

# Exploring the Primary School Teachers' Attitude towards Information and Communication Technology (ICT) as an Instructional Method in Mathematics Teaching in Anambra State.

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## ABSTRACT

This study investigated the attitude of Primary School teachers towards Information and Communication Technology (ICT) as an instructional method in Anambra State. It has been stated by several authors and scholars that the development of any nation depends very much on their knowledge of Mathematics. Mathematics has been so useful right from the origin of man. Mathematics is a vital subject in our lives, its application can be found in any field or profession. Unfortunately the performance of the pupils in mathematics has been consistently poor in primary school, which is the foundation of all levelsof education. This could be as a result of poor teaching method, one teaching cannot be used for all subjects especially mathematics. There is a need to explore other methods of teaching mathematics in primary school such as ICT. ICT has been identified worldwide as a way out, if the teachers are ready to use it. The attitude of primary school teachers has been seen as prerequisite to find out their readiness to use ICT in mathematics classroom. Three research question and two hypotheses guided the study. The descriptive survey research was adopted. A total of 130 public primary school teachers were randomly selected from the population of 1362 primary school teachers involved in the study. The instrument for data collection was Computer Attitude Scale (CAS). The CAS was validated by experts and the reliabilities established to be 0.87. The data collected were analyzed using SPSS package program to obtain mean, standard deviation and independent z-test. The result from the findings shows that, the primary school teachers' attitude is generally positive; there is no significant difference in the attitude of male and female primary school teachers; no significant difference in the attitude of urban and rural science teachers. Based on this findings recommendations were made.

**Keywords:** Information and Communication Technology (ICT), Primary School Teacher and Attitude

## INTRODUCTION

An existence without the knowledge of mathematics would have been impossible because mathematics is a crucial subject for the aspiration of scientific and technological development. Hardly can a nation of the

world developed technologically without putting mathematics in an appropriate position. Most advancement in science and technology owe their origin to mathematics, which is often referred to as the language of science and technology (Alata, 2017) Mathematics is a vital subject in our lives, its application can be found in any field or profession. Yadav (2019) while pointing out that mathematics is at the centre of human life insisted that without mathematics no one can even count the number of his/her family members. This statement underscores the important of mathematics in human life.

Despite the highly decorated and recognized importance of Mathematics and the fact that it is the prerequisite for most of the subjects, poor achievement and lack of interest in Mathematics Science and Technology,

Engineering and Mathematics (STEM) among students remains an issue of concern in schools; Primary, Colleges, and Universities in developed and developing countries alike (Naiker et al, 2020). Mathematics continues to be one of the most challenging subjects in schools as perceived by students (Akhter & Akhter, 2018) There is a general impression that mathematics is a complicated subject as such, mathematics students of the 21st century enter mathematics classrooms with a serious lack of fluency and reliability in numerical and algebraic manipulation and simplification, problem-solving, and negative attitude (Yeh et al, 2019). This can be attributed to some factors such as the teachers' attitude about teaching mathematics, lack of practice in solving mathematical problem, gender issue, poor method of teaching mathematics in primary schools.

Education at primary school level is the foundation towards higher learning. It is an instrument that can be used to achieve a more rapid economic, social, political, technological, scientific and cultural development in the country. Primary education is the key to the success or failure of the entire education system because primary education is the first level or the foundation upon which all other levels of education are built (Etor et al, 2013). Therefore, if the goals of primary education could be effectively pursued and realized, then every product of the school system will be a good citizen. This therefore, brings us to the need to exploring the potentials of information and communication technology in teaching and learning of mathematics in primary schools for a better outcome. Information and communication technologies (ICT) are influencing every discipline under the sun including education. It is affecting every aspect of education from teaching-learning to assessment and evaluation. It improves the effectiveness of education. It aids literacy movement, it enhances scope of education by facilitating mobile learning and inclusive education and it also facilitates research and scholarly communication (Tikam, 2013)

