Evaluation of the Adoption and Implementation of Technology-Enhanced Mathematics Lessons in Basic Schools

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Abstract:- The study evaluated the adoption and implementation of technology-enhanced mathematics lessons in basic schools in the Ho West District of the Volta Region of Ghana. Grounded in the Technology Acceptance Model. The target population was all basic school teachers in Ho West District. The adopted research design was a descriptive survey research design with a quantitative approach. A stratified random sampling technique was employed and 450 basic school teachers were used as samples for the study. Data were collected using a close-ended questionnaire with a reliability coefficient of 0.77 was analyzed using frequencies, percentages, means, standard deviations, independent samples t-tests, and Pearson's moment correlation. The results revealed that a teacher recognizes instructional technology as useful for their mathematics instruction. Hence, challenges from teachers, least access to instructional technology tools, training, time for lesson preparation, technical issues, and resistance from their students and colleagues were identified. The study recommends that regular assessments are made on the teachers' perceptions to tailor professional development needs. Additionally, teachers should be supported by their head teachers to tackle issues specific to individual teachers.

Keywords:- *Evaluation, Adoption, Technology-enhanced, Mathematics lessons, Perception, Attitudes.*

I. INTRODUCTION

Since technology and progress are two important elements of modernization, the dramatic advancement of information and communication technologies (ICT) over the last few decades has rapidly brought profound changes at most levels of society. The digital revolution has not only changed the way citizens consume information but also left its mark on progress and developments in education. In more advanced countries like the United States of America and others, integrating instructional technology into instruction has become an inseparable element of their education system as it facilitates and promotes the efficient and effective delivery of quality instruction to the populace (Galvin, 2017; Hinostroza, 2018; Mathews, 2017). The development of ICT has led to the reformulation of the educational curriculum at different stages of schooling to remove the existing pedagogical gap in many countries' curricular systems (Hakkarainen et al., 2010). The education system has made use of what happens in society through an ever-increasing and overwhelming trend for ICT elements in the classroom to bring about changes in teaching and learning in line with the information-rich society in which our students would inherit (Hakkarainen, Niemi, & Palonen, 2010). Among various educational changes that have ensued from the use of ICT are attempting to replace the traditional teacher-centered approach to education with a learner-centered approach based on active learner participation as it echoes a modern and complete constructivist approach to pedagogy by providing the students with greater control and autonomy over what they learn.

Several studies extol the manifold advantages of integrating instructional technology into teaching and learning across various subject areas, including the humanities, social sciences, pure mathematics, and languages (Akpabio & Ogiriki, 2017). Motivating, the infusion of technological tools into education has been empirically demonstrated to enhance student performance (Afolayan & Oyekunle, 2016; Obinwa, 2015; Natia & Al-hassan, 2015). Within Ghana's educational landscape, there has been a concerted effort to incorporate instructional technology into curricula, spanning from elementary schools to tertiary institutions. However, the comprehensive extent of ICT resource accessibility and utilization in Ghana remains a subject of ongoing inquiry (Acquah-Doughan, 2015; Natia & Al-hassan, 2015). Regrettably, the existing studies have not delved into subject-specific investigations, instead opting for generalized assessments spanning all academic disciplines. While many basic schools in Ghana have introduced computerized systems, the seamless integration of computing technology into regular classroom instruction remains a challenge (Alesina, 2010). It is imperative that developing nations not only furnish classrooms with computers but also cultivate a culture of technological acceptance among educators. In this

digital age, the acquisition of adaptable instructional technological skills by students has been underscored as an essential prerequisite for future employment opportunities. As a critical reference point for understanding the dynamics of technology adoption and utilization in mathematics education, bridging gaps in existing literature and providing insights into the broader implications of technology integration in teaching and learning. The researchers recognized the urgent need to evaluate basic school teachers' adoption and implementation of technology-enhanced mathematics lessons in basic schools in the Ho West District.

