether significant differences existed in teachers' perceptions based on selected profile variables.

Locale of Study

This study was conducted in the Aritao II District Elementary Schools Division in Nueva Vizcaya, Philippines. The district comprises public elementary schools that have implemented information and communication technology (ICT) as part of classroom instruction in the country. The locale was selected because it provided an appropriate setting for assessing teachers' perceptions and the effectiveness of ICT integration in teaching.

Respondents of the Study

The respondents of the study consisted of 100 elementary school teachers from the Aritao II District Elementary Schools. They represented different age groups, sexes, years of teaching, and fields of specialization. These teachers were considered appropriate respondents because they actively used ICT in classroom instruction and possessed relevant experience regarding technology integration in teaching.

Sampling Technique

The study utilized total enumeration sampling, in which all teaching staff in the Aritao II District Elementary Schools were included as respondents. This sampling technique ensured that the entire target population participated in the study, providing comprehensive and reliable data for the analysis.

Research Instrument

Data were gathered using a researcher-adapted questionnaire comprising three parts. The first part collected the respondents' demographic profiles, including age, sex, years of teaching, and field of specialization. The second part measured teachers' perceptions of ICT integration, and the third part assessed the perceived effectiveness of ICT integration in classroom instruction. Responses were measured using a four-point Likert scale, where 4 = strongly agree, 3 = agree, 2 = disagree, and 1 =

strongly disagree. The questionnaire underwent expert validation to ensure content validity before administration.

Data Gathering Procedure

Prior to data collection, permission to conduct the study was secured from the Schools Division Office, district supervisors, and school heads. After obtaining the necessary approvals, the researcher personally administered the questionnaire to the respondents. The purpose of the study was explained, and informed consent was obtained before participation in the study. Completed questionnaires were retrieved, checked for completeness, and organized for statistical analysis while maintaining respondents' confidentiality.

Data Analysis

The collected data was analyzed using appropriate descriptive and inferential statistical tools. Frequency and percentage were used to describe the respondents' demographic profiles. Weighted means were employed to determine teachers' perceptions toward ICT integration and the perceived effectiveness of ICT integration in classroom instruction. To determine whether significant differences existed according to the respondents' profile variables, the independent samples t-test was used for sex, while the Kruskal–Wallis H-test was employed for age, years in teaching, and field of specialization. All hypotheses were tested at the 0.05 level of significance.

RESULT AND DISCUSSION

Table 1. Demographic Profile of the Respondents

Profile Variable	Category	Frequency (f)	Percentage (%)
Age	20–30 years	15	15.0
	31–40 years	30	30.0
	41–50 years	40	40.0
	51 years and above	15	15.0
	Total	100	100.0
Sex	Male	20	20.0
	Female	80	80.0
	Total	100	100.0
Years in Teaching	1–5 years	10	10.0
	6–10 years	15	15.0
	11–15 years	20	20.0
	16–20 years	25	25.0
	More than 20 years	30	30.0
	Total	100	100.0
Field of Specialization	Basic Education	90	90.0
	Mathematics	2	2.0
	English	2	2.0
	Science	2	2.0
	Social Studies	1	1.0
	Filipino	1	1.0

MAPEH	1	1.0
Computer	1	1.0
Total	100	100.0

Table 1 presents the respondents' demographic profiles in terms of age, sex, years of teaching, and field of specialization. The findings show that the largest group of respondents belonged to the 41–50 years age bracket (40.0%), indicating that most teachers are in their mid-career stage and have accumulated substantial teaching experiences. Female teachers comprised many respondents (80.0%), reflecting the predominance of women in the elementary teaching profession. In terms of teaching experience, the highest proportion of respondents had more than 20 years of service (30.0%), suggesting that the district is largely composed of experienced teachers. Regarding the field of specialization, most respondents specialized in Basic Education (90.0%), while only a few specialized in subject-specific disciplines such as Mathematics, English, Science, Filipino, Social Studies, MAPEH, and Computer. Overall, the respondents represented a workforce of experienced, predominantly female teachers with educational backgrounds appropriate for elementary instruction. These characteristics provide a credible basis for evaluating teachers' perceptions of ICT integration and its effectiveness in classroom teaching, as experienced educators are well positioned to assess the practical implementation of technology in education.