The impact of ICT and its potential on the field of education is of manifolds. It positively affects every areain the field of education. ICT plays a paramount role in sectors like education, where it facilitates knowledge acquisition, sharing, and utilization, ultimately improving the quality of education and accessibility in primary (Gizaw & Tessema, 2020). Additionally, the integration of ICT in education is crucial for students to enhance their learning strategies and meet the demands of the global technological world (Dibaba, 2017). Information and Communication Technology is a generic term that includes technologies that are used for collecting, storing, editing, processing, creating, and transmitting information from one source to another in various forms. ICT changes classroom teaching through its potential as a source of knowledge, a medium to transfer content, and a means of interaction based and process oriented. This brings creativity, critical thinking, logical thinking, problem-solving, cooperative, and self-confidence in learners (Gangadharan & Thangavel, 2023). These skills are developed through the application and integration of ICT and its modern method in the classroom. Akudolu and Olibie (2007, p.33) have it that:

ICT is concernedwith the knowledge, skills, method and systems for locating facts... as well as for modifying communication strategies. In this regard, ICT is a method, a resource, a subject and a key skill. ICT as a tool covers different forms of computer-based technologies and application such as internet... and

electronic white boards, etcetera. ICT is an instructional method when it is used for performing instructional activities more efficiently. It is a resource when it serves as a support in curriculum implementation. ICT as an instructional method or instructional resource is often referred to as ICT in education.

The integration of Information and Communication Technologies (ICT) in education has brought about significant transformations in teaching and learning. ICT as an instructional tool has shown positive effects on student learning outcomes. Studies have indicated that utilizing ICT tools in teaching enhances scholarly performance, improves reasoning skills, and positively impacts students' academic achievements in subjects like physics and mathematics. Furthermore, the use of ICT in education creates learner-centered environments, offering convenience for both teachers and students, especially in combined classrooms. Research emphasizes that effective ICT integration requires well-prepared teachers and adequate resources to maximize its benefits, highlighting the importance of continuous support for teaching, learning, and information resources through ICT tools. Generally, evidences suggests that integrating ICT as an instructional strategy can significantly contribute to enhancing student learning outcomes across various subjects and educational settings (Ali et al, 2023; Sanfo, 2023). Furthermore, the use of ICT in education creates learner-centered environments, offering convenience for both teachers and students.

The integration of Information and Communication Technology (ICT) in primary school education encompass various aspects. Teachers' confidence and training in STEM and technology subjects, along with the need for clear curricula frameworks, are crucial factors for successful technology integration. Additionally, the availability of ICT resources and the relationship between teachers' profiles and their assessment of ICT implementation play a significant role in the effective use of technology in teaching and learning of all subjects especially mathematics. The integration of Information and Communication Technologies (ICT) as an instructional tool has shown positive effects on student learning outcomes. Studies have indicated that utilizing ICT tools in teaching enhances students' academic performance and reasoning skills. Different forms of ICT use, both inside and outside of school, have been associated with improved learning achievements, especially in subject-related activities. Additionally, the successful integration of ICT in education has been highlighted during challenging times like the Covid-19 pandemic, emphasizing the importance of ICT infrastructure and resources for effective teaching and learning processes. Furthermore, the use of technology in combined classrooms has been found to be beneficial in developing students' mathematical skills, providing valuable insights for educational stakeholders to enhance teaching practices (Wambui et al, 2022).

Research emphasizes that effective ICT integration requires well-prepared teachers and adequate resources to maximize its benefits, highlighting the importance of continuous support for teaching, learning, and information resources through ICT tools. Overall evidences suggests that integrating ICT as an instructional tool can significantly contribute to enhancing student learning outcomes across various subjects and educational settings overtly, (Orhani & Saramati, 2023). One of the major factors that can determine the effective implementation of ICT in mathematics classroom as an instructional method is the teachers' attitude towards ICT. Attitude plays a significant role in shaping individuals responses and behaviors towards various entities. Muhammad and Nurhayani (2023) defined attitude as mental tendencies to evaluate objects, subjects, events, or actions with favor or disfavor, attitudes are influenced by a multitude of factors, including biological and cultural aspects. This predisposition, formed early in life, can be explicit or implicit, impacting reactions and behaviors. It involves a predisposition or tendency to respond positively or negatively towards ideas, objects, persons, or situations, shaped by experiences and impacting behaviour. They play a crucial role in predicting and influencing behavior, especially when deeply ingrained and aligned with core values or social allegiances. (Ishrat et al 2020). Attitudes are organized patterns of thoughts, feelings, and reactions towards people, groups, or events, influencing interactions and relationships. In essence, attitudes are fundamental in shaping individual experiences and societal norms, reflecting cultural values and impacting various aspects of life.

