The Influence of Teachers Familiarity on Competency in Integrating Instructional Technology in Mathematics Teaching

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ABSTRACT

The study explored the influence of teachers' familiarity on competency in integrating instructional technology in mathematics teaching. Structured questionnaire which had a reliability co-efficient of 0.74 determined through Cronbach alpha as the main instrument was used for data collection. The researcher upheld privacy and confidentiality of the respondents, the questions that were used did not infringe on the respondents' privacy, the respondents were allowed to ignore questions that they felt are more uncomfortable for them and they were assured that their responses were kept secret. The data were analyzed using descriptive statistics such as mean, and standard deviation and inferential statistics such as independent samples t-test and One way between groups ANOVA. Survey method was used to involve all the seventy-five professionally trained teachers in the Municipality. The study revealed that familiarity level of mathematics teachers were good predictors of their instructional technology integration. It also revealed that knowledge and frequency of use of digital tool, access and ownership of digital tools contributed significantly to mathematic teachers' competency with integrating Instructional technology in mathematics teaching accruing a total percentage of 41% variance of mathematics teachers' competency whereas other factors not included in this study were responsible for 59% influence on mathematics teachers' competency in integrating instructional technology in mathematics instruction. Based on these findings, it was recommended that public junior high schools' mathematics teachers should direct their efforts towards improving on their familiarity on competency in the integration of instructional technology in mathematics teaching.

Keywords: Influence, Familiarity, Competency, Teaching and Instructional Technology.

INTRODUCTION

Globally, the important role played by the integration of Instructional technology in education has grown with countries heavily investing in the procurement of ICT equipment and training of teachers. Thus, the integration of instructional technology in pedagogical teaching is expected to enhance the quality of learning outcomes by improving the manner in which knowledge is disseminated; improves the effectiveness of learning process and improving efficiency of education services (Collins & Jung, 2003). The influence of technology in recent times have become an evolving area of argument in all sectors exclusively in education. Educational institutions are adopting the methods of teaching which consists of technology and its offering into associated educational programmes (Talukder, Alam & Apu, 2015). Recent research has demonstrated the importance of teachers' familiarity and competency in integrating instructional technology into mathematics teaching to improve students learning outcomes. Studies have reported that mathematics teachers who are familiar with technological tools such as educational software, computer programming, and the Internet are better able to employ instructional technology in their teaching, thus providing learners with an environment where they can interact with relevant materials in different contexts and process information more effectively (Zhang & Liu, 2016). This technology enables teachers and students to accomplish familiarity and competency, how they interconnect and recognize with each other in instructional processes. As Students of this 21st century is more creative and interested in technology driven

tasks, hence teachers are expected to exhibit familiarity and competency of ICT in instruction. Research has revealed that familiarity and competency of ICT has influenced on teachers instructional and pedagogical processes. For instance, Shaheen and Khatoon (2017) posit that the quality of teaching and managing of educational activities can be enhanced by the instructional technology integration. Additionally, the incorporation of instructional technology in classrooms improves teaching and learning processes across all subjects especially in mathematics. It increases the motivation of children and enhances the process of addressing their individual learning needs. It also improves the enjoyment and interest in learning and augments self-directed learning. In view of this, various effort has been rolled out in a bid by the government of Ghana through the Ministry of Education, Ghana Education Service and development partners to facilitate instructional technology integration in the education system with specialty in mathematics, and this has led to significant development and progress in the dissemination of teaching using e-learning platforms. A significant milestone by the Government of Ghana towards technology integration in schools was the introduction of one-teacher one-laptop initiative which witnessed the distribution of personal laptops to teachers at the pre-tertiary levels. Teachers are further provided with ICT training geared toward improving on their familiarity and competency of instructional technology integration in mathematics.

Nonetheless, there is still a knowledge gap regarding the manner in which mathematics teachers' familiarity and competency influence their integration of instructional technology in mathematics in the teaching and learning processes. This study, therefore, sought to explore the influence of teachers' familiarity on competency in integrating instructional technology in mathematics teaching in the Effutu Municipality of the Central Region of Ghana.