TABLE 2: Teachers' perceptions towards ICT integration

Impacts / Statement Indicator	Weighted Mean	Qualitative Interpretation
I feel confident about learning new computer skills.	3.79	Strongly Agree
I find it easier to teach using ICT.	3.63	Strongly Agree
I am aware of the great opportunities that ICT offers for effective classroom teaching.	3.79	Strongly Agree
I am effective in teaching using ICT.	3.50	Strongly Agree
I am confident that my students learn best with ICT.	3.50	Strongly Agree
I believe that the use of ICT improves the quality of education.	3.67	Strongly Agree
I think that the use of ICT helps prepare teaching resources and materials.	3.75	Strongly Agree
ICT-supported teaching makes learning more effective and efficient.	3.67	Strongly Agree
ICT is a beneficial and essential tool for teaching.	3.58	Strongly Agree
The use of ICT enables students to be more active and engaged in lessons.	3.58	Strongly Agree
The use of ICT helps teachers improve their teaching with more up-to-date materials.	3.75	Strongly Agree

Using ICT instead of traditional means can help save time in discussions.	3.54	Strongly Agree
I have more time to cater to students' needs if ICT is used in teaching	3.29	Strongly Agree
Students pay more attention when ICT is used in teaching.	3.38	Strongly Agree
ICT use in teaching can lead to students making more effort in their lessons.	3.37	Strongly Agree
OVERALL MEAN	3.59	Strongly Agree

Teachers had a very positive perception toward ICT integration, with an overall mean of 3.59, interpreted as strongly agree. The highest-rated indicators were teachers' confidence in learning new computer skills, and their awareness of the opportunities ICT provides for effective teaching (WM = 3.79), followed by the belief that ICT helps prepare instructional materials and improves teaching (WM = 3.75). These findings indicate that teachers recognize ICT as an essential tool that enhances teaching effectiveness, facilitates lesson preparation, and increases student engagement. The results are consistent with previous studies, which reported that teachers with positive attitudes toward ICT are more likely to integrate technology effectively into classroom instruction, resulting in improved teaching practices and learning experiences (Abel et al., 2022; Akram et al., 2022; Momčilović & Ninković, 2024).

Table 3. Teachers' Perception of the Effectiveness of ICT Integration in Classroom Instruction

Statement	Mean	SD	Interpretation
The ICT facilities in my school are functional and can be used effectively.	3.13	0.69	Agree
Technical support is available when teachers encounter ICT-related difficulties.	2.96	0.73	Agree
Teachers are provided sufficient time to learn and become competent in using ICT.	3.17	0.67	Agree
My school has a computer laboratory that supports classroom instruction.	3.29	0.62	Strongly Agree
Teachers are given the freedom to design lessons using ICT.	3.50	0.58	Strongly Agree
Limited access to ICT resources hinders classroom instruction. *	2.50	0.78	Disagree
Lack of administrative support discourages ICT integration. *	2.29	0.82	Disagree
Insufficient teaching time limits the use of ICT in instruction. *	2.42	0.79	Disagree
Inadequate ICT training affects teachers' effective use of technology. *	2.50	0.77	Disagree
ICT resources in the school are underutilized. *	1.96	0.85	Disagree
Overall Mean	2.77	0.73	Agree

Table 3 presents teachers' perception of the effectiveness of ICT integration in teaching, which obtained an overall mean of 2.77, interpreted as agree. Teachers strongly agreed that having computer

laboratories (WM = 3.29) and the freedom to design lessons using ICT (WM = 3.50) support effective teaching. However, they also agreed that challenges such as limited technical support, inadequate training, and insufficient ICT facilities still affect ICT implementation. These findings suggest that while teachers consider ICT effective in enhancing instruction, continuous improvement in infrastructure, technical assistance, and professional development is necessary to maximize its benefits. Similar findings have been reported in previous studies, which emphasized that adequate ICT resources, institutional support, and teacher training are essential for successful technology integration in education (Ngao et al., 2022; Sartor Harada et al., 2022; Olugbade et al., 2025).

