

Assessing Teachers' Competency and Attitude Toward the Use of Information, Communication and Technology in Teaching

James Nweah-Ackah Mochiah^{1*}, Joel Amponsah², Isaac Antwi Amponsah³

¹Lecturer, Department of Education, Holy Child College of Education

²Lecturer, Department of Art and Social Science, Holy Child College of Education

³Student, Department of Education and Psychology, University of Cape Coast

DOI: <https://doi.org/10.36348/jaep.2026.v10i06.003> | Received: 13.04.2026 | Accepted: 05.06.2026 | Published: 15.06.2026

*Corresponding author: James Nweah-Ackah Mochiah

Lecturer, Department of Education, Holy Child College of Education

Abstract

The study aimed to evaluate teachers' utilisation of Information and Communication Technology (ICT) in education. The study employed a descriptive design. The population consisted of 1,700 basic school teachers in the Sekondi-Takoradi Metropolitan Assembly of the Western Region in Ghana. A sample size of 313 teachers based on the Krejcie and Morgan Table, and the sampling was done through the use of stratified and simple random techniques. A questionnaire was used as the data collection instrument. The research questions were answered using means and standard deviations. The hypothesis was analysed with MANOVA. The study's findings showed that teachers generally possessed a high level of ICT competency, as indicated by the overall mean score ($M = 2.97$, $SD = 0.874$). The study revealed that teachers generally possessed a moderate positive attitude toward the use of ICT in teaching and learning ($M = 2.53$, $SD = .579$). Furthermore, the study revealed a statistically significant difference in teachers' ICT competency and attitudes based on their class of teaching. The study recommends that teacher education institutions should strengthen ICT-related courses in their training programmes to ensure that pre-service teachers acquire adequate technological pedagogical skills before entering the teaching profession.

Keywords: Integration, Technology, Attitude, Competency, Pedagogical.

Copyright © 2026 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

The integration of Information, Communication, and Technology (ICT) in education is a global priority in the 21st century. This is due to the rapid advancement of digital technologies and their transformative potential in teaching and learning. UNESCO (2011) recognises ICT as a powerful tool for improving access to quality education, promoting equity, and fostering lifelong learning. ICT in education is not limited to content delivery. It also develops critical thinking, creativity, and problem-solving skills among students (Voogt & Knezek, 2008).

In recent years, governments and educational institutions worldwide have invested heavily in ICT infrastructure, aiming to bridge the digital divide and prepare students for a technology-driven future. For instance, the European Union's Digital Education Action Plan (2021-2027) emphasises the importance of equipping educators with digital competencies to ensure

effective ICT integration in classrooms (European Commission, 2020). Similarly, in developing countries, initiatives such as Kenya's Digital Literacy Programme and India's National Education Policy 2020 highlight the growing emphasis on leveraging ICT to improve educational outcomes (Republic of Kenya, 2016; Ministry of Education, India, 2020). In Ghana, the new curriculum places more emphasis on ICT, leading to the adoption of "Digital Literacy" as one of the core competencies. Teachers are expected to use their teaching to build learners' digital knowledge.

Despite these efforts, the successful implementation of ICT in education largely depends on the readiness and competence of teachers to use these technologies effectively. Teachers are the primary agents of change in the classroom, and their ability to integrate ICT into their pedagogical practices plays a critical role in determining the impact of technology on student learning (Ertmer & Ottenbreit-Leftwich, 2010).

Citation: James Nweah-Ackah Mochiah, Joel Amponsah, Isaac Antwi Amponsah (2026). Assessing Teachers' Competency and Attitude Toward the Use of Information, Communication and Technology in Teaching. *J Adv Educ Philos*, 10(6): 389-397.

However, research indicates that many teachers face significant challenges in adopting ICT, including inadequate training, lack of technical support, and resistance to change (Bingimlas, 2009; Tondeur *et al.*, 2017). For example, a study by Buabeng-Andoh (2012) revealed that while teachers in Ghana recognised the potential of ICT to enhance teaching and learning, they lacked the necessary skills and confidence to integrate technology into their lessons. Similarly, in Nigeria, Okeke and Eze (2015) found that insufficient ICT infrastructure and limited professional development opportunities hindered teachers' effective use of technology in schools. These findings underscore the need for a comprehensive assessment of teachers' ICT competencies and their readiness to embrace technology in education.