Problem Statement

Public junior high school teachers' integration of instructional technology in teaching most especially in mathematics in the Effutu Municipality still remains a mirage and a stern dilemma despite the unprecedented efforts by the Government of Ghana, Ministry of Education and the Ghana Education Service in recent times through the provision of 21st century and up to speed laptops to inculcate in teachers' acceptance and use in instructional delivery and for other educational purposes. Limited research revealed that the low rate in integrating new technology especially in the public basic schools in Ghana is ascribed to several factors which include teachers' familiarity of technology, teacher's competency of technology, inadequate ICT facilities in the schools, poor ICT policies, poor perceptions of using technology in education among teachers, students and the school administrators. Despite the fact that the new curriculum of education for pre-tertiary is underpinned by the use of technology which revolve around the student-centered learning which involve the use of technological resources in teaching, chalkboard and text books and other traditional methods of teaching are still the most continuously dominant class room facilities in virtually all the public basic schools in Ghana (NaCCA, 2023). Teachers' persuasive approach to integrating instructional technology in mathematics teaching relies on mathematics teachers' familiarity and competency couple with the accessibility of ICT facilities. Experience over the past years has shown that public junior high schools' teachers are limited with regards to the use of instructional technology the in teaching and learning processes especially in the coastal precinct of Ghana. This therefore has militated against the urge of teachers to integrate instructional technology in mathematics instruction, although technology integration in teaching is said to be one of key drivers for any successful instructional activity. Agyei and Voogt (2012) carried out a study to evaluate in-service training programmes in Ghanaian secondary schools. The study revealed that mathematics teachers were trained using a collaborative design approach to develop their ICT-TPACK competency and familiarity for effective teaching at the pre-service training, however, they did not continue that same urge of technology integration as in-service teachers. This therefore has adverse effects on the teaching and learning of mathematics. It is therefore deduced from this assertion that poor performance in mathematics at higher levels of learning is traceable to learners'

deficiencies at an early stage. This therefore raises questions on the influence of teachers' familiarity on competency in integrating instructional technology in mathematics instruction. However, the lack of evidence to support these avowals could cast doubt on the credibility and subsequently making it intuitive. In essence, stakeholders of education are required to design and implement ICT policies that will improve on mathematics teachers' familiarity and competency level of instructional technology in promoting effective learning of mathematics by students at an early stage so as to lay a solid foundation for the learning of higher mathematical concepts. Supported by these significant revelations of the influence of teachers' familiarity on competency in integrating instructional technology in mathematics teaching. it thus appears there is still insufficient conception of the influence of teachers' familiarity on competency of instructional technology integration in the Effutu Municipality. This study therefore sought to fill this gap by exploring the influence of teachers' familiarity on competency in integrating instructional technology in mathematics teaching in the Effutu Municipality of the Central Region of Ghana.

Purpose of the Study

The purpose of the study was to explore the influence of teachers' familiarity on competency in integrating instructional technology in mathematics teaching in the Effutu Municipality of the Central Region of Ghana.

Research Question

The study was directed by one research question:

1. To what extent do JHS mathematics teachers' familiarity level predict teachers' competency level in integrating ICT in mathematics teaching?

Study Hypotheses

H_{01}: There is no statistically significantly difference between mathematics teachers' demographic variables on their familiarity level in integrating instructional technology in mathematics teaching.

H_1: There is statistically significantly difference between mathematics teachers' demographic variables on their familiarity level in integrating instructional technology in mathematics teaching.

H_{02}: There is no statistically significantly difference between mathematics teachers' demographic variables on their competency level in integrating instructional technology in mathematics teaching.

$H_{2:}$ There is statistically significantly difference between mathematics teachers' demographic variables on their competency level in integrating instructional technology in mathematics teaching.

Significance of the Study

The study would help identify the relationship between teachers' familiarity on and competency in integrating instructional technology in mathematics teaching. It is anticipated that the findings of this study would increase the awareness of the need of public junior high school teachers' integration of instructional technology in mathematics instruction. The results would further give valuable insight into how teachers should better empower their students by helping them develop familiarity with technology and better integrate it within mathematics instruction. The findings of the study would be used as a baseline by the National Council for Curriculum and Assessment (NaCCA) in ensuring that ICT policies on mathematics teaching are strategically implemented for effective instructional delivery. The findings would further be of significance to mathematics teachers and other teachers in the Municipality, as this would reawaken the awareness, development and use the 21st century instructional resources to the meet the needs and aspirations of students. The findings of the study would also trigger a comprehensive in-service training for

mathematics teachers on the areas of familiarity and competency of ICT integration in mathematics instruction. Finally, this study could provide further evidence for declaring the inclusion of instructional technology into learning environments as a vital aspect of mathematics teaching in 21st century schools.

METHODOLOGY

Research Design

The study utilizes the quantitative research approach, supported by the correlational research design to investigate any relationship between the variables, McCombes (2019). This study was conducted in the Effutu Municipality in the Central Region of Ghana. The accessible population was all public Junior High School mathematics teachers in the Effutu Municipality in the Central Region of Ghana. The participants were considered appropriate for the study because their vast experience of instructional technology integration which has implication on their instructional practices as mathematics teachers. All seventy-five public junior high school mathematics teachers in the study area participated in the study through the use of the survey method.

