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Gender Influence of College Tutors Perception of ICT Integration in Teaching and Learning in Volta Region of Ghana

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Abstract

Purpose: One of the key areas of research in education has been the gender variations in academic performance. This seems to be reflecting among teachers well, particularly because it may reveal potential gaps and inequalities in particular areas. While these disparities have mostly been studied in traditional fields like math, reading, and science, the body of experimental research on ICT literacy is far smaller yet is rife with interesting results. This study investigated the sex influence on Colleges of Education (CoEs) tutors' perception of ICT integration in teaching in Volta region of Ghana.

Methodology: The study employed a cross-sectional analytic survey design with 121 participants. The Tutor ICT Integration Perception (TIIP) questionnaire which consists of 12 items was used to elicit information from selected tutors. Data collected was analysed using a median and Mann- Whitney U sample t – test. Three variables of tutor ICT integration perception were considered; tutor competence, improve tutors' teaching and student learning and no effect on lesson delivery in relation to sex influence.

Findings: The result showed that majority of the tutors disagreed with most of the statements and there was no significant sex difference influence on tutor perception. It is concluded that integration or no integration of ICT in the classrooms should be anticipated from all tutors irrespective of their gender.

Unique Contribution to Theory, Policy and Practice: The unique contribution of tutors' perception of ICT integration in teaching and learning is that it provides valuable insights into how technology is being used in the classroom and the effectiveness of its integration. By understanding tutors' perceptions of ICT integration, educators and policymakers can make informed decisions about how to use technology effectively in the classroom, ultimately improving the quality of education for students.

Keywords: *ICT integration, Sex, CoEs, Competence, Teaching and learning*

1.0 Introduction

Information and Communications Technology (ICT) as a pedagogical tool for transforming the learning environment and enhancing effective teaching and learning is globally embraced by all stakeholders of education having acknowledged its resilient potential of advancing quality educational outcomes including retention and learning achievement. However, the perception of teachers who are major stakeholders in the implementation of ICT in education toward the use of ICT in teaching and learning is a major factor that determines the success or failure of ICT integration in education (Jatileni & Jatileni, 2018). According to Lawrence and Tar (2018), ICT is playing a bigger role in both our daily lives and our educational system. Educational institutions are under increasing pressure to use ICT to impart to students the knowledge and skills they will need to succeed in the digital era. The adoption and integration of ICT into the teaching and learning environment gives teachers and students additional opportunity to collaborate more effectively in the globalized digital era. Whether used for administration, online learning, or other activities, ICT has the potential to play a significant role in education. Teachers and students have a great opportunity to use ICT to enhance the standard of instruction and learning in the classroom. They further opined that ICT has a notable influence and has an impact on every part of human endeavour. The adoption and integration of ICT in education are still picking up steam in the academic literature. With the ability to take place anytime and everywhere, the development of ICT has created a large new field that offers prospects for improving education, especially in teaching. Utilizing ICT to raise the standard of instruction and learning in the classroom offers instructors and students a wealth of opportunity. ICT provides a new paradigm shift in the way that education is provided globally, and it is transforming the way that education is perceived. Hence, the effects of ICT can be seen in a variety of ways, from virtual communication via mobile phones and web technologies to heightened awareness due to higher-quality information and visuals. The role of ICT in teaching and learning is increasingly essential among educators as a method to increase classroom quality, participation, and freedom in learning experiences, anywhere and at any time that is convenient for specific persons. Learners can choose what they want to study, when and where they want to learn, giving them greater independence, which is a component of continuous learning. Learners can connect and collaborate with other students all around the world by using ICT.