Table 4. Differences in Teachers' Perception toward ICT Integration According to Profile Variables

Profile Variable	Statistical Test	Test Statistic	p-value	Decision	Interpretation
Age	Kruskal–Wallis test	H = 0.486	.586	Fail to Reject H_0	No significant difference
Sex	Independent Samples T-test	t = 1.050	.470	Fail to Reject H_0	No significant difference
Years in Teaching	Kruskal–Wallis test	H = 2.610	.510	Fail to Reject H_0	No significant difference
Field of Specialization	Kruskal–Wallis test	H = 9.230	.360	Fail to Reject H_0	No significant difference

Decision Rule: Reject H_0 if $p < .05$; otherwise, fail to reject H_0 .

The analysis of teachers' perceptions of ICT integration across various profile variables—including age, sex, years of teaching, and field of specialization— showed no statistically significant differences. Specifically, the Kruskal–Wallis H-tests for age ($H = 0.486$, $p = .586$), years of teaching ($H = 2.610$, $p = .510$), and field of specialization ($H = 9.230$, $p = .360$), alongside the Independent Samples t-test for sex ($t = 1.050$, $p = .470$), all resulted in failing to reject the null hypothesis ($p > .05$). This indicates uniformity in teachers' perceptions, regardless of these demographic and professional characteristics.

These results align with research suggest that demographic factors are often less influential on ICT integration attitudes than internal variables, such as digital literacy and self-efficacy. For example, researchers have found that digital literacy, attitudes, and self-efficacy significantly predict teachers' intentions and effectiveness in ICT use, overshadowing variables such as age and gender (Chen & Gao, 2025; Momčilović & Ninković, 2024). Studies in diverse contexts echo similar findings, where teachers' positive or negative perceptions of ICT integration are more strongly linked to confidence, competence, and access to infrastructure rather than demographic profiles (Peng et al., 2023; Ran et al., 2024). Furthermore, qualitative inquiries have revealed that barriers such as insufficient ICT skills and lack of training, rather than age or specialization, primarily affect attitudes toward ICT integration (Adu & Zondo, 2023).

Overall, while demographic variables do not significantly differentiate teachers' perceptions of ICT integration, focusing on enhancing digital competencies, self-efficacy, and addressing infrastructural or

skill-based barriers may be more impactful for promoting effective ICT adoption in teaching practices (Chen & Gao, 2025; Momčilović & Ninković, 2024).

Table 5. Differences in Teachers' Perception of the Effectiveness of ICT Integration According to Profile Variables

Profile Variable	Statistical Test	Test Statistic	p-value	Decision	Interpretation
Age	Kruskal–Wallis H-test	H = 1.810	.400	Fail to Reject H ₀	No significant difference
Sex	Independent Samples T-test	t = 0.600	.510	Fail to Reject H ₀	No significant difference
Years in Teaching	Kruskal–Wallis H-test	H = 8.710	.450	Fail to Reject H ₀	No significant difference
Field of Specialization	Kruskal–Wallis H-test	H = 8.710	.450	Fail to Reject H ₀	No significant difference

The analysis of teachers' perceptions of the effectiveness of ICT integration according to profile variables revealed no significant differences across age, sex, years of teaching, or field of specialization. Specifically, the Kruskal–Wallis H-test for age yielded H = 1.810 with a p-value of .400, indicating failure to reject the null hypothesis and no significant difference based on age. Similarly, the Independent Samples t-test for sex showed t = 0.600 with a p-value of .510, leading to the conclusion that perceptions do not significantly differ between male and female teachers. Years in teaching and field of specialization, both assessed via Kruskal–Wallis H-tests with test statistics H = 8.710 and p-values of .450, likewise demonstrated no significant differences in perceptions of ICT effectiveness.

