



Gender Differences among Teachers in the Implementation of Computer-Assisted Instruction in Public Secondary Schools in Zango Kataf Local Government, Kaduna State, Nigeria

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ABSTRACT

The study evaluated the influence of teachers' gender on the use of computer-assisted instruction (CAI) in public secondary schools in Zango Kataf Local Government Area, Kaduna State. The primary objective was to examine how gender affects the application of CAI among teachers in this region. This objective was translated into a research question and hypothesis. A survey research design was employed for the study. The target population comprised 409 individuals, including 43 principals, 361 teachers, and 5 Ministry of Education officials in Zango Kataf Local Government Area. A sample size of 217 respondents was selected, consisting of 202 teachers, 12 principals, and 3 Ministry of Education officials. Data collection was conducted using an instrument titled "Teacher Factors in the Application of Computer-Assisted Instruction Questionnaire (TFACAIQ)." The instrument was validated, pilot tested, and found to have a reliability coefficient of 0.78, determined using Cronbach's Alpha. Descriptive statistics, including frequency counts, mean, and standard deviation, were used to analyze the data and answer the research questions. The Kruskal-Wallis test was employed to test the null hypothesis at a 0.05 level of significance. The study's findings revealed that teachers' gender significantly influences the application of CAI in public secondary schools in Zango Kataf Local Government Area. Based on these findings, it was recommended that the Kaduna State Ministry of Education, Science, and Technology should encourage female teachers to enhance their ICT literacy through workshops and training. This would enable them to better integrate ICT into their teaching, thereby improving students' academic performance in schools.

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INTRODUCTION

There is a growing demand on educational institutions to use computer-assisted instruction (CAI) to teach the skills and knowledge students need for the 21st century. Computer-assisted instruction (CAI) is an example of the use of information and communication technology (ICT) supported teaching and learning processes. Realizing the impact of computer on the workplace and everyday life, today's educational institutions try to restructure their educational curricula and

classroom facilities, in order to bridge the existing technology gap in teaching and learning. This restructuring process requires effective adoption of technologies into existing teaching and learning environment in order to provide learners with knowledge and information of specific subject areas, to promote meaningful learning and to enhance professional productivity. Therefore, with the emerging new technologies, the teaching profession is evolving from an emphasis on teacher-centred, lecture-based instruction to

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student-centred, interactive learning environments (UNESCO, in Alasoluyi, 2015).

Importantly, the application of CAI into the educational process offers numerous advantages. In this sense, the application of CAI in classes to complement conventional teaching methods is associated with greater student motivation through the use of more attractive, entertaining, and fun tools (Bullock in Gomez-Fernandez & Mediavilla, 2022; Tüzün et al., 2009). Sequel to say that, CAI enables greater interactivity in learning, with more opportunities for cooperation and an improvement in communication between teachers and students (Schulz-Zander, Büchter & Dalmer, 2012). CAI also stimulates initiative and creativity (Allegra, Chifari & Ottaviano, 2011; Wheeler, Waite & Bromfield, 2012) and facilitates the individualization and flexibilization of education (Abell, 2006). These advantages, among others, can improve students' acquisition of knowledge and have a positive influence on students' academic performance.

Despite all the potential advantages of using CAI for educational purposes in classes, there is still a low usage rate of CAI for educational purposes in Zango Kataf Local Government Area, Kaduna State. Teachers may find it impossible to incorporate CAI into their work without support and encouragement from colleagues, parents, and leaders. To bring this about, these community members may also need professional development, along with the teachers. In this regard, considering that the application of CAI for educational purposes in classes is ultimately decided by the teacher of each subject, it is of great interest to analyse what factors determine whether a teacher is more or less conducive to the use of these tools. Numerous studies consider teachers and their attitudes, training, concepts, or practices to be factors in the application of CAI into the classroom that possess much greater weight than other factors (Akbulut et al., 2007, Drent and Meelissen, 2008, Koh and Chai, 2014, Lee and Lee, 2014, Prestridge, 2012, Tondeur et al., 2008, Valtonen et al., 2015).

Regarding teachers, the factors that are associated with the application of CAI include

experience, age, gender (Suárez et al., 2012, Tondeur et al., 2008, Wong and Li, 2008) and academic department (Akbulut, 2009). Application of CAI appears to be greater among male teachers who are relatively young (Scherer, Siddiq, & Teo, 2015) and who teach the senior classes, although the effect of these variables is small and only statistically significant in the cases of age (Scherer et al., 2015) and gender (Anderson & Maninger, 2007; Suárez et al., 2012; Van Braak, 2001). Gender is one of the attributes which affects the attitude towards computers. Jamieson-Proctor, Burnett, Finger and Watson (2006) also found that female teachers are less likely to use CAI in classrooms compared to their male counterparts on account of a lower level of confidence.