Again, it was emphasized that, the universal applicability of the integration idea itself and the multiplicity of meanings connected to ICT integration should be the main points that catch people's eyes during the integration process of ICT. This variety should cover a wide range of viewpoints, from those who believe using ICT in the classroom to be sufficient to those who believe it should be a regular, ongoing process that aids in student learning. However, a comprehensive definition of ICT integration should include the ongoing use of ICT in the classroom to enhance student learning (Haslaman et al, 2008). They also emphasized that ICT integration was not just a straightforward use but rather a must to support the students' learning. ICT has two educational components which are technology and pedagogy. From the technological view, it is used to support the integration of technological infrastructures and systems into the educational environment. And from pedagogical view it is used to support the

integration of ICT materials and programs in accordance with social constructivist learning principles. Both views of pedagogical and technical support encourage strong links between appropriate technological content delivery and pedagogical principles for learning environment design. In addition, they discovered that teachers actually did not know how to integrate ICT in their teaching-learning contexts; and so should be provided with concrete sample applications support other than in-service training and technical help. Demonstration of lessons with new strategy should be designed in which ICT can be integrated into the teaching and learning process for teachers to implement. The sample plan should indicate the problem that mandates the use of ICT in the class, the ICT applications and resources, ICT application skills, application techniques, and reflections and suggestions about the application's use.

According to Baya et al., (2019) studies from several fields have discussed the advantages of ICT integration in education. These advantages are divided into pedagogical benefits for teachers and learning motivation benefits for students. It was clarified that ICT helps students produce knowledge by causing them to not only acquire information but also to provide information on their own. This might be seen as a sign of constructivist teaching, which encourages students to use technology to study and grasp concepts, is supported by ICT and specifically improves students' knowledge of fundamental ideas. They also emphasized the role of ICT in fostering contact among students, claiming that it both facilitates and stimulates interaction between students and the technology. ICT helps teachers instruct students. Despite the advantages of ICT, teachers frequently show more reluctance than willingness to adopt it. They further highlighted several obstacles to ICT integration, including: (1) Lack of tutor confidence in using technology; (2) Inability to provide time for practical ICT in the school timetable; (3) Lack of professional development training for tutors on ICT practical; (4) Unavailability of technical support, resources and ICT facilities in schools; (5) Lack of tutors' knowledge about ways to integrate ICT to enhance the curriculum; (6) Difficulty integrating and using different ICT tools in a single lesson; (7) Lack of resources

There is a positive correlation between teacher preparation and successful implementation of ICT in education (Mwalongo, 2011). In Ghana, this teacher preparation takes place in the Colleges of Education and universities that are mandated to train individuals to become professional teachers for Basic Schools and Second cycle institutions. With the introduction of the Four-Year Bachelor of Education Programme in the colleges of education and the emphasis on ICT integration at all levels of education, it is worth knowing the perception of college tutors who have the responsibility to train and prepare teachers to use ICT in teaching. There are courses designed to help students acquire knowledge, attitudes and skills necessary for using ICT in teaching and learning. Such courses help students to understand the numerous benefits of ICT use in education, acquire basic skills in computing, master basic skills in the use of software such as word processing, spreadsheet, and presentation software, and information literacy skills. For student teachers to have the culture of ICT integration, however, the professional practices and use of ICT in teaching by college tutors are key influential factors.

Even though more educators are embracing digital methods for teaching and learning, there has not been much research on the influence of sex of tutors in CoEs in relation to acceptance

and effective use of ICT in the classroom (Park et al., 2019). They also argue that professionals in information systems (IS) have examined ideas and models to assess the efficacy of IT adoption. The task technology fit model, which concentrates on user evaluation of IT by employing fit between task and technology features, and the IS performance, which emphasizes on system use and user satisfaction based on system quality and information quality, are two examples. The technology acceptance model (TAM), was assessed to be the most popular and effective way to access ICT integration in teaching. The study revealed that there was a significant difference between male and female teachers in accepting and integrating ICT in teaching. It was suggested that males demonstrate a higher influence of adopting ICT compared to the female counterparts during teaching. Siddiq and Scherer, (2019) expressed that, it has long been assumed that male students have more positive views toward technology and technology use, utilize ICT more actively, have more ICT self-efficacy, and hence do better than their female colleagues. A new meta-analysis on gender and attitudes toward technology partially verifies this notion by demonstrating a tiny but substantial positive effect for males, implying that male teachers and learners have stronger ICT self-efficacy and more favourable views about technology than female (Cai, Fan & Du, 2017). This conclusion, while consistent with current assumptions regarding the direction of a probable gender difference in technology-related subjects, is based purely on self-report measures (Siddiq and Scherer, 2019).