➢ *Problem Statement*

The incorporation of Information and Communication Technology (ICT) in teaching and learning has the potential to transform pedagogy and advance 21st-century teaching methods, particularly in subjects like Mathematics. According to Natia and Al-Hassan (2015), educational technology plays a crucial role in improving the productivity of students and teachers, leading to better learning outcomes. In the Ho West District of Ghana, where mathematics education is of utmost importance, quality teaching and learning is dependent on the effective use of technology by basic school teachers. Conversely, implementing instructional technology in educational institutions in developing countries faces numerous challenges. A study by Acquah–Doughan (2015) revealed a significant gap between policy directives and implementation, despite national guidelines mandating the inclusion of ICT in instructional delivery. There is a growing recognition of the potential benefits of ICT in instruction, such as improved student engagement and learning outcomes (Singh and Tiwari 2021; Unwin 2017). Yet, there is a lack of research on teachers' perceptions and implementation of ICT resources in basic school teaching and learning. Empirical studies on the day-to-day application of ICT by basic school mathematics teachers, as well as its actual benefits in mathematics education, are scarce in the Ho West District of Ghana. Moreover, there is a dearth of research on the positive impact of instructional technology in basic school mathematics instruction, especially on student learning outcomes in this district. Existing studies on technology integration in education often focus on a national scale, leaving a geographical research gap in Ghana, particularly at the district level, such as in the Ho West District. Additionally, mathematics education may require specific support in technology implementation compared to other subject areas. Therefore, there are further research gaps on the specific needs and challenges of basic school Mathematics teachers in using instructional technology resource materials in their lessons. Although studies on the use of instructional technology resources for teaching and learning Mathematics exist for secondary and tertiary education, there remains a substantial research gap in basic schools. Addressing the challenges faced by basic school mathematics teachers in their attitudes and utilization of instructional technology resources in Mathematics lessons has received limited research attention

compared to technology in education research in various contexts. Previous research methods have not fully captured the daily practices among basic school mathematics teachers in the use of instructional technology tools, creating a critical research gap. Moreover, there is a lack of empirical evidence on the experimentation with instructional technology tools by Mathematics teachers in the district. These research gaps have left subsequent empirical works incomplete and insufficient to inform policy-makers, school administrators, and teacher education programs, hence the study sought to evaluate basic school teachers' adoption and implementation of technology-enhanced mathematics lessons in basic schools in the Ho West District of the Volta Region of Ghana.

➢ *Purpose of the Study*

The study sought to evaluate basic school teachers' adoption and implementation of technology-enhanced mathematics lessons in basic schools in the Ho West District of the Volta Region of Ghana.

➢ *Research Questions*

The study sought to answer the following research questions:
• What is the perception of basic school teachers regarding integrating instructional technology into mathematics lessons in the Ho West District?
• What factors influence teachers' use of instructional technology in mathematics lessons in the Ho West District?
• What challenges do Basic school teachers in the Ho West District encounter integrating instructional technology into mathematics lessons?

➢ *Hypotheses*

The following hypotheses were tested:

H_{01}: There is no significant difference between male and female basic school teachers' perceptions regarding the utilization of instructional technology resources in mathematics lessons.

H_{02}: Challenges faced by Basic school teachers have no significant relationship with the perception teachers hold regarding incorporating instructional technology into mathematics lessons.

➢ *Study Significance*

The study has the potential to contribute valuable insights into the adoption and implementation of technology-enhanced mathematics lessons by basic school teachers in the Ho West District of the Volta Region of Ghana. By exploring the perceptions of teachers regarding the integration of instructional technology, identifying the factors that influence their use of technology in mathematics lessons, and uncovering the challenges they face in this process, this study addresses critical gaps in the existing literature. Also, understanding basic school teachers' attitudes on integrating

technology into mathematics instruction is crucial for enhancing teaching practices and improving student learning outcomes. By examining the factors that shape teachers' decisions to use instructional technology, this study can provide evidence-based recommendations for professional development programs and policy interventions aimed at promoting effective technology integration in the educational context. Moreover, by highlighting the challenges faced by basic school teachers in the Ho West District when incorporating technology into mathematics lessons, this study would inform strategies to address these barriers and create a conducive environment for successful implementation. Ultimately, the findings of this study have the potential to inform educational stakeholders, policymakers, and educators on how to enhance the use of technology in mathematics teaching, thereby contributing to the advancement of educational practices and student achievement in the region.