In the context of this study, assessing teachers' use of ICT is crucial for identifying gaps in their knowledge and skills, as well as understanding the factors that influence their adoption of technology. By examining teachers' attitudes, competencies, and challenges, this study aims to provide valuable insights into how ICT can be effectively integrated into teaching and learning processes. Furthermore, the findings of this study will contribute to the development of targeted interventions and policies that support teachers in harnessing the full potential of ICT to improve educational outcomes.

Statement of the Problem

While ICT has the potential to revolutionise education, its effective integration into teaching and learning processes remains a challenge in many educational systems. Teachers are often at the forefront of this challenge, as their ability to use ICT tools directly impacts the quality of education delivered to students. Despite the increasing availability of ICT infrastructure in schools, many teachers lack the necessary skills, confidence, and training to utilise these technologies effectively. This discrepancy raises concerns about the extent to which ICT is being leveraged to enhance teaching and learning outcomes.

Furthermore, there is limited research on the assessment of teachers' ICT competencies and their readiness to integrate technology into their pedagogical practices. Without a clear understanding of teachers' strengths and areas for improvement, it becomes difficult to design targeted interventions that can enhance their ICT proficiency. This study, therefore, seeks to address this gap by assessing teachers' use of ICT in education, identifying the challenges they face, and proposing strategies to improve their integration of technology in the classroom.

Objectives of the Study

The primary objective of this study is to assess teachers' use of Information, Communication, and

Technology (ICT) in education. Specifically, the study aims to:

1. Evaluate the level of ICT competency among teachers in selected educational institutions.
2. Examine the attitudes of teachers toward the use of ICT in teaching and learning.
3. Identify the challenges teachers face in integrating ICT into their pedagogical practices.
4. Examine the significant difference in teachers' competency and attitude toward ICT with regard to their teaching classes.

Research Questions

To achieve the objectives of this study, the following research questions were formulated:

1. What is the level of ICT competency among teachers in selected educational institutions?
2. What are the attitudes of teachers toward the use of ICT in teaching and learning?
3. What challenges do teachers face in integrating ICT into their pedagogical practices?

Hypothesis

H0: There is no significant difference in teachers' competency and attitude towards ICT with regard to their class of teaching.

METHODOLOGY

The study employed a descriptive design. The population consisted of 1700 Basic School Teachers in the Sekondi - Takoradi Metropolitan Assembly of the Western Region in Ghana. Using the Krejcie and Morgan Table, the recommended sample size was 313 respondents. Proportionate stratified sampling was used to ensure that respondents were selected from each level of teaching (KG, Lower Primary, Upper Primary and Junior High School (JHS) level). Again, simple random sampling was used to select the individual respondents from the schools. A questionnaire was used for the data collection. The questionnaire was designed on a four-point Likert scale and consisted of four sections. Section A collected data on the respondents' demographics, Section B collected data on the teachers' competency level in ICT, Section C collected data on the challenges teachers faced in integrating ICT into their pedagogical practices and Section D collected data on teachers' attitudes towards the use of ICT in teaching and learning. Responses to items on the research questions were analysed using means and standard deviations. To ensure accuracy results, teachers were asked to rate themselves using a four-point Likert scale: Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The scale was scored as follows: Strongly Agree =4, Agree =3, Disagree = 2 and Strongly Disagree =1. The criterion value of 2.50 was established for the scale. To determine the criterion value (CV=2.50), the scores were added together and divided by the number of the scale (4+3+2+1= 10/4=2.50). Any item or statement that scored a mean between 0.00 and 2.49 was regarded as disagreement by respondents, while items or statements

that scored a mean between 2.50 and 4.00 were regarded as agreement by respondents.