Instrumentation

Data collection was through structured questionnaire which involve using a 5-point Likert-type scale ranging from (1) strongly disagree to (5) strongly agree to solicit for information in relation to teachers' integration of ICT in mathematics instruction. The use of scales enhances the reliability of measurements because an aggregate score from several variables is a more reliable indicator of an attribute (Gliem & Gliem, 2003). The Cronbach's Alpha statistics was used to calculate for the internal consistency for the questionnaire. This was done by using the Statistical Package for Service Solution (SPSS) version 25. The questionnaire was coded, and entered into the Statistical Product for Service Solution (SPSS) version 25. The data were then explored to identify missing data and outliers. Descriptive statistics (mean, standard deviations) was used for the analysis of the demographic variables whereas the inferential statistics was used for research question one.

RESULTS AND DISCUSSIONS

Demographic Characteristics of Teachers

The bio-data of participants were examined, and the results are shown in Table 1.

Table 1: Bio-Data of Participants

Variables	Categories	Frequency	Percent
Gender	Male	42	56.0
	Female	33	44.0
Age	Less than 30	15	20.0
	30-39years	44	58.7
	40-49years	15	20.0
	50+	1	1.3
Educational qualification	Certificate A	3	4.0
	Diploma	11	14.6
	Bachelor's Degree	47	62.7
	Masters	14	18.7

Years of practice	1-3years	13	17.3
	4-6years	8	10.7
	7-10years	30	40.0
	11+ years	24	32.0

Source: Fieldwork Data (2023).

As indicated in Table 1, it depicts more male teachers (n=42, 56.0%) than female teachers (n=33, 44.0%) were involved in the study. Vis-à-vis age, the findings disclosed that most of the teachers who participated in the study were 30-39 years (n=44, 58.7%) than those who were less than 30 years (n=15, 20.0%), 40-49 years (n=15, 20.0%) as well as those who were 50+ (n=1, 1.5%). The distribution of the respondents on educational qualification revealed that 47 respondents representing 62.7%s had Bachelor's degree, 14 respondents, representing 18.7% were Master's degree holders, and the remaining respondents had diploma (n=11, 14.6%) and certificate 'A' (n=3, 4.0%) respectively. The composition of the respondents by years of practice showed that most of the respondents had 7-10 years of professional practice (n=30, 40.0%) as compared to those with 11 + (n=24, 32.0%), 1-3 years (n=13, 17.3%), and 4-6 years (n=8, 10.7%). The demographic distributions of the participants showed that data were collected from respondents with diverse backgrounds, thereby making the data rich and devoid of prejudice. In this way, the authenticity of the data and their findings were enhanced.

Research Question One: To what extent do junior high school mathematics teachers' familiarity level predict their competency level in integrating instructional technology in mathematics teaching?

The first research question investigated the extent to which mathematics teachers' familiarity level predict their competency level with integrating instructional technology in mathematics teaching. The familiarity construct included in the analysis are access and ownership of digital tools, their frequency of using digital tools and knowledge, their experience with e-Learning and the use of instructional activities using ICT. The multiple regression was used to analyze the data, and the results are presented in Table 2.

Table 2. Model summary for familiarity factors contributing to mathematics' teachers' integration of instructional technology in mathematics teaching

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics				
					R^2 Change	F Change	df1	df2	Sig. F Change
1	0.641	0.410	0.377	0.552	0.410	12.179	4	70	0.000

Source: Fieldwork Data (2023).

The simple linear multiple regression results in Table 2 revealed that familiarity constructs such as access and ownership of digital tools, their frequency of using digital tools and knowledge, their experience with e-Learning and the use of instructional activities using ICT collectively contributed 41.0% of the variance in the mathematics teachers' competency in integrating instructional technology in mathematics teaching which was found to be statistically significant [F (4, 70) =12.179, $p<0.05$]. This result implied that other factors not included in this study were responsible for 59% influence on mathematics teachers' competency in integrating ICT in mathematics instruction. It is inferred from this result that generally familiarity level of mathematics teachers in instructional technology were good predictors of their integration of instructional technology in mathematics teaching in public junior high schools in the Effutu Municipality.

The study further examined the influence of each predictor contained in the familiarity construct on

mathematics teachers' competency in integrating instructional technology in mathematics, and the results are presented in Table 3.

Table 3. Standardized and unstandardized coefficients for familiarity constructs contributing to mathematics teachers' instructional technology integration competency

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta B			Tolerance	VIF
		1.311	0.288		4.554	0.000		
	Access and Ownership to Digital Tools	0.167	0.077	0.239	2.184	0.032	0.702	1.424
	Knowledge and Frequency of Use of Digital Tools	0.331	0.096	0.406	3.437	0.001	0.603	1.659
	Teachers Experience with E-Learning	-0.015	0.110	-0.015	-0.139	0.890	0.752	1.330
	Instructional Activity Using ICT	0.114	0.070	0.163	1.639	0.106	0.846	1.181
a. Dependent Variable: Overall Level of Competency								

Source: Fieldwork Data (2023).