II. THEORETICAL FRAMEWORK

The Technology Acceptance Model (TAM) was initially developed by Fred Davis in 1985 (Chuttur, 2009) to identify the determinants of computer acceptance and observe behaviors related to technology usage (Ugwu & Oboegbulem, 2011). TAM demonstrates that the motivation of technology users can be calculated by three factors: perceived ease of use, perceived usefulness, and attitude toward using the system (Chuttur, 2009). This framework specifies the relationship between these essential factors that determine the relationship between individuals and technology systems. The first research objective involves assessing the perception of Basic school teachers regarding integrating ICT into mathematics lessons, aligning with the TAM's core construct, which is the user's perception and attitude toward technology. According to TAM, perceived ease of use (PEOU) and perceived usefulness (PU) significantly impact a user's intention to use technology. In the context of this study, teachers' perceptions of how easy it is to integrate ICT into mathematics teaching and how useful they believe it is will influence their willingness to do so. The second research objective focuses on identifying factors that influence teachers' use of ICT in mathematics lessons. TAM incorporates external factors that may affect the user's intention to use technology, including training, technical support, access to resources, and time constraints. TAM suggests that if these factors positively affect perceived ease of use and usefulness, they can lead to greater technology adoption. The third research objective is to find out the challenges that Basic school teachers face in incorporating ICT in mathematics lessons. TAM indirectly acknowledges that perceived ease of use (PEOU) can be influenced by challenges such as technical issues and resistance. Understanding these challenges can provide insights into why teachers may have negative perceptions or low intentions to use ICT. Applying the Technology Acceptance Model (TAM) to this study can provide a structured framework to investigate Basic school teachers'

perceptions and use of ICT resources in mathematics lessons in the Gomoa Central District. It can help uncover the underlying factors affecting technology adoption and its impact on students' learning outcomes while addressing the challenges teachers encounter in integrating ICT.

III. METHODOLOGY

The researchers opted to use a descriptive research design for this study because of its capacity to gather valuable insights from a large and diverse participant pool (Creswell & Plano-Clark, 2018). This design proved to be especially advantageous in obtaining comprehensive and accurate feedback from elementary school teachers regarding their attitudes and usage of ICT (Information and Communications Technology) resources in mathematics instruction. Furthermore, the descriptive design allowed the use of a questionnaire to collect information from the participants, enabling the researchers to make general conclusions about the perceptions and usage of ICT resources in mathematics lessons among elementary school teachers (Cohen et al., 2017). The study included a sample size of 450 public basic school teachers, selected using the stratified random sampling technique. This sample consisted of 400 primary school teachers and 50 Junior High School teachers from all educational circuits in the Ho West District, aiming to represent the diversity within the basic school teaching population. The decision to include both primary and Junior High School teachers acknowledged the unique roles and experiences associated with each group, providing a comprehensive perspective on the perceptions and use of ICT resources in mathematics lessons. To determine the appropriate sample size, the researchers utilized the Krecjie and Morgan table of sample size determination, ensuring a statistically sound sample size to enhance the study's ability to draw meaningful conclusions and generalize findings to the broader population of basic school teachers in the district. The study utilized questionnaires for data collection, which were developed by researchers based on existing literature. Closed-ended statements were employed for the questionnaire, with sections B to E containing Likert-type scale items ranging from Strongly Agree (SA) = 5, Agree (A) = 4, Neutral = 3, Disagree (D) = 2, and Strongly Disagree (SD) = 1. The Likert-type scale was chosen for its universal approach to data collection, making it easily understandable and allowing respondents to remain neutral if they so desired (Bryman, 2012). Validity in this study was ensured through face and content validity procedures, with the questionnaire being validated by an expert colleague. Content validity was also examined by the supervisor to ensure that the instrument accurately measured what it was intended to measure. Pre-testing of the questionnaire informed the researchers about the understanding of the respondents, allowing for modifications to be made. The reliability coefficient for the questionnaire was found to be 0.77, meeting the threshold for reliability as suggested by Cohen et al. (2017). The completed

questionnaires were meticulously numbered and input into the SPSS software, specifically IBM version 26. The analysis encompassed coding, organizing, describing, interpreting, cross-tabulating, and drawing conclusions. The data was synthesized and transformed into tabular form to showcase relative proportions where applicable. An item-by-item analysis of the data was carried out, with all questionnaire items being carefully coded. Items in the form of a five-point Likert scale were rated on a scale of 1 to 5, with 5 representing the highest rating and 1 the lowest. The analysis focused on descriptive statistics such as frequencies, percentages, means, and standard deviations for the research questions, as well as inferential statistics (including independent samples t-test and Pearson's moment correlation) for hypothesis testing.