1.1 Problem statement

ICT integration in the classroom is progressively establishing a technological culture in schools, leading to an increased passion for the best ways to use ICT tools to enhance the efficiency of concept teaching and learning. While the dedication to fully integrating ICT will result in a significant turning point, numerous researches on the application of ICT in schools have focused on various factors, such as teachers' competencies, attitudes, and knowledge of Colleges of Education (CoEs) in Volta region. It is clear that men seem to be more open to using ICT and its educational tools than women, and this poses a threat to the rapid expansion of ICT use in education. This study explores tutors' perceptions of integrating ICT into teaching and learning processes. As a result, the purpose of this study is to investigate the gender impact on CoE tutors' ICT integration perception in CoEs in Volta region of Ghana

1.2 Purpose of the Study

The purpose of this study is to investigate the gender influence on tutors ICT integration in CoEs in Volta region. Specifically, the study intends to:

1. Determine male and female tutors' influence on ICT integration into teaching and learning in relation to "tutor competence" in CoE in Volta region.
2. Investigate male and female tutors' influence on ICT integration into teaching and learning in terms of "improve tutor teaching and student learning" in CoE in Volta region.
3. Examine male and female tutors' influence on ICT integration into teaching and learning in relation to "no effect on lesson delivery and classroom management" in CoE in Volta region.

1.3 Research questions

1. What is the perception of male and female tutors on ICT integration into teaching and learning in terms of tutor competence in CoE in Volta region?
2. What is the perception of male and female tutors regarding the influence of ICT integration in teaching and learning in terms of "improve tutor teaching and student learning" in CoE in Volta region?
3. What is the perception of male and female tutors and influence of ICT integration into teaching and learning in terms of "no effect on lesson delivery and classroom management" in CoE in Volta region?

1.4 Hypothesis

H_{01}: There is no statistically significant difference in the perception of male and female tutors on ICT integration into teaching and learning in terms of tutor competence in CoE in Volta region.

H_{02}: There is no statistically significant difference in the perception of male and female tutors regarding the influence of ICT integration in teaching and learning in terms of "improve tutor teaching and student learning" in CoE in Volta region.

H_{03}: There is no statistically significant difference in the perception of male and female tutors and influence of ICT integration into teaching and learning in terms of "no effect on lesson delivery and classroom management" in CoE in Volta region.

2.0 ICT integration and Perceived Adoption by Tutors in Relation to Sex

Several governments and higher institutions around the world prioritize ICT integration into teaching and learning. Many governments have created a number of controlling plans addressing ICT in education and have also invested a lot of money in educational infrastructure, and other staff professional development. Indication suggests that despite all of these efforts, ICT has not been fully incorporated into teaching and learning activities. According to earlier research, tutors' technological knowledge and proficiency affect how they use technology in the teaching and learning process (Amponsah & Stonier, 2020; Buabeng-Andoh, 2019). According Ola, Anders, and Göran (2017) and Aslan and Zhu, (2017), tutors regularly utilize ICT for lesson planning, lesson organization, and informational purposes, but they rarely use it for simulation software and programs. As a result, the use of ICT in the classroom is restricted to a few specific resources and commonly used to carry out traditional teaching tasks. They further state that although ICT has been utilized in a variety of ways to assist instructors, part of the literature notes that there is scant evidence to back up the assertion that ICT has revolutionized education. Researchers have concluded that it is crucial to investigate how ICT is utilized in schools and to pinpoint the elements that influence teachers' ICT usage.

Some studies for example Khawaji, (2016) and Appianing and Van Eck (2015) expressed that Expectancy Value Theory (EVT) is a person's decision to perform a specific activity, is influenced by their perception of the task's benefits and confidence in their ability to complete it. In other words, there must be a strong expectation of success and perceived worth. They

adopted expectancy-value theory to investigate how teachers use ICT in the classroom. They discovered that the most important predictors of teachers' ICT use were their perceived value and successful expectations. Teachers who held this view appeared to be technologically forward-thinking in their use of ICT to enhance teaching and learning. They further revealed that teachers' use of technology is significantly influenced by their perceptions of perceived value, success expectations, and the cost of adopting ICT. The studies maintain that male teachers had greater perceived levels of perceived ICT integration than female teachers.