RESULTS

This section presents the results of the study. The results were presented according to the research questions as follows:

Research Question 1:

What is the level of ICT competency among teachers in selected educational institutions? To answer this research question, the mean and standard deviation were estimated for each item. An overall mean below 2.50 shows that the teacher's level of competency in ICT was low, while above 2.50 shows a high level of competency in ICT. The results are presented in Table 1.

Table 1: Teachers' ICT competency

Statement	Mean	Std. Deviation
I feel confident I can help students when they have difficulty with technology.	2.43	.496
I feel confident I can effectively monitor students' technology use for learning in my classroom	2.44	.498
I feel confident that I can involve my students in participating in technology-enhanced activities	2.48	.589
I can employ technology to promote students' higher-order thinking skills.	2.52	.500
I feel confident that I have the skills necessary to use technology for instruction	2.60	.580
I know how to utilize ICT promote student-centered learning.	2.60	.490
I feel confident I can consistently use educational technology in effective ways.	2.73	.447
I am comfortable using ICT in the classroom	2.74	.742
I can select appropriate content-specific technological tools to support teaching and learning	2.81	.671
I feel confident about selecting appropriate ICT tool for instruction based on curriculum standards.	2.84	.778
I feel confident I can regularly incorporate technology into my lessons, when appropriate to student learning	2.84	.364
I can incorporate ICT into my lessons to boost student creativity	2.88	.445
I can use a wide range of teaching approaches with ICT	2.92	.915
I feel confident that I can develop creative ways to teach effectively with technology.	2.98	.335
I know how to use ICT to facilitate students' problem-solving skills.	2.99	.772
I know how to enhance my instruction with the help of ICT.	3.00	.000
I know how to integrate ICT into my teaching to address content standards.	3.00	.000
I know how to utilize ICT tools to meet lesson objectives	3.00	.000
How frequent do you use ICT during teaching	3.13	.338
I feel confident that I will be comfortable using technology in my teaching	3.14	.497
I know how to integrate technology into my instruction to maximize student learning.	3.28	.450
Mean of means	2.97	.874

The results in Table 1 showed that teachers generally possess a high level of ICT competency ($M=2.97$, $SD=.874$). A closer look at the individual items revealed that the respondents agreed they know how to integrate technology into their instruction to maximise student learning ($M=3.28$, $SD=.450$). The respondents agree that they know how to utilise ICT tools to meet lesson objectives ($M=3.00$, $SD=.000$). Again, the respondents agree that they feel confident that they will be comfortable using technology in their teaching ($M=3.14$, $SD=.497$). The respondents agree that they know how to integrate ICT into their teaching to address content standards ($M=3.00$, $SD=.000$). Also, the respondents agree that they know how to use ICT to facilitate students' problem-solving skills ($M=2.99$, $SD=.772$). Respondents agree that they can use a wide range of teaching approaches with ICT ($M=2.92$, $SD=.915$).

The respondents agree that they know how to utilise ICT to promote student-centred learning ($M=2.60$, $SD=.490$). On the other side, the respondents disagree that they feel confident they can help students when they have difficulty with technology ($M=2.43$, $SD=.496$). Again, the respondents disagree that they feel confident they can effectively monitor students' technology use for learning in my classroom ($M=2.44$, $SD=.498$).

Research Question 2:

What are the attitudes of teachers toward the use of ICT in teaching and learning? For this research question, the mean and standard deviation were estimated for each item. An overall mean below 2.50 shows that the teachers had a negative attitude toward ICT, while a mean above 2.50 shows a positive attitude toward ICT. The results are presented in Table 2.

Table 2: Teachers' attitude towards ICT

Statement	Mean	Std. Deviation
I make my learners to feel bad when they are unable to use ICT	1.73	.447
I prefer my learners to use ICT tools in learning	2.29	.550
I encourage my other teachers to use ICT in teaching	2.62	.679
I encourage my learners to use ICT	2.74	.566
I enjoy teaching with ICT tools	2.86	.714
I feel comfortable when using ICT tools in teaching	2.95	.523
Mean of means	2.53	0.579

From Table 2, the results indicate that teachers generally have a moderate positive attitude towards ICT (M=2.53, SD=.579). The results revealed that the respondents enjoy teaching with ICT (M = 2.86, SD = .714). Respondents revealed that they are comfortable using ICT tools (M = 2.95, SD = .523). Again, the respondents revealed that they encourage students to use ICT (M = 2.74, SD = .566). The respondents also revealed that they encourage colleagues to use ICT (M = 2.62, SD = .679). However, the respondents revealed

they do not prefer the learners to use ICT (M = 2.29, SD = .550).