Despite the challenge of measuring subconscious attitudes, their alignment with core values or social allegiances can predict and influence behaviour. Attitude have a considerable effect on openness to new experiences, as well as on reflecting implementing change. Teachers' attitudes towards the use of Information and Communication Technology (ICT) as an instructional tool in the education sector have been predominantly positive (Qeġa, 2023). Studies have shown that teachers exhibit a favorable outlook on integrating ICT into teaching practices, regardless of gender or computer experience (Gangadharan & Thangavel, 2023). Putra et al (2022) also found out elementary teachers has positive attitudes towards technology-based mathematics assessment, indicating a willingness to embrace technology in teaching and learning Positive attitudes among teachers have been linked to a higher likelihood of implementing ICT in their instructional methods, emphasizing the significant influence of teachers' attitudes on ICT integration (Bariu & Chun, 2022). The importance of supporting teachers through adequate infrastructure, training, and motivation has been highlighted to enhance their knowledge and skills, ultimately shaping their attitudes towards ICT use in education. Overall fostering of positive attitudes among teachers towards ICT is very important for successful implementation of ICT in mathematics classroom.

Gender disparities could affect the attitude of teachers towards ICT. Gender is an ascribed attribute that socially differentiate feminine from masculine. It connotes male and female or boys or girls in a given group of students (Eze et al, 2020). some studies indicated that male teachers generally exhibit a more positive attitude towards ICT integration in classrooms compared to their female counterpart (Chen & Wa Sit, 2023) This finding aligns with the broader trend that male educators tend to have a higher and more favorable perception of incorporating technology into teaching practices. Islahi and Nasrin (2019) found out that gender does not affect teachers' attitude towards ICT integration in the classroom that both male and female teachers acknowledge the importance of technology in enhancing instructional practices and making learning more engaging and interactive. Guillén-Gómez (2020) indicated that male teachers exhibits higher positive attitude towards ICT integration in classrooms compared to female teachers. Location of schools could also affects teachers' attitude towards ICT as an instructional tool. Josiah (2012) indicated that schools in urban areas characterized by electricity, water supply, more teachers, more learning facilities, and infrastructure have good academic achievement over the rural schools.

Teachers' attitude, whether positive or negative affects how they respond to the use of ICT in mathematics classroom as an instructional method. Therefore, information is required about teachers' attitude toward integration of ICT into Mathematics teaching as an instructional tool because the research on attitude of teachers towards ICT as an Instructional method is inclusive. It based on this background, that the researcher wish to explore the primary school teachers' attitude towards information and communication technology as an instructional tool in mathematics.

## STATEMENT OF THE PROBLEM

Despite the importance of Mathematics to the development of the nation, the performance of the pupils in mathematics teaching has remained consistently poor over the years. Poor achievement, poor retention and lack of interest in mathematics has been a great issue of concern at primary level of education in Nigeria, traced to poor foundation of mathematics at primary school level. Hardly would a child go for external examination and score above average in mathematics. Evidence from of Examination Development Centre shows that in 2020/2021 session out of 80,113 that sat for the First School Leaving examination, the result showed that 42,300 scored below 50%; 36,932 pupils scored between 50% and 69% and 871 pupils scored 70% and above. In 2021/2022 out of 86,307 that sat for the FSL exam, the result showed that 40,753 scored below 50%; 38,825 pupils scored between 50% and 66% ; then 798 pupils scored 67% and above. In 2022/2023 session out of 89,126 pupils that sat for FSL exam, 61,519 scored below 50%; 24503 pupils scored between 50% and 69%; and 3104 pupils scored 70% and above. This could be as a result of poor

method of teaching mathematics.