The ability to manage a broad range of diverse ICT applications for a variety of objectives is referred to as ICT competency. According to Lawrence and Tar, (2018) teachers' initial ICT use and future behaviour with technology are influenced by their attitudes and ICT ability. They examined how teachers felt about ICT integration, their level of ICT proficiency, and the potential barriers to their use of ICT in the classroom. The study came to the conclusion that ICT-savvy teachers frequently incorporate the technology into their teaching. Similar research was conducted by Cakir and Yildirim (2013), who looked at the professional development of ICT teachers in terms of teaching views and competences. They found that, teachers' views and competences are key contributors to their professional development. Additionally, ICT competence and confidence were found to be associated with instructors' use of ICT in their instruction (Aslan & Zhu, 2017). According to Pelgrum (2001), the degree of teachers' competences is largely responsible for the effectiveness of ICT implementation in schools. However, it was pointed out that inventive teachers hone their skills in accordance with the learning objectives they hope to achieve through ICT. For tutors and students to function properly, the usage of ICT in schools continues to be a crucial topic. Consequently, it is necessary for teachers to be proficient in ICT use. There are varied views on gender variations in ICT skills. Ritzhaupt, et al., (2013) found no significant differences in ICT competency while Kaarakainen, et al., (2017) found substantial gender disparities in ICT competency. Gómez-Trigueros and Yáñez de Aldecoa, (2021), also suggest that, with regard to the teaching task, female participants have significantly poorer self-perceptions of their digital teaching competence than male participants do, as well as a lower propensity to use technologies. We emphasize the importance of changing teaching methods in initial teacher education by properly integrating ICT resources.

3.0 Materials and Methods

3.1 Research Design: The cross-sectional survey research design was used for this study. It was used to determine the perception of ICT integration in relation to male and female tutors in CoEs in Volta region.

3.2 Participants: A total of 121 tutors voluntarily participated in the study out of 171 tutors. The sampling technique used was the simple random technique. This entails a section of the tutors in the five public CoE of Volta region, Ghana.

3.3 Instrumentation: The instrument for data collection was a 12-item instrument titled Tutor ICT Integration Perception (TIIP) adopted from (Ghavifekr & Rosdy, 2015). The instrument was divided into three sections. The instrument measured the tutor’s ICT perception which

consists of three measures. Section A has items 1-4 which measured ICT competence of tutors; for section B, items 5-9 measured tutor's perception on ICT integration in terms of "improve tutors teaching and student learning" and for section C, items 10-12 measured tutor's perception on ICT integration in terms of "does not affect lesson delivery and classroom management". A four – point Likert scale was used to rate the items ranging from strongly agree = 1, agree = 2, disagree = 3 and strongly disagree = 4. The reliability of the instrument was determined using the Cronbach Alpha formula, which gave an index of 0.85. One item and two items were deleted from sections A and C respectively after computing for reliability test because they correlate negatively which reduced the index to 0.70 Cronbach alpha acceptable value. Below is the dropped down value for each item.

Table 1: Item Reliability Statistics (Overall Cronbach's α = 0.85)

	Cronbach's α
1. I feel confident learning new computer skills.	0.869
2. I find it easier to teach by using ICT	0.841
3. I think the use of ICT helps to prepare teaching resources and materials.	0.816
4. I am confident that my students learn best without the help of ICT.	0.811
5. I am aware of the great opportunities that ICT offers for effective teaching.	0.816
6. I think that ICT supported teaching makes learning more effective.	0.817
7. The use of ICT helps teachers to improve teaching with more updated materials.	0.832
8. I think the use of ICT improves the quality of teaching.	0.812
9. The use of ICT enables the students' to be more active and engaging in the lesson.	0.824
10. I can still have an effective teaching without the use of ICT.	0.816
11. I think the use of ICT in teaching is a waste of time.	0.880
12. The classroom management is out of control if ICT is used in teaching.	0.892

3.4 Data Collection and Analysis: The researchers are colleagues to the participants hence sought permission from them through the social media platform (WhatsApp) to undertake this

study. As some agreed to participate in the study, the researchers administered the instrument to the participants on the same social platform by providing them with the link of the questionnaire using google form. After one month of continuous reminder, 121 participants filled the TIIP questionnaire completely and submitted successfully. The responses were retrieved, scored and transferred into MS Excel and imported into JASP version 16 for analysis. The data collected were analysed with descriptive (Mean and Standard Deviation) and inferential statistics (independent sample t-test) was used to test the hypotheses at a .05 level of significance.