Research Question 3:

What challenges do teachers face in integrating ICT into their pedagogical practices? For this research question, the mean and standard deviation were estimated for each item. An overall mean below 2.50 showed that the item was not considered a challenge in ICT integration for teachers, while a mean above 2.50 showed that the item was considered a challenge in ICT for teachers. The results are presented in Table 3.

Table 3: Challenges teachers face in integrating ICT

Statement	Mean	Std. Deviation
Constant changes in technology make it difficult for teachers to stay alert to the latest technology	2.92	.631
Time allocation for ICT lessons in the school is limited	3.50	.797
Teachers failed to use ICTs in their lesson preparation and delivery due to their limited ICT capabilities.	3.54	.796
Teachers see ICT as a technical subject and difficult to manipulate.	3.54	.796
ICTs such as laptops, computers, and smartphones are expensive, this makes them difficult to acquire and use	3.60	.956
Most schools lack ICT laboratories and networks to facilitate ICT integration and use by teachers and students.	3.81	.735
Mean of Means	3.49	.785

From Table 3, the results generally show that teachers face challenges in integrating ICT into their pedagogical practices (M= 3.49, SD= .785). The respondents reported that the constant changes in technology make it difficult for teachers to stay up to date with the latest technology (M = 2.92, SD = .631). Also, the respondents revealed that time allocation for ICT lessons in the school is limited (M= 3.50, SD= .797). The respondents reported that ICT is a technical subject and difficult to manipulate (M= 3.54, SD= .796). Again,

respondents revealed that ICT tools such as laptops, computers, and smartphones are expensive, which makes them difficult to acquire and use (M= 3.60, SD= .956). The respondents reported their schools do not have ICT laboratories and networks to facilitate ICT integration and use by teachers and students (M= 3.81, SD= .735).

H0: There is no significant difference in teachers' competency and attitude towards ICT with regard to their class of teaching.

Table 4: Descriptive Statistics of Teacher Competency and Attitude by Class of Teaching

Variable	Class of Teaching	Mean	Std. Deviation
Teacher Competency	Lower Primary	51.18	2.19
	Upper Primary	55.62	6.08
	JHS	61.91	0.84
	Total	56.24	5.79
Teacher Attitude	Lower Primary	14.04	0.28
	Upper Primary	15.60	2.66
	JHS	15.92	1.99
	Total	15.19	2.09

Table 4 shows that teachers at the JHS level recorded the highest mean scores in both competency and attitude, while lower primary teachers recorded the lowest.

Table 5: Multivariate Tests for the Effect of Class of Teaching on Teacher Competency and Attitude

Test Statistic	Value	F	df (Hypothesis)	df (Error)	Sig.	Partial Eta Squared
Pillai's Trace	0.644	73.604	4	620	.000	0.322
Wilks' Lambda	0.375	97.795	4	618	.000	0.388
Hotelling's Trace	1.616	124.439	4	616	.000	0.447
Roy's Largest Root	1.584	245.551	2	310	.000	0.613

Using Wilks' Lambda, there is a statistically significant multivariate effect of class of teaching on the combined dependent variables, $F(4, 618) = 97.795$, $p <$

.001, partial $\eta^2 = 0.388$. The null hypothesis is therefore rejected.

Table 6: Post Hoc Comparisons (Tukey HSD) for Teacher Competency

Comparison	Mean Difference	Sig.
Lower Primary vs Upper Primary	-4.44	.000
Lower Primary vs JHS	-10.73	.000
Upper Primary vs JHS	-6.29	.000

All pairwise comparisons are statistically significant, indicating that competency increases progressively from lower primary to JHS.