As a result of these, making progress in teaching and learning of science and technology has therefore become a far cry from what it should be. It has been identified that, for effective and efficient teaching of mathematics, learner centered methods that requires teachers to actively involve students in the teaching and learning process must be applied. ICT has been recognized to be a very powerful tool in education reform in the sense that it takes into cognizance the learner. This reform can only take place if the teachers who are the implementers of this innovation are ready to use it. Therefore, the problem of this study is, are the primary school teachers ready to use this tool? Attitude of primary school teachers have been seen as a prerequisite to determine their readiness to adopt and integrate ICT into teaching and learning of mathematics. Therefore, this study set out to investigate the Primary School Teachers' Attitude towards ICT as an Instructional Tool in mathematics teaching in Anambra state.

### **Purpose of the Study**

The purpose of the study is to assess the attitude of Primary school teacher towards the use of ICT as an Instructional tool in mathematics teaching. Specifically, the study aim is to determine:

1. The primary school teachers' attitude towards ICT as an instructional method in mathematics teaching
2. Gender differences in the attitude of primary school teachers toward ICT as an instructional method in mathematics teaching
3. Differences in attitude of science teachers towards ICT as an instructional method in relation to school location.

### **Research Questions**

The following research questions guide the study;

1. What is the primary school teachers' attitude towards ICT as an instructional method in mathematics classroom
2. What is the difference between attitude of male and female primary school teachers towards the use of ICT as an Instructional method.
3. What is the difference between attitude of urban and rural primary school teachers towards the use of ICT as an instructional method.

### **Research Hypotheses**

The following hypotheses were formulated to guide the study and was tested at 0.5 level of significance:

HO<sub>1</sub>: There is no significant difference in attitude of male and female primary school teachers towards the use of ICT as an instructional method.

HO<sub>2</sub>: There is no significant difference in attitude of urban and rural primary school teachers towards the use of ICT as an instructional method.

## **METHOD**

Descriptive survey design was adopted in carrying out the study. The study was carried out in Awka Education Zone of Anambra State. The population of the study consisted one thousand three hundred and sixty two (1362) primary school teacher in Awka Education Zone. Using simple random sampling balloting with replacement were used to select 130 public primary school teachers from Awka Education Zone of



Anambra State.

The instruments for data collection is Computer Attitude Scale (CAS). The CAS was a five-point Likert type of scale in which the Science teachers indicated their degree of agreement and disagreement on the statement about ICT. For the scale, strongly agree, agree, undecided, disagree and strongly disagree have the scores 5, 4, 3, 2, 1 for positive response items and 1, 2, 3, 4, 5 for negative response by the teachers. The instrument was validated by four (two each) expert in the field of educational research, and computer education. Item accepted by them were used in the final production of the questionnaire. Kuder Richardson formular 21(KR-21) was used to determine the internal consistency of CAS which was found to be 0.87

## RESULT AND DISCUSSION

The results of the study are presented on the tables one to five

Table 1: Mean Score and Standard Deviation of Primary School Teachers' attitude towards ICT as an instructional tool in Mathematics Classroom.

Subject	N	X	SD	Decision
CAS	130	3.21	1.44	Positive

From the Table 1, the mean score shows that teachers' attitude towards ICT is positive because the mean score of science teachers' attitude is 3.21 which is above 3.0. The finding revealed that the attitudes of primary school teachers are general positive towards ICT. This finding agreed with Qeła, (2023) who said that teachers' attitudes towards the use of Information and Communication Technology (ICT) as an instructional tool in the education sector have been predominantly positive. The finding also agrees with that of Putra et al (2022) also found out that elementary teachers have positive attitudes towards technology-based mathematics assessment. This implies that the primary school teachers are ready to use ICT in the mathematics classroom.

Table 2: Mean and Standard Deviation of male and female Primary School teachers' Attitude towards ICT as an Instructional tool in Mathematics Classroom.

Gender	N	X	SD	Mean Difference
Male	18	3.36	1.39	0.19
Female	112	3.17	1.61	

From the Table 2, both male and female primary school teacher have positive attitude towards ICT but the mean scores of the male primary school (3.36) is higher than that of the female primary school teachers (3.17) with the range of 0.19 and score of male primary school teacher spread less than that of female counterpart.

Table 3: Mean and Standard Deviation of male and female Primary School teachers' Attitude towards ICT as an Instructional tool in Mathematics Classroom.