IV. RESULTS AND DISCUSSIONS

The primary data analysis involves four critical research questions, each focusing on different aspects of how Basic school teachers perceive and utilize ICT resources in mathematics lessons in the Ho West District. The analysis of the research questions utilized means and standard deviations, along with independent samples t-tests and Pearson's correlation to test the hypotheses.

➢ **Research Question 1:** *What is the perception of Basic school teachers regarding integrating ICT into mathematics lessons in the Ho West District?*

Research Question 1 explored the perceptions of basic school teachers in the Ho West District regarding the integration of Information and Communication Technology (ICT) into their mathematics lessons. This inquiry delves into the attitudes, beliefs, and viewpoints of educators in the district concerning the incorporation of digital tools and resources in the teaching and learning of mathematics. The result is presented in Table 1.

Table 1: Perception of ICT Use in Mathematics Lessons

Sr. No.	Statement	Mean	SD
1.	The use of ICT tools is an integral part of my mathematics teaching.	3.09	1.01
2.	ICT resources enhance my ability to teach mathematics effectively.	2.97	1.01
3.	ICT integration enhances students' understanding of mathematical concepts.	2.84	0.67
4.	The use of ICT in mathematics lessons makes learning more engaging for students.	2.74	0.77
5.	Integrating ICT into mathematics lessons helps students develop problem-solving skills.	2.83	0.81
6.	I am confident in my ability to effectively use ICT resources for teaching mathematics.	3.19	0.78
7.	I am satisfied with the quality of training I have received	3.49	1.12
8.	I receive adequate technical support or assistance when using ICT resources in mathematics teaching.	3.89	1.33
9.	The level of support and resources provided by my school or district for ICT integration in mathematics lessons is sufficient.	4.37	1.45
10.	I anticipate that ICT integration in mathematics teaching will become even more essential.	2.78	0.67

Source: Field Survey, 2024

Table 1 presents the perceptions of Basic school teachers in the Ho West District regarding the use of Information and Communication Technology (ICT) in mathematics lessons, providing mean and standard deviation values for each statement. The analysis offers insights into teachers' attitudes and experiences with ICT integration. Statements 1, 2, and 3 suggest a moderate perception towards ICT tools being integral to mathematics teaching (Mean = 3.09, SD = 1.01), enhancing teaching effectiveness (Mean = 2.97, SD = 1.01), and improving students' understanding of mathematical concepts through ICT integration (Mean = 2.84, SD = 0.67). However, statements 4 and 5 indicate a lower perception of the use of ICT in making mathematics lessons more engaging (Mean = 2.74, SD = 0.77) and helping students develop problem-solving skills (Mean = 2.83, SD = 0.81). Statement 6 reflects teachers' confidence in their ability to use ICT resources effectively (Mean = 3.19, SD = 0.78). Statements 7, 8, and 9 point towards teachers' satisfaction with the quality of training received (Mean = 3.49, SD = 1.12), the adequacy of technical support (Mean = 3.89, SD = 1.33), and the sufficiency of support and resources from schools or districts

for ICT integration (Mean = 4.37, SD = 1.45). Statement 10 indicates a moderate anticipation of the increasing importance of ICT integration in mathematics teaching (Mean = 2.78, SD = 0.67). The results suggest a mixed perception, highlighting areas of confidence and satisfaction alongside aspects that may require further attention and improvement. The finding corroborates with the assertion of Chen and Lin (2019) that teachers viewed ICT as a valuable tool that enhances instructional quality and engages students in the learning process. Similarly, Galvin (2017) reported that teachers perceived ICT as a facilitator of effective teaching and a means to improve students' understanding of subject matter. The consistency in findings across studies reinforces the notion that teachers generally recognize the potential benefits of incorporating ICT in mathematics education. This finding is also in harmony with the results of a study by Brown and Williams (2020), which indicated a moderate level of agreement among teachers regarding the usefulness of ICT in education.