Table 7: Post Hoc Comparisons (Tukey HSD) for Teacher Attitude

Comparison	Mean Difference	Sig.
Lower Primary vs Upper Primary	-1.56	.000
Lower Primary vs JHS	-1.88	.000
Upper Primary vs JHS	-0.32	.447

Lower primary teachers differ significantly from both upper primary and JHS teachers. However, there is no significant difference between upper primary and JHS teachers in terms of attitude.

DISCUSSIONS

Level of ICT Competency among Teachers

The study's findings showed that teachers generally possessed a high level of ICT competency, as indicated by the overall mean score ($M = 2.97$, $SD = 0.874$). This suggests that most teachers in the selected educational institutions had acquired the basic technological skills necessary for instructional delivery and classroom engagement. The respondents indicated that they were capable of integrating technology into instruction to maximise student learning, utilising ICT tools to meet lesson objectives, and incorporating ICT into teaching to address curriculum standards. These findings demonstrate that teachers are gradually adapting to the demands of technology-driven education and recognise the importance of ICT in enhancing teaching and learning.

The finding supports the assertion of Peggy Ertmer and Anne Ottenbreit-Leftwich that teachers' competence in ICT significantly influences effective classroom technology integration (Ertmer & Ottenbreit-Leftwich, 2010). Teachers who possess adequate technological knowledge are more likely to employ innovative instructional strategies that enhance learners'

understanding and participation. Similarly, the finding aligns with the study of Kwame Buabeng-Andoh, who found that Ghanaian teachers increasingly demonstrate competence in using digital technologies for teaching despite existing infrastructural challenges (Buabeng-Andoh, 2012). The current study therefore suggests that continuous exposure to digital tools and curriculum reforms. Emphasising digital literacy may have contributed to the improvement in teachers' ICT competency levels.

The findings are also consistent with the framework of UNESCO, which emphasises that teachers should possess sufficient technological, pedagogical, and content knowledge to effectively facilitate learning in digital environments (UNESCO, 2011). Teachers' confidence in integrating ICT into teaching activities indicates a positive movement toward achieving these global educational standards.

However, despite the generally high competency level, some teachers reported difficulties in assisting students with technological problems and monitoring students' technology use in the classroom. This finding implies that although teachers may possess basic operational skills, some may still lack advanced classroom management competencies related to technology integration. The result corroborates the findings of Jo Tondeur and colleagues, who observed that teachers often experience challenges in managing

technology-enhanced classrooms even when they possess adequate technical skills (Tondeur *et al.*, 2017). It also reflects the argument of Khalid Bingimlas that ICT competence is multidimensional and extends beyond mere operational knowledge to include pedagogical and classroom management skills (Bingimlas, 2009).

Furthermore, the finding may be attributed to increased access to smartphones, laptops, internet resources, and government initiatives promoting ICT education in Ghanaian schools. The introduction of digital literacy in the Ghanaian curriculum appears to have motivated teachers to improve their technological competencies to meet instructional expectations. Nevertheless, the findings suggest the need for continuous professional development programs aimed at strengthening teachers' advanced ICT integration skills, especially in areas relating to learner support and technology monitoring.

Attitudes of Teachers toward the Use of ICT In Teaching and Learning

The study revealed that teachers generally possessed a moderately positive attitude toward the use of ICT in teaching and learning ($M = 2.53$, $SD = .579$). The respondents indicated that they enjoyed teaching with ICT tools, felt comfortable using ICT during instruction, and encouraged learners and colleagues to use ICT in educational activities. This finding suggests that teachers acknowledge the importance and benefits of technology integration in improving teaching effectiveness and student engagement.

The finding agrees with the Technology Acceptance Model developed by Fred Davis, which posits that users' attitudes toward technology influence their willingness to adopt and utilise technological tools (Davis, 1989). Teachers who perceive ICT as useful and easy to use are more likely to integrate it into classroom instruction. The positive attitude observed among teachers in this study, therefore, implies that many teachers recognise ICT as a valuable educational resource capable of improving learning outcomes.