4.0 Results

Table 2: *Summary of descriptive statistics and independent-sample t-test on the perception of male and female tutors on ICT integration into teaching and learning in terms of tutor competence.*

Tutor competence	**Group**	**Median**
1. I feel confident learning new computer skills.	Male	2.00
	Female	2.00
2. I find it easier to teach by using ICT	Male	2.00
	Female	3.00
3. I think the use of ICT helps to prepare teaching resources and materials.	Male	3.00
	Female	3.50
4. I am confident that my students learn best without the help of ICT.	Male	4.00
	Female	4.00

Overall median: Mann – Whitney U $= 1778, M = 2.80, F = 2.80, p = 0.826 > 0.05$

Table 2 presents the result on tutor competence in ICT integration in teaching and learning at CoEs in relation to gender. Since the data collected could not meet the parametric assumptions the non – parametric analysis was conducted. The median was used to determine if there is any

difference between male and female regarding the influence of integrating ICT in teaching at CoEs. Apart from item 2 in table 2 that revealed that there is rating difference between male and female, all other individual items rate same with different median values. The overall median (for Male and Female = 2.80) using Mann – Whitney $U = 1778, p = 0.826 > 0.05$ showed that there is no significant difference between male and female tutors' competence in integrating ICT into teaching. Hence the null hypothesis H_{01} is retained at 0.05 level of significance.

Table 3: *Summary of descriptive statistics and independent-sample t-test on the perception of male and female tutors regarding the influence of ICT integration in teaching and learning in terms of "improve tutor teaching and student learning"*

Improve tutor teaching and student learning	**Group**	**Median**
5. I am aware of the great opportunities that ICT offers for effective teaching.	Male	2.00
	Female	2.00
6. I think that ICT supported teaching makes learning more effective.	Male	2.00
	Female	2.00
7. The use of ICT helps teachers to improve teaching with more updated materials.	Male	1.00
	Female	1.00
8. I think the use of ICT improves the quality of teaching.	Male	2.00
	Female	1.00
9. The use of ICT enables the students' to be more active and engaging in the lesson.	Male	2.00
	Female	2.00

Table 3: *Summary of descriptive statistics and independent-sample t-test on the perception of male and female tutors regarding the influence of ICT integration in teaching and learning in terms of "improve tutor teaching and student learning"*

Improve tutor teaching and student learning	**Group**	**Median**
Overall median: Mann – Whitney U = $1702, M = 1.85, F = 1.87, p = 0.531 > 0.05$		

Table 3 presents the parametric analysis result on male and female tutors' perception on ICT integration in teaching at CoEs in relation to "improve tutor teaching and student learning". This result examines the influence of male and female tutors' perception about the use of ICT integration considering whether it improves tutor's teaching and student learning. It was realised that there are no differences between male female tutors' perception considering the individual items in table 3. Following that, the overall median rating was used to examine the male and female tutors' influence on the perception of ICT integration using a Mann-Whitney $U = 1702, M = 1.85, F = 1.87, p = 0.531 > 0.05$ regarding "improve tutor teaching and student learning". The findings suggest that there is no significant difference between male and female tutors influencing ICT integration in Volta region of Ghana. Therefore, we retain the null hypothesis at 0.05 level of significance.

Table 4: *Summary of descriptive statistics and independent-sample t-test on* the perception of male and female tutors and influence of ICT integration into teaching and learning in terms of "no effect on lesson delivery and classroom management".

No effect on lesson delivery and classroom management	**Group**	**Median**
11. I can still have an effective teaching without the use of ICT.	Male	2.00
	Female	2.00
12. I think the use of ICT in teaching is a waste of time.	Male	1.00
	Female	1.00
13. The classroom management is out of control if ICT is used in teaching.	Male	2.00

Table 4: *Summary of descriptive statistics and independent-sample t-test on* the perception of male and female tutors and influence of ICT integration into teaching and learning in terms of "no effect on lesson delivery and classroom management".