➤ **Research Question 2**: *What factors influence teachers' use of ICT in mathematics lessons in the Ho West District?*

The exploration of Research Question 2 delved into the factors that exert influence on teachers' utilization of Information and Communication Technology (ICT) in mathematics lessons within the Ho West District. The investigation aims to unravel the multifaceted elements that shape teachers' decisions and behaviors concerning the integration of ICT tools in their instructional practices. Table 2 presents the results.

Table 2: Factors Influencing the Use of ICT in Mathematics Lessons

Sr. No.	Statement	Mean	SD
1.	Lack of access to ICT tools is a significant barrier to using ICT in mathematics lessons.	2.64	0.98
2.	Insufficient training and support hinder the effective integration of ICT into mathematics lessons.	2.62	0.84
3.	Limited time for lesson planning and integration affects the frequency of ICT use in mathematics lessons.	3.15	1.10
4.	Technical issues or equipment problems pose challenges to using ICT in mathematics lessons.	2.78	0.89
5.	Resistance from students or colleagues discourages the integration of ICT into mathematics lessons.	3.72	1.36
6.	I have received formal training or professional development related to ICT integration in mathematics teaching.	4.04	1.34
7.	I have easy access to updated ICT equipment and software for mathematics lessons.	4.09	1.43
8.	The level of support and resources provided by my school or district for ICT integration in mathematics lessons is sufficient.	4.35	1.38

Source: Field Survey, 2024

The results in Table 2 reveal that insufficient access to ICT tools emerges as a significant barrier, with a mean score of 2.64 and a standard deviation of 0.98, emphasizing the pivotal role of accessibility in determining the successful integration of technology into mathematics lessons (Statement 1). Moreover, teachers underscore the hindrance posed by insufficient training and support (Mean = 2.62, SD = 0.84), suggesting that ongoing professional development is essential for effective ICT integration (Statement 2). Limited time for lesson planning is identified as a constraint affecting the frequency of ICT use, with a mean score of 3.15 and a standard deviation of 1.10, highlighting the need for time-efficient strategies in lesson preparation and integration (Statement 3). Technical issues or equipment problems are recognized as challenges, with a mean score of 2.78 and a standard deviation of 0.89, emphasizing the importance of reliable ICT infrastructure for successful integration (Statement 4). Resistance from students or colleagues is perceived as a significant discouraging factor (Mean = 3.72, SD = 1.36), signaling the importance of addressing resistance through effective communication and collaboration (Statement 5). On a positive note, teachers who receive formal training or professional development related to ICT integration are more likely to effectively incorporate ICT tools into their mathematics teaching (Mean = 4.04, SD = 1.34; Statement 6). Similarly, those with easy access to updated ICT equipment and software demonstrate a higher inclination toward using ICT in mathematics lessons (Mean = 4.09, SD = 1.43; Statement 7). The highest mean score is attributed to the perception that sufficient support and resources provided by schools or districts are crucial facilitators for ICT integration into mathematics lessons (Mean = 4.35, SD = 1.38; Statement 8). In essence, the findings, supported by mean and standard deviation values, underline the intricate interplay of various factors influencing teachers' decisions and behaviors in utilizing ICT in mathematics lessons. This result echoes the results of a study by Chen and Lin (2019), which identified access and training as critical determinants of teachers' technology adoption. Moreover, the acknowledgment of limited time for lesson planning and integration, technical issues, and resistance from students as factors influencing ICT use is consistent with the multifaceted challenges reported in previous studies (Ertmer et al., 2015; Tezci, 2011a). These findings are in line with the work of Davis and Shade (2019), who emphasized the importance of addressing time constraints, technical problems, and student resistance to enhance technology integration.

➤ **Research Question 3**: *What challenges do Basic school teachers in the Ho West District encounter in integrating ICT into mathematics lessons?*

Research Question 3 explored the challenges faced by Basic school teachers in the Ho West District when integrating ICT into their mathematics lessons. The investigation into these challenges is crucial for understanding the barriers that educators encounter in leveraging technology for teaching mathematics.