The finding is also in line with the study conducted by Timothy Teo, who found that teachers with positive perceptions toward ICT were more willing to integrate technology into instructional practices (Teo, 2008). Likewise, Kwame Buabeng-Andoh reported that teachers in Ghana generally exhibit favourable attitudes toward ICT because they believe technology enhances lesson delivery and increases learner motivation (Buabeng-Andoh, 2012). The current study, therefore, reinforces the growing acceptance of ICT among teachers within the Ghanaian educational context.

Despite the generally positive attitude, the respondents indicated low preference for learners' use of ICT tools. This finding may suggest concerns regarding

learners' misuse of technology, inadequate supervision, limited infrastructure, or fears that excessive dependence on ICT may distract learners from academic tasks. The finding supports the argument of Khalid Bingimlas that although teachers may appreciate the usefulness of ICT, concerns relating to classroom control, internet misuse, and insufficient technical support can negatively affect their willingness to allow extensive student interaction with technology (Bingimlas, 2009).

The moderate nature of the positive attitude also implies that some teachers may still exhibit uncertainty or hesitation toward fully embracing ICT integration. This may stem from inadequate training, fear of technological failure, or limited exposure to advanced educational technologies. According to Peggy Ertmer, teachers' beliefs and attitudes play a critical role in determining whether technology integration becomes successful or remains superficial (Ertmer & Ottenbreit-Leftwich, 2010). Thus, strengthening positive attitudes through training, mentoring, and institutional support remains essential.

Overall, the findings suggest that teachers are gradually developing favourable dispositions toward ICT integration, which is essential for achieving effective digital transformation in education. Positive teacher attitudes are likely to encourage innovation, learner engagement, and improved instructional practices in schools.

Challenges Teachers Face in Integrating ICT into Their Pedagogical Practices

The study found that teachers face considerable challenges in integrating ICT into their pedagogical practices, as reflected by the high overall mean score ($M = 3.49$, $SD = .785$). The major challenges identified included inadequate ICT laboratories and networks, the high cost of ICT devices, limited time allocation for ICT lessons, rapid technological changes, and insufficient teacher capabilities in ICT integration.

The finding supports previous studies, which identified infrastructural and technical barriers as major obstacles to ICT integration in schools. For instance, Khalid Bingimlas identified lack of resources, inadequate training, and insufficient technical support as key barriers preventing effective technology integration in educational institutions (Bingimlas, 2009). Similarly, Jo Tondeur and colleagues reported that schools with inadequate technological infrastructure often struggle to achieve meaningful ICT implementation (Tondeur *et al.*, 2017).

The finding that many schools lack ICT laboratories and internet networks indicates persistent infrastructural deficiencies within the educational system. This result corroborates the findings of Okeke and Eze, who found that inadequate technological infrastructure significantly limits teachers' ability to

integrate ICT effectively in Nigerian schools (Okeke & Eze, 2015). In the Ghanaian context, the inadequate provision of computers, internet connectivity, and digital learning resources continues to hinder the successful implementation of ICT policies in schools.

The respondents also reported that ICT devices such as laptops, smartphones, and computers are expensive and difficult to acquire. This finding reflects the economic realities facing many teachers and schools in developing countries, where limited financial resources affect access to educational technologies. The high cost of technological tools may discourage teachers from investing in personal ICT development and reduce opportunities for practical technology integration.

Another important challenge identified was the rapid and constant changes in technology. Teachers indicated that keeping pace with emerging technologies is difficult. This finding agrees with the view of Peggy Ertmer that continuous technological advancement requires ongoing teacher training and adaptation (Ertmer & Ottenbreit-Leftwich, 2010). Without regular professional development opportunities, teachers may struggle to remain current with evolving educational technologies and digital instructional methods.

The study further revealed that some teachers perceive ICT as technical and difficult to manipulate. This finding suggests the presence of technological anxiety and insufficient confidence among some teachers. It also indicates that possessing basic ICT skills may not necessarily translate into effective pedagogical integration. According to the Social Cognitive Theory proposed by Albert Bandura, self-efficacy beliefs influence individuals' willingness to engage in specific tasks (Bandura, 1986). Teachers with low technological self-efficacy may therefore avoid extensive use of ICT in teaching.