Location	N	X	SD	Mean Difference
Urban	503	3.31	1.41	0.13
Rural	80	3.18	1.31	

From the Table 3, both urban and rural primary school teacher have positive attitude towards ICT but the mean scores of the urban primary school (3.36) is higher than that of the rural primary school teachers

(3.17) the range of 0.13 and score of urban primary school spread higher than that of rural counterpart

Table 4: The Z-test comparison between the mean score of the attitude of male and female primary school teachers towards ICT

Gender	N	X	SD	DF	Z-Cal	Z-Crit	P>0.5	Decision
Male	18	3.36	1.39	128	0.60	1.96	0.05	Accepted
Female	112	3.17	1.61					

From the Table 4, the calculated value of Z (0.60) is less than the critical value of Z (1.96), the null hypothesis is up-held. Thus, male primary school teachers do not differ significantly in their attitude towards ICT from their female counterparts. The findings concerns the gender variable, in the comparison in terms of attitude towards ICT, there exist no significant statistical differences between male and female primary school teachers. The study agreed with Islahi and Nasrin (2019) found out that gender does not affect teachers' attitude towards ICT integration in the classroom, that both male and female teachers acknowledge the importance of technology in enhancing instructional practices and making learning more engaging and interactive. It disagree with Chen & Wa Sit, (2023) who indicated that male teachers generally exhibit a more positive attitude towards ICT integration in classrooms compared to their female counterparts. It also disagreed with Guillén-Gámez (2020) who indicated that male teachers exhibit higher positive attitude towards ICT integration in classrooms compared to female teachers. This finding indicates that gender does not affect the teachers readiness to embrace ICT as Instructional method in mathematics teaching.

Table 5: The Z-test comparison between the mean score of the attitude of urban and rural science teachers towards ICT

Location	N	X	SD	DF	Z-Cal	Z-Crit	P>0.5	Decision
Urban	40	3.31	1.41	128	0.49	1.96	0.05	Accepted
Rural	90	3.18	1.32					

From the Table 5, the calculated value of Z (0.49) is less than the critical value of Z (1.96), the null hypothesis is up-held. Thus, urban primary school teachers do not differ significantly in their attitude towards ICT from their rural counterparts. The result from the finding revealed that there is significant different between the attitude of urban and rural science teachers towards information and communication technology. These indicate that location is not a barrier to attitude towards ICT.

## CONCLUSION

As revealed by the study results, positive attitude towards ICT, despite the positive attitudes, challenges such as inadequate training, slow internet speed, and lack of infrastructure hinder effective ICT integration for both male and female teachers. Therefore, it is difficult to say that they are good enough to use ICT. This implies that they cannot transfer these technologies to classroom use for education purposes; they are thus far from creating a student-centered learning environment, with ICT.

## EDUCATIONAL IMPLICATIONS OF THE STUDY

The result of the study have obvious implications on the students, teachers, curriculum planners and stakeholders in education. This study will be helpful to students because if teachers adopt ICT into mathematics classroom, learning will be more engaging and interactive for students, it will potentially increase their interest and motivation and their performance will improve. Identifying teachers' attitudes

towards ICT can help in designing targeted professional development programs to enhance the ICT skills and confidence of the teachers in using technology for mathematics instruction. Teachers with positive attitudes can be encouraged to adopt a more student-centered and interactive pedagogy using ICT, promoting active learning in mathematics classrooms. Exploring primary school teachers' attitudes towards ICT in mathematics teaching can provide valuable insights that inform curriculum development, professional development initiatives, school policies, and research agendas. By addressing the educational implications of teachers' attitudes towards ICT, stakeholders can work collaboratively to promote effective and equitable ICT integration in primary school mathematics education.

## RECOMMENDATION

The following recommendations were made among others that;

1. In educational system, the decision-makers and implementers should have enough knowledge on whether the investments for the integration of ICT into mathematics classroom will be directed according to teachers' knowledge, how are they using it in teaching-learning process, as well as their attitudes. As it is, educating teachers who will use this technology in the classroom to integrate them into the curricula will become a more important issue.
2. Policymakers are recommended to provide necessary tools and support to the teachers to successfully integrate ICT into teaching and learning processes
3. Primary schools should be well equipped with adequately functional and well-furnished computer laboratories with internet facilities for teachers and students use.

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