Computer-assisted instruction is an interactive instructional technique whereby a computer is used to present the instructional material and monitor the learning that takes place (Alasoluyi, Shaibu & Garba, 2016). CAI learning uses a combination of text, graphics, sound and video in learning process. Computer-assisted instruction (CAI) is the process by which written and visual information is presented in a logical sequence to a learner through a computer (Alasoluyi, 2021). The student learns by reading the text material presented or by observing the graphic information displayed. Some of the programmes provide audio-visual presentation with an option to the student to select audio presentation in addition to the visual media. Each segment of text is followed by questions, for student's response. Feedback on response is indicated immediately (Locatis & Atkinson; Wang & Sleeman in Alasoluyi, 2015).

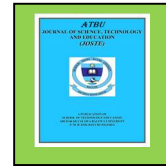
Personal factors of a teacher such as gender, educational experience, training, attitudes and perceptions can influence the adoption of a technology. Jones (2011) asserts that teachers' training and preparedness to integrate CAI into teaching determines the effectiveness of technology. Graduating in a degree of teaching is not that much tough as getting mastery in experience. Experience holds an important place when you are teaching students. Some aspirants acquire high qualifications which can make them

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qualified for teaching but lacking in experience hamper their progress. With high qualifications, teachers can get a better understanding of the different topics or complex formulas but experience helps teachers to deal with the students and prepare them for how to teach students.

Gender difference and the application of CAI has been reported in several studies. Research studies reveal that male teachers use more CAI in teaching and learning process than their female counterparts (Kay, 2006). Research conducted on teachers' application of CAI in schools in Queensland state from 925 teachers also revealed that female teachers were integrating technology into their teaching less than the male (Watson, 2006). Wozney et al. (2006) agrees with this that male teachers used CAI more than female, citing female teachers' low levels use of CAI due to their limited technology access, skill and interest.

Additionally, Markauskaitie (2006) investigated gender difference on ICT literacy amongst first year graduate trainee teachers. The study revealed significant differences between males and females in technical ICT capabilities, and situational and longitudinal sustainability. Male scores were higher compared to females. Furthermore, Bowser-Brown (2004) argues that female students are more likely to enter programmes with few technology skills due to lack of access. However, in a research conducted by Kay (2006) on teacher's attitudes on ICT, findings were that male teachers had relatively higher levels of ICT attitude and ability before implementation, but there was no difference between males and females regarding ICT attitude and ability after the implementation of the technology.

Specifically, Lee and Lee (2014) speak of encouraging the self-efficacy beliefs of teachers with respect to technology integration, teacher attitudes towards computers, computer use, lesson-planning skills, knowledge for effective technology integration, and instructional media development skills. The real challenge for educationists is, therefore, how to harness the potential of CAI to complement the role of a

teacher in the teaching and learning process. There is an understandable apprehension, even fear, as to the role of a teacher in CAI-equipped classroom. Teachers who lack the chance to develop professionally in the use of modern technologies feel under threat. The relevance of a teacher in the 21st century is determined by their willingness to develop in this way. However, despite the policies directed at incorporating technology into teaching, this paradoxical situation makes the case of Zango Kataf Local Government Area particularly interesting. In an effort to increase understanding of this issue, this study sought to assess teacher factors associated with the application of computer-assisted instruction (CAI) in public secondary schools in Zango Kataf Local Government Area, Kaduna State, Nigeria.

Statement of the Problem

There have been concerns raised by the Education stakeholders about the ways in which CAI could be integrated in teaching and learning to enhance the acquisition of knowledge and skills in secondary schools. One general concern is that in Kaduna State, the application of CAI in learning and teaching has been less than was originally anticipated. Studies concerning teachers' gender in the application of CAI have cited female teachers' low levels of computer use due to their limited technology access, skill, and interest (Volman & van Eck, 2001). Research also revealed that male teachers used more CAI in their teaching and learning processes than their female counterparts (Kay, 2006; Wozney, Venkatesh & Abrami, 2006). Lack of in-service training is cited as one of the major barriers for applying CAI in the classroom by many teachers (Basargekar & Singhavi, 2017). More so, the attitudes of teachers towards technology greatly influence their adoption and integration of CAI into their teaching. However, lack of confidence and competence and fear often implies CAI takes a back seat to conventional learning mechanisms.