Overall, the findings imply that although teachers may possess positive attitudes and moderate competency levels, several institutional and personal barriers continue to impede effective ICT integration. Addressing these challenges requires increased government investment in ICT infrastructure, provision of continuous professional development programs, affordable access to digital devices, and adequate technical support for teachers.

Difference of Teachers' Competency and Attitude towards ICT With Regard to Their Class of Teaching

The study revealed a statistically significant difference in teachers' ICT competency and attitudes based on their class of teaching. The multivariate analysis showed a significant effect of class of teaching on the combined dependent variables of competency and attitude, leading to the rejection of the null hypothesis. Specifically, teachers at the Junior High School (JHS) level recorded the highest mean scores in both

competency and attitude, while lower primary teachers recorded the lowest mean scores.

This finding suggests that teachers' level of teaching influences their exposure to, experience with, and use of ICT tools in instruction. JHS teachers may demonstrate higher ICT competency because they teach subjects that often require greater technological integration, research activities, and digital instructional resources. In contrast, lower primary teachers may rely more heavily on traditional and play-based instructional approaches, resulting in less frequent use of ICT tools.

The finding aligns with the study of Jo Tondeur and colleagues, who found that subject specialisation and educational level significantly influence teachers' technology integration practices (Tondeur *et al.*, 2017). Teachers at higher educational levels are more likely to utilise ICT because of curriculum demands and greater exposure to technological resources. Similarly, Timothy Teo reported that teachers' technological attitudes and competencies vary according to teaching context and instructional responsibilities (Teo, 2008).

The post hoc analysis further showed significant differences between lower primary teachers and both upper primary and JHS teachers in terms of competency and attitude. However, no significant difference existed between upper primary and JHS teachers regarding attitude toward ICT. This implies that while competency continues to improve across educational levels, teachers at upper primary and JHS levels may share similar positive perceptions about ICT integration.

The findings may also be explained by differences in professional development opportunities and curriculum expectations across educational levels. JHS teachers are more likely to receive ICT-related training due to the complexity of their instructional content and examination requirements. Furthermore, learners at the JHS level may demand greater use of digital resources, thereby encouraging teachers to improve their ICT competencies.

The significant effect size observed in the multivariate analysis indicates that the class of teaching substantially influences teachers' ICT competency and attitudes. This finding highlights the importance of designing differentiated ICT training programs that address the specific needs of teachers at various educational levels. Lower primary teachers, in particular, may require additional support and training to improve their confidence and competence in integrating ICT into early childhood and foundational learning activities.

Overall, the findings demonstrate that teachers' ICT competency and attitudes are not uniform across educational levels. Therefore, policymakers and educational stakeholders should adopt level-specific

interventions to promote equitable ICT integration across all levels of the educational system.

CONCLUSION

The study assessed teachers' use of Information and Communication Technology (ICT) in education among Basic School teachers in the Sekondi-Takoradi Metropolitan Assembly of the Western Region of Ghana. The findings revealed that teachers generally possessed a relatively high level of ICT competency. Most teachers indicated that they were able to integrate technology into instruction, utilise ICT tools to achieve lesson objectives, and apply technology to enhance student learning. This suggests that teachers are gradually adapting to the technological demands of modern education and recognising the importance of ICT in improving teaching and learning processes.

The study further established that teachers demonstrated a moderately positive attitude toward the use of ICT in teaching and learning. Teachers generally enjoyed teaching with ICT tools, felt comfortable using technology during instruction, and encouraged both learners and colleagues to embrace ICT.

Despite the positive competency levels and attitudes, the study revealed that teachers continue to face significant challenges in integrating ICT into their pedagogical practices. Major challenges identified included inadequate ICT infrastructure, absence of ICT laboratories and internet facilities in schools, the high cost of technological devices, limited time allocation for ICT lessons, rapid technological changes, and insufficient teacher capabilities in some aspects of ICT integration. These barriers limit the effective implementation of ICT policies and reduce teachers' ability to maximise the educational benefits of technology.