The results in Table 3 showed that out of the four indicators of familiarity, it was discovered that access and ownership to digital tools (β=0.239, t=2.184, $p<0.05$), and knowledge of and frequency use of digital tools (β=0.406, t=3.437, $p<0.05$) individually contributed significantly to mathematic teachers' competency of integrating instructional technology in mathematics teaching while the contribution of teachers experience with e-learning (β =-0.015, t=-0.139, $p>0.05$) and instructional activity using ICT (β=0.163, t=1.639, $p>0.05$) was not significant. In order of magnitude, it was revealed that knowledge and frequency of use of digital tools and access and ownership of digital tools contributed uniquely to mathematic teachers' competency in integrating instructional technology in mathematics instruction. Therefore, the study concluded that these were critical in determining the competency level among mathematics teachers in public Junior High Schools in the Effutu Municipality.

Test of the Research Hypotheses

Hypothesis 1

H_{01}: There is no statistically significantly difference between mathematics teachers' demographic variables on their familiarity level in integrating instructional technology in mathematics instruction.

H_1: There is statistically significantly difference between mathematics teachers' demographic variables on their familiarity level in integrating instructional technology in mathematics instruction.

To provide answers to this hypothesis, the independent samples t-test was carried out, and the results are presented in Table 5.

Table 4: T-test results for male and female teachers on their familiarity of instructional technology integration

Sex	Mean	Std. Dev.	T	Df	Sig. (2-tailed)
Male	2.62	0.57	-1.143	73	0.257
Female	2.79	0.74			

Source: Fieldwork Data (2023).

As indicated in Table 4, the results have demonstrated that sex was not important determining the familiarity level of mathematics teachers in integrating instructional technology in mathematics teaching in public junior high schools in the Effutu Municipality. Hence, the null hypothesis that is "H_{01}: Sex of mathematics teachers will not significantly affect their familiarity level in integrating instructional technology in mathematics teaching in public junior high schools in the Effutu Municipality was not rejected.

To test the differences of teachers' age on their familiarity level of integrating instructional technology into mathematics instruction, One-Way between groups ANOVA was used and the results are shown in Table 5.

Table 5: ANOVA results for age and teachers' familiarity level of instructional technology integration

Age	Mean	Std. Dev.	Sum of Squares	Df	Mean Square	F	Sig.
Less than 30	3.47	0.84	0.304	3	0.536	0.669	0.616
30- 39 years	3.86	1.13	0.888	71	0.609		
40-49 years	3.64	1.43	0.776	74			
50+	4.50	0.74					
Total	3.83	0.41					

Source: Fieldwork Data (2023).

The one-way between groups ANOVA results in Table 5 shows that there is no statistically significant differences in mathematics teachers age and their familiarity level in integrating instructional technology in mathematics teaching [F (3, 71) =0.669, p=0.616] at 0.05 alpha level. Based on these results, it is concluded that age did not affect mathematics teachers' familiarity level of integrating instructional technology in mathematics teaching in public junior high schools in the Effutu Municipality.

To further test the difference of teachers' academic qualification on their familiarity level of integrating instructional technology into mathematics instruction, One-Way between groups ANOVA was used and the results are shown in Table 6.

Table 6: ANOVA results for academic qualification and teachers' familiarity level of instructional technology integration

Academic Qualification	Mean	Std. Dev.	Sum of Squares	Df	Mean Square	F	Sig.
Certificate A	2.51	1.02	1.204	3	0.401	0.942	0.425
Diploma	2.44	0.42	30.237	71	0.426		
Bachelor's Degree	2.78	0.66	31.441	74			
Masters	2.65	0.71					
Total	2.69	0.65					

Source: Fieldwork Data (2023).

The one-way between groups ANOVA results in Table 6 shows that there were no statistically significant differences in terms of mathematics teachers academic qualification and familiarity level in integrating instructional technology in mathematics teaching [F(3, 71)=0.942, p=0.425] at 0.05 alpha level. Based on these results, it is concluded that academic qualification did not affect mathematics teachers' familiarity level of integrating instructional technology in mathematics teaching in public junior high schools in the Effutu Municipality.

In determining the difference of years of teaching experience on the familiarity level of mathematics teachers in integrating instructional technology in mathematics instruction, the one-way between groups ANOVA was used, and the results are shown in Table 7