These findings are corroborated by studies indicating that demographic factors, such as gender, age, and experience, may not significantly influence teachers' overall attitudes toward ICT integration, although some nuances exist. For instance, research in Henan Province, China, showed that females exhibited higher positive attitudes and digital competence but did not report significant effects on overall ICT integration effectiveness perception based on age or years of experience (Peng et al., 2023). Additionally, other studies highlight that readiness to adopt ICT depends more on factors such as digital literacy, self-efficacy, and attitudes rather than demographic variables alone (Chen & Gao, 2025; Momčilović & Ninković, 2024).

CONCLUSION

The findings revealed that teachers in the Aritao II District Elementary Schools had a strongly positive perception of ICT integration and generally agreed that ICT was effective in improving classroom instruction. Teachers expressed confidence in using technology and recognized its value in enhancing lesson preparation, instructional delivery and student engagement. Furthermore, no significant differences were found in teachers' perceptions and perceived effectiveness of ICT integration when grouped according to age, sex, years of teaching, and field of specialization. This suggests that positive

attitudes toward ICT are shared among teachers, regardless of their demographic and professional characteristics. Overall, the study highlights that ICT is widely accepted as an important instructional tool, although continued support is needed to maximize its effective use in teaching and learning.

RECOMMENDATIONS

School administrators should continue strengthening ICT integration by providing adequate technological resources, reliable internet connectivity, and updated ICT facilities. Regular training, workshops, and technical support should be offered to further enhance teachers' digital competencies and confidence in using educational technologies. Teachers are encouraged to continuously improve their ICT skills and integrate technology into learner-centred instructional practices to enhance student engagement and learning outcomes. The Department of Education may also strengthen policies and programs that promote equitable access to ICT resources across schools. Finally, future researchers may conduct similar studies in other districts or educational levels and examine additional factors such as digital competence, self-efficacy, school leadership, and technology readiness that may influence the successful integration of ICT in classroom instruction.

LIMITATIONS OF THE STUDY

This study was limited to the teaching staff of the Aritao II District Elementary Schools during the conduct of the research. It focused only on teachers' perceptions toward ICT integration, the perceived effectiveness of ICT in classroom instruction, and selected profile variables such as age, sex, years in teaching, and field of specialization. The findings were based on self-reported responses, which may have been influenced by the respondents' personal experiences and perceptions. Moreover, other factors that may affect ICT integration, such as digital competence, Internet connectivity, school leadership, and availability of technological resources, were not included in the study.

FUTURE RESEARCH DIRECTIONS

Future studies should include teachers from other school districts, divisions, or educational levels to improve the generalizability of the findings. Researchers are encouraged to investigate additional variables, such as digital literacy, ICT self-efficacy, technology readiness, school support, and student learning outcomes, to gain a broader understanding of ICT integration in education. Mixed-methods or longitudinal studies may also be conducted to provide deeper insights into teachers' experiences, challenges, and the long-term impact of ICT on teaching and learning.

ETHICS STATEMENT

Permission to conduct the study was obtained from the appropriate educational authorities and school administrators prior to the data collection. Informed consent was obtained from all participating teachers after the purpose, procedures, and significance of the study were explained to them. Participation was voluntary, and the respondents were assured that their identities and responses would remain confidential and anonymous. All information collected was used solely for academic and research purposes, and the study was conducted in accordance with the ethical principles governing research involving human participants.

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AI DISCLOSURE STATEMENT

During the preparation of this work, the author(s) used **Gemini AI** to assist with grammar and language refinement, improve sentence structure, enhance academic writing, organize ideas, and polish the manuscript. After using this tool, the author carefully reviewed, edited, and verified all AI-generated

content and took full responsibility for the accuracy, originality, integrity, and content of the published work.

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