No effect on lesson delivery and classroom management	**Group**	**Median**
Overall median: Mann – Whitney U = $1492, p = 0.087 > 0.05$	Female	2.00
	Male	2.20
	Female	2.00

Similarly, table 4 shows that the perception of male and female tutors influence of ICT integration into teaching and learning in terms of "no effect on lesson delivery and classroom management". The result indicates that all three items rated no difference between the male and female influence. The overall median Mann – Whitney U = $1492, p = 0.087 > 0.05$ suggests that there is no significant difference between male and female influence on ICT integration in teaching and learning. Therefore, we retain the null hypothesis.

Boxplots showing summary of sex (1 – male; 2 – female) variation of participants perception

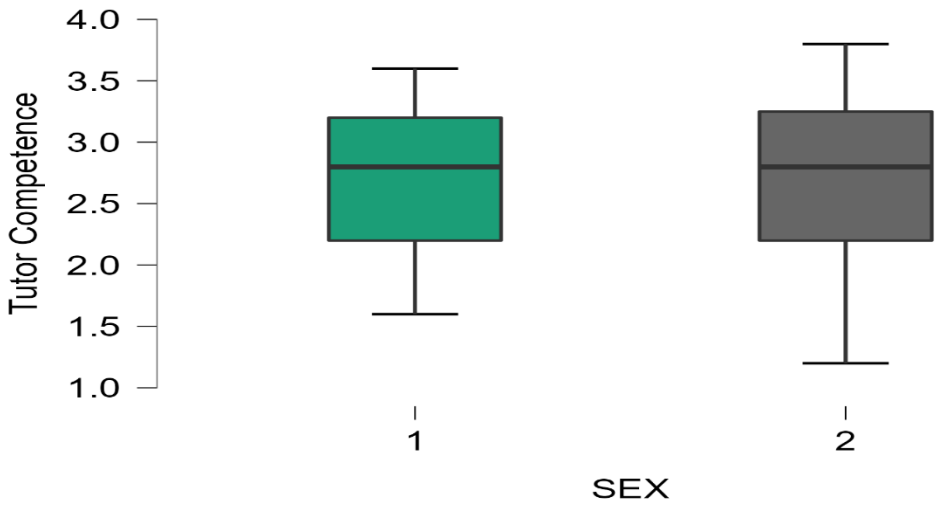

Figure 1: Tutor Competence

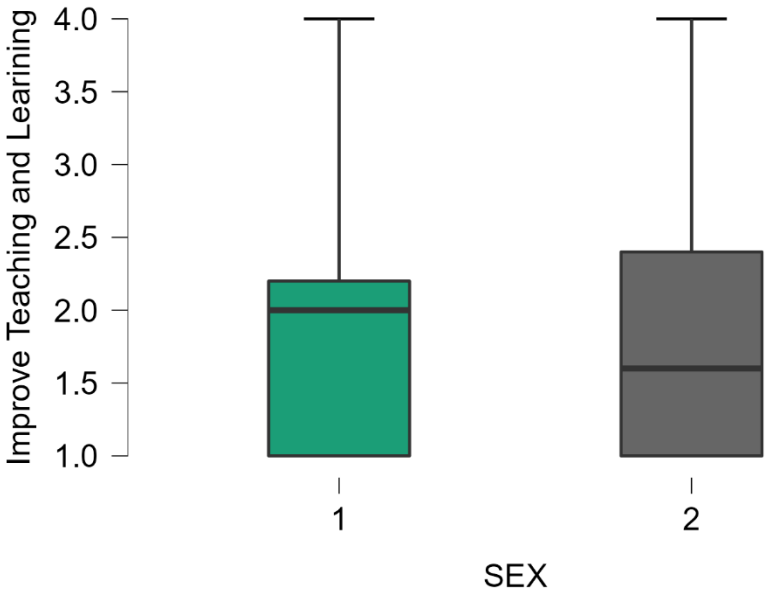

Figure 2: Improve Teaching and Learning

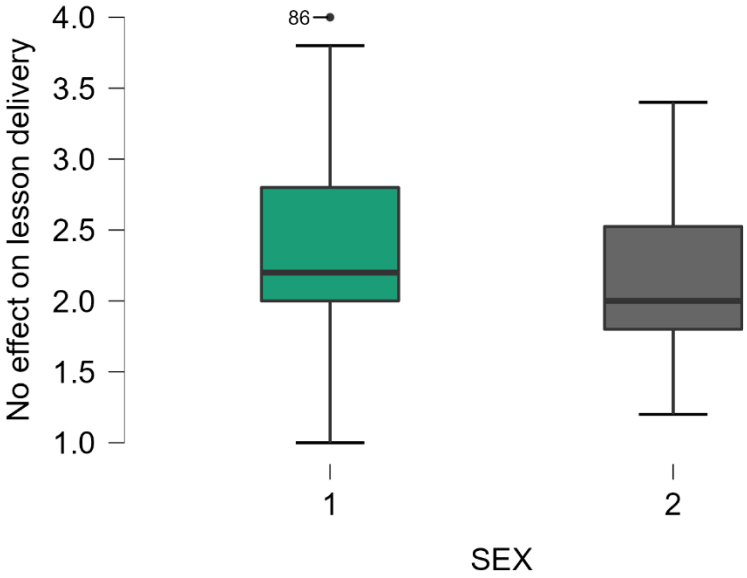

Figure 3: No effect on lesson delivery and classroom management

5.0 Findings and Discussion

It was found in this study that more male tutors completed the questionnaire compared to female; and so more male tutors took part in the study than female tutors. The instrument was reliably tested to meet internal consistency of Cronbach alpha formula threshold. With regard to tutor competence on integrating ICT into teaching at CoEs, it was found that both male and

female tutors rated equal median across all items in table 2. In line with this, hypothesis one revealed that there was no significant difference between male and female tutors' perception on the influence of integrating ICT into teaching. Similarly, this study also tested hypothesis on whether ICT integration perception improve tutors teaching and student learning in relation to sex. It was found that there was no significant difference between male and female tutors' perception. Finally, we also investigated the perception of tutors considering whether ICT integration has effect on their lesson delivery. It was revealed that there was no significant difference between male and female tutors.