To the best knowledge of the researcher, no previous research has been carried out on teacher factors in the application of CAI in teaching and learning in the public secondary schools within Zango Kataf Local

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Government Area, Kaduna State. The need for research in this area became apparent to the researcher because of the conventional learning style attributed to public secondary schools in Zango Kataf Local Government Area. The investigation therefore sought to assess teacher factors in the application of computer-assisted instruction (CAI) in public secondary schools in Zango Kataf Local Government Area, Kaduna State, Nigeria.

Objectives of the Study

The main objective of this study is to assess teacher factors in the application of computer-assisted instruction (CAI) in public secondary schools in Zango Kataf Local Government Area, Kaduna State, Nigeria. Specifically, the study sought to:

- 1- examine teacher's gender in the application of computer-assisted instruction (CAI) in public secondary schools in Zango Kataf Local Government Area, Kaduna State; and

Research Questions

The following questions guided the study:

- 1- To what extent does teacher's gender influence the application of computer-assisted instruction (CAI) in public secondary schools in Zango Kataf Local Government Area, Kaduna State?

Research Hypotheses

The following null hypotheses were formulated and tested at 0.05 probability level:

- H₀₁: There is no significant difference in the response of teachers, principals and ministry of education officials on

teacher's gender in the application of computer-assisted instruction (CAI) in public secondary schools in Zango Kataf Local Government Area, Kaduna State.

METHODOLOGY

Survey research design was adopted in the study. The target population of the study was made up of 409 respondents, which consist of 43 principals, 361 teachers and 5 ministry of education officials in Zango Kataf Local Government, Kaduna State, Nigeria. A sample size of 217 respondents, which comprised 202 teachers, 12 principals, and 3 MOE officials. The instrument titled "Teacher Factors in the Application of Computer-Assisted Instruction Questionnaire (TFACAIQ)" was used for data collection in the study. The validated instrument was pilot tested, the reliability co-efficient was determined using Cronbach Alpha statistic and a reliability coefficient of 0.78 was obtained. The data collected in the study was analysed using descriptive statistics; frequency counts, mean and standard deviation to answer the research questions. Kruskal-Wallis was used to test the four null hypotheses at 0.05 level of significance.

RESULTS

Research Question: To what extent does teacher's gender influence the application of computer-assisted instruction (CAI) in public secondary schools in Zango Kataf Local Government Area, Kaduna State?

The data collected through the administration of questionnaire was analysed using frequency counts, mean and standard deviation. The summary of analysis made on this research question is presented in table 1.

Table 1: Teacher's gender influence in the application of CAI in public secondary schools in Zango Kataf Local Government Area, Kaduna State

SN	Item Statements	Respondents	SA	A	U	D	SD	Mean	SD
1.	Male teachers generally display greater skill endowments in the application of CAI than the female teachers.	MOE	-	2	1	-	-	3.666	0.577
		Principals	2	6	2	1	1	4.583	1.164
		Teachers	44	64	17	60	17	3.712	1.322
2.		MOE	-	1	1	-	1	2.999	1.732

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	Female teachers integrate technology to create a learning environment which promotes engagement among students.	Principals	3	5	4	-	-	3.083	1.240
		Teachers	12	61	27	24	78	2.529	1.411
3.	Female and male teachers have equal skills to apply CAI for all subjects.	MOE	-	-	1	2	-	2.800	0.000
		Principals	1	1	2	8	-	2.750	0.753
		Teachers	27	21	27	60	67	2.410	1.387
4.	Female teachers are more endowed with technological skills to apply CAI to stimulate new knowledge among students than their male counterparts.	MOE	-	2	1	-	-	2.966	0.577
		Principals	1	4	2	4	1	2.975	1.288
		Teachers	7	81	39	56	19	3.005	1.094
5.	Female teachers are more endowed with technology skills that are responsive to the needs and interests of individual learners than their male counterparts.	MOE	2	-	-	-	1	3.000	2.309
		Principals	6	2	3	1	-	3.083	1.083
		Teachers	15	84	44	34	25	3.148	1.166
6.	Male teachers used CAI more than female teachers due to their limited technology access, skill and interest.	MOE	-	2	1	-	-	3.333	0.577
		Principals	5	4	-	3	-	3.916	1.240
		Teachers	8	56	56	57	25	2.926	1.090
7.	Because of disparities in self-confidence, male teachers tend to use CAI better than the female teachers.	MOE	-	2	-	-	1	3.000	1.732
		Principals	2	5	-	4	1	3.750	1.544
		Teachers	21	75	33	68	5	3.876	1.101
8.	Female teachers are more endowed with pedagogy skills to use CAI for lessons preparation than their male counterparts.	MOE	2	-	-	1	-	3.000	1.732
		Principals	6	4	-	1	1	3.750	1.422
		Teachers	26	41	23	82	30	2.757	1.291
9.	Shortages of soft skills in technology are prevalent with female teachers than their male counterparts.	MOE	-	3	-	-	-	4.000	0.000
		Principals	6	3	3	-	-	4.250	0.866
		Teachers	47	76	30	43	6	3.757	1.260
10.	Female teachers were integrating technology into their teaching less than the male teachers.	MOE	-	2	1	-	-	3.666	0.577
		Principals	6	6	-	-	-	3.500	0.522
		Teachers	9	51	20	69	53	2.752	1.246
Average Mean								3.29	1.11