Table 3: Challenges of Using ICT Resources in Mathematics Lessons

Sr. No.	Statement	Mean	SD
1.	I have negative attitude towards ICT integration	3.98	1.17
2.	There is inadequate technical support	2.25	1.31
3.	There is inadequate ICT resources	1.83	1.12
4.	There is unreliable or no internet connectivity/ network	2.38	1.92
5.	I lack the competence and confident to use ICT resources	3.25	1.37
6.	Insufficient training and support	2.13	1.26
7.	Time constraints often make it challenging to incorporate ICT into my mathematics teaching.	2.27	1.22
8.	Resistance or reluctance from students hinders the introduction of ICT resources in my mathematics lessons.	3.00	1.38

Source: Field Survey, 2024

Table 3 presents the results of challenges faced by Basic school teachers in the Ho West District when integrating Information and Communication Technology (ICT) resources into mathematics lessons, presenting mean and standard deviation values for each statement. The analysis highlights specific areas of concern as follows: Statement 1 reveals a significant negative attitude towards ICT integration (Mean = 3.98, SD = 1.17), emphasizing the necessity of initiatives aimed at altering teachers' perceptions. Statements 2, 3, and 4 underscore challenges related to inadequate technical support (Mean = 2.25, SD = 1.31), insufficient ICT resources (Mean = 1.83, SD = 1.12), and unreliable internet connectivity (Mean = 2.38, SD = 1.92), signaling the importance of enhancing institutional support and technological infrastructure. Statement 5 indicates concerns about teachers' competence and confidence in using ICT resources (Mean = 3.25, SD = 1.37), pointing towards the need for targeted training programs. Statements 6, 7, and 8 address challenges related to insufficient training and support (Mean = 2.13, SD = 1.26), time constraints (Mean = 2.27, SD = 1.22), and the adequacy of support and resources from schools or districts (Mean = 3.00, SD = 1.38), suggesting the importance of comprehensive strategies for efficient integration. The findings from the Ho West District underscore the challenges perceived by basic school teachers regarding the integration of ICT in mathematics lessons. These challenges include negative attitudes towards ICT, concerns about technical support and resources, issues with internet connectivity, a lack of confidence and competence, insufficient training and support, time constraints, and resistance from students. This is consistent with previous research (Galvin, 2017; Hinostroza, 2018; Teo et al., 2009) emphasizing the pivotal role of robust technical infrastructure and support systems for successful ICT integration. The challenges related to confidence and training limitations underscore the importance of targeted professional development programs to address teachers' needs and enhance their competence in utilizing ICT (Davis, 2017). Additionally, time constraints were identified as a prevalent challenge, emphasizing the demanding nature of teachers' responsibilities and the necessity for flexible and time-efficient ICT integration strategies (Olufemi et al., 2013). These findings contribute valuable understanding of the existing knowledge on barriers to ICT adoption in educational contexts, informing potential interventions and support mechanisms for teachers.

➢ *Hypotheses*

Ho1: There is no significant difference between male and female basic school teachers' perceptions regarding the utilization of ICT resources in mathematics lessons.

This hypothesis posits that gender may influence how teachers perceive and utilize information and communication technology (ICT) tools in the context of mathematics education. The analysis sought to determine if there is a statistically significant difference in the perceptions of male and female Basic school teachers in the Ho West District regarding the integration of ICT resources into their math lessons. The results are outlined in Table 4.

Table 4: Gender and teachers' perception regarding the utilization of ICT resources in mathematics lessons

Gender	N	M	Sd	Df	T	Sig.
Male	261	21.9	6.2	448	0.545	0.587
Female	189	22.4	6.3			

Source: Fieldwork, 2024

The analysis of gender differences in teachers' perceptions regarding the utilization of ICT resources in mathematics lessons is presented in Table 4. The mean perception score for male teachers is 21.9 (SD = 6.2), while female teachers have a mean score of 22.4 (SD = 6.3). A t-test was conducted to examine whether there is a significant difference between the two groups. The t-value is 0.545 with 223 degrees of freedom, resulting in a p-value of 0.587. The results indicate that there is no statistically significant difference in the perception of ICT resource utilization between male and female teachers (t (448) = 0.545, p = 0.587). Both groups have similar mean scores, suggesting a

similar level of perception regarding the integration of ICT resources in mathematics lessons. Based on the findings, the null hypothesis one (Ho1) which states, "Ho1: There is no significant difference between male and female basic school teachers' perception regarding the utilization of ICT resources in mathematics lessons" was retained. The absence of a significant difference aligns with research suggesting that, in contemporary educational settings, gender may not be a determining factor in teachers' attitudes toward technology integration (Albirini, 2006; Ertmer, 2005). It underscores the inclusive nature of teachers' perceptions, emphasizing that considerations related to ICT utilization in mathematics education are not influenced by gender-specific perspectives. These results contribute to the broader discourse on equity and inclusivity in technology adoption within educational contexts.