These findings suggest that both male female tutors in CoEs in Volta region of Ghana have equal perception regarding ICT integration into teaching. This supports Ritzhaupt, et al., (2013) who also found that, there is no significant sex differences in ICT competency, acceptance and integration into teaching. However, several studies for example Buabeng-Andoh, (2019) and Aslan & Zhu, (2017) demonstrated that tutors' usage of ICT was still limited to fundamental and conventional tasks like information searching, class presentations and online teaching. The use of ICT by teachers was found to be influenced by both internal and external factors. Additionally, more female instructors were reported using ICT often than male teachers. In conclusion, they added to the body of knowledge that there are variations between male and female teachers' pedagogical use of ICT. Similarly, the findings of Gómez-Trigueros and Yáñez de Aldecoa, (2021), suggest that, with regard to the teaching task, female participants have significantly poorer self-perceptions of their digital teaching competence than male participants do, as well as a lower propensity to use technologies. We emphasize the importance of changing teaching methods in initial teacher education by properly integrating ICT resources.

Conclusion and Recommendation

In conclusion, no significant sex difference exists among CoEs tutors in relation to their perception on ICT integration in teaching in Volta region of Ghana. Findings suggest that with regard to tutor ICT competence, ICT improve tutors' teaching and student learning and ICT has no significant effect on tutors' lesson delivery, no sex definite differences in perception was found. In view of these results, it can be concluded that the integration or no integration of ICT in the classrooms should be anticipated from all tutors irrespective of their gender. We therefore, recommend that tutors'

1. ICT competence should be worked on, since it is the new normal of today's teaching and learning.
2. There should be continuous development and workshops to make tutors understand that ICT integration can improve their teaching and also help students' learning.
3. ICT integration can also have effect on lesson delivery if tutors' pedagogical knowledge is developed on the use of ICT, hence management should organise workshop for tutors on it.
4. Finally, educational technology courses should be mounted for both tutors and pre – service teachers in order create conscious use the ICT among teacher educators in Ghana.

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