Table 1 revealed the extent to which teacher's gender influence the application of computer-assisted instruction (CAI) in public secondary schools in Zango Kataf Local Government Area, Kaduna State. The table presents the average response mean of 3.29 which is higher than the rating mean of 3.0. By implication, teacher's gender influenced the application of computer-assisted instruction (CAI) in public secondary schools in Zango Kataf Local

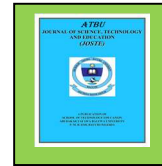
Government Area, Kaduna State. Most of the items stated on this research question recorded a response means higher than the rating mean of 3.0, which indicated agreement on the part of the participants. This is evident with item number 9 on the table which divulged that, shortages of soft skills in technology are prevalent with female teachers than their male counterparts.

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Hypothesis: There is no significant difference in the response of teachers, principals and ministry of education officials on teacher's gender in the application of computer-assisted instruction (CAI) in public secondary schools in Zango Kataf Local Government Area, Kaduna State.

The response of MOE, principals, and teachers regarding hypothesis one was analysed using Kruskal-Wallis. The summary of the hypothesis tested is presented in table 2:

Table 2: Summary of Kruskal-Wallis Statistics on the Influence of Teacher's Gender in the Application of Computer-Assisted Instruction (CAI) in Public Secondary Schools in Zango Kataf Local Government Area, Kaduna State

Group	N	Mean Rank	df	α	P-value	Decision
MOE	3	20.020				
Principal	12	18.001	2	0.05	.000	Rejected
Teacher	202	24.304				

Table 2 revealed that teacher's gender significantly influenced the application of computer-assisted instruction (CAI) in public secondary schools in Zango Kataf Local Government Area, Kaduna State. The table showed the p-value of .000 at 2 degrees of freedom. Since the p-value (.000) is lesser than the alpha level (0.05), the hypothesis which says that there was no significant difference in the response of ministry of education officials, principals, and teachers on teacher's gender in the application of computer-assisted instruction (CAI) in public secondary schools in Zango Kataf Local Government Area, Kaduna State was rejected.

evident as shortage of soft skills in technology are prevalent with female teachers than their male counterparts. Therefore, hypothesis one which states that there is no significant difference in the response of ministry of education officials, principals, and teachers on teacher's gender in the application of computer-assisted instruction (CAI) in public secondary schools in Zango Kataf Local Government Area, Kaduna State was rejected. This finding is in agreement with the findings of Tenai (2017) which showed that there was a significant correlation between gender and technology literacy only. Regardless, the finding is at variance with the findings of Basargekar and Singhavi (2017) which reflected that female teachers have higher level of perceived proficiency in using ICT in the classroom than their male counterparts.

MAJOR FINDINGS

The following findings were established in the study:

- 1- Teacher's gender has significant influence on the application of computer-assisted instruction (CAI) in public secondary schools in Zango Kataf Local Government Area, Kaduna State.

CONCLUSION

Teacher's gender influenced the application of computer-assisted instruction (CAI) in public secondary schools in Zango Kataf Local Government Area, Kaduna State.

DISCUSSION OF FINDINGS

The first finding of the study revealed that, teacher's gender influenced the application of computer-assisted instruction (CAI) in public secondary schools in Zango Kataf Local Government Area, Kaduna State. This was

RECOMMENDATION

Recommendations were made in the study that:

- 1. Kaduna State Ministry of Education Science and Technology should encourage both male and female

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teachers to develop ICT literacy through workshops and training to enable them integrate ICT for teaching thus enhancing the students' academic performance in schools.

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