Ho2: Challenges faced by basic school teachers have no significant relationship with the perception teachers hold regarding incorporating ICT into mathematics lessons.

To test this hypothesis, we utilized Pearson's correlation to assess the relationship between teachers' reported challenges and their perceptions of integrating ICT. The goal was to ascertain if variations in reported challenges are associated with variations in teachers' perceptions. The correlation analysis, presented in Table 5, was conducted to explore the relationship between teachers' perception of ICT integration in mathematics lessons and the challenges they encounter.

Table 5: Relationship Perception and Challenges in the Use of ICT in Mathematics Lessons

Variable	N	Mean	Sd	R	R^2	$Sig.$
Perception	450	22.2	6.4	-0.123	0.015	0.073
Challenges	450	21.1	5.6			

Source: Fieldwork, 2024

The results show a mean score and standard deviation of 22.2 (SD = 6.4) for perception and 21.1 (SD = 5.6) for challenges. The correlation coefficient (R) of -0.123 indicates a statistically significant negative relationship between teachers' perception and challenges encountered in incorporating ICT into mathematics lessons (p = 0.073, two-tailed). The coefficient of determination (R^2) is 0.015, suggesting that approximately 1.5% of the variation in perception can be attributed to the reported challenges. The correlation was not statistically significant at the 0.05 level (2-tailed), p = 0.073. Based on the findings (p > 0.05), the null hypothesis two (Ho2) which states, "Challenges faced by Basic school teachers have no significant relationship with the perception teachers hold regarding incorporating ICT into mathematics lessons" was retained. The findings corroborate theoretical perspectives such as the Technology Acceptance Model (TAM), which posits that individuals' perceptions of technology significantly influence their willingness to use it (Davis, 1989). In the context of this study, teachers who hold more positive perceptions regarding ICT integration may be more resilient in overcoming challenges or may perceive obstacles differently. While the correlation is statistically significant, the weak effect size indicates that various other factors beyond perceptions contribute to the challenges teachers experience in adopting ICT.

V. STUDY FINDINGS

The findings revealed that:
- Basic school teachers in the Ho West District hold positive views on integrating ICT into mathematics lessons, considering it to be a valuable tool that improves their effectiveness in teaching mathematics.

- The significant barriers influencing teachers' use of ICT in mathematics lessons include a lack of access to ICT tools, insufficient training, and limited time for lesson planning. Additionally, technical issues and resistance from students or colleagues pose further challenges. Teachers face challenges such as negative attitudes towards ICT, inadequate technical support, time constraints, and resistance from students.
- The perceptions of male and female teachers regarding ICT integration in mathematics lessons show no significant difference. Gender does not appear to be a significant factor influencing teachers' perceptions about the use of ICT resources in Mathematics lessons.
- A significant but weak negative correlation exists between teachers' perceptions and the challenges they face. As teachers' perceptions become more positive, reported challenges tend to decrease.

VI. CONCLUSION

In conclusion, the results of this study contribute significantly and valuably to the ongoing discussion about integrating technology into mathematics instruction. The practical insights it provides are pertinent for policy-makers, educational authorities, and teachers who aim to establish an environment where information and communication technology play a crucial and beneficial role in teaching and learning mathematics in basic schools. To effectively adapt to the constantly evolving landscape of educational technology, a collaborative and flexible approach is essential to bring about meaningful and lasting change.

RECOMMENDATIONS

Based on the findings and conclusions drawn, the following recommendations are made for consideration;

- It is important for basic school headteachers to implement gender-sensitive ICT training programs to address any disparities in perception between male and female teachers. Regular assessments of teachers' perceptions should also be conducted to identify evolving needs and tailor professional development accordingly.

- Basic school headteachers should provide targeted support and resources to address specific challenges identified by teachers. Establishing a feedback mechanism for teachers to express challenges and concerns will foster a collaborative problem-solving approach.

- Professional development programs should be tailored to address the specific challenges faced by teachers at different stages of their careers. Basic school headteachers should also establish mentorship programs where experienced teachers can guide on overcoming ICT integration challenges.

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