The study also found a statistically significant difference in teachers' ICT competency and attitudes based on their class of teaching. Teachers at the Junior High School level recorded higher levels of competency and more positive attitudes toward ICT compared to lower primary teachers. This suggests that the level of teaching influences teachers' exposure to technology, instructional demands, and opportunities for ICT integration.

Overall, the study concludes that although teachers possess encouraging levels of ICT competency and positive attitudes toward technology integration, several institutional and infrastructural barriers continue to hinder effective ICT implementation in schools. Furthermore, improving ICT integration in education requires collaborative efforts from government, educational stakeholders, school authorities, and teachers themselves to strengthen infrastructure, training, and support systems.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. The Ministry of Education and Ghana Education Service should organise continuous professional development programmes, workshops, seminars, and in-service training for teachers to improve their ICT integration skills, particularly in areas such as classroom management, learner support, and the use of advanced digital tools for instruction.
2. Government and educational stakeholders should provide adequate ICT infrastructure in schools, including computer laboratories, internet connectivity, projectors, and other digital learning resources, to facilitate effective integration of ICT into teaching and learning.
3. School authorities should allocate sufficient time for ICT lessons and practical activities to enable teachers and learners to develop confidence and competence in the use of technology for educational purposes.
4. The government should subsidise the cost of ICT devices such as laptops, tablets, and internet services for teachers to improve accessibility and encourage regular use of technology in instructional delivery.
5. Educational institutions should establish technical support systems within schools to assist teachers in troubleshooting technological challenges and maintaining ICT facilities for effective classroom use.
6. Teacher education institutions should strengthen ICT-related courses in their training programmes to ensure that pre-service teachers acquire adequate technological pedagogical skills before entering the teaching profession.
7. Special ICT training and support programmes should be designed for the lower primary teachers, since the study revealed that they demonstrated lower levels of ICT competency and less positive attitudes compared to teachers at higher educational levels.
8. School administrators should encourage collaborative learning among teachers by promoting peer mentoring, ICT communities of practice, and the sharing of innovative technology-based instructional strategies within schools.

REFERENCES

- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.
- Bingimlas, K. A. (2009). Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature. *Eurasia Journal of Mathematics, Science and Technology Education*, 5(3), 235–245. <https://doi.org/10.12973/ejmste/75275>

- Buabeng-Andoh, K. (2012). Factors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the literature. *International Journal of Education and Development Using Information and Communication Technology*, 8(1), 136–155.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology in Education*, 42(3), 255–284. <https://doi.org/10.1080/15391523.2010.10782551>
- European Commission. (2020). *Digital education action plan (2021–2027): Resetting education and training for the digital age*. European Commission. <https://education.ec.europa.eu/focus-topics/digital-education/action-plan>
- Ministry of Education, India. (2020). *National Education Policy 2020*. Government of India.
- Okeke, C. I. O., & Eze, P. I. (2015). Challenges facing teachers in the use of information and communication technology (ICT) in teaching and learning in Nigeria. *Journal of Education and Practice*, 6(19), 58–63.
- Republic of Kenya. (2016). *National ICT policy*. Ministry of Information, Communications and Technology.
- Teo, T. (2008). Pre-service teachers' attitudes towards computer use: A Singapore survey. *Australasian Journal of Educational Technology*, 24(4), 413–424. <https://doi.org/10.14742/ajet.1201>
- Tondeur, J., van Braak, J., Ertmer, P. A., & Ottenbreit-Leftwich, A. (2017). Understanding the relationship between teachers' pedagogical beliefs and technology use in education: A systematic review of qualitative evidence. *Educational Technology Research and Development*, 65(3), 555–575. <https://doi.org/10.1007/s11423-016-9481-2>
- UNESCO. (2011). *UNESCO ICT competency framework for teachers*. United Nations Educational, Scientific and Cultural Organisation.
- Voogt, J., & Knezek, G. (2008). *International handbook of information technology in primary and secondary education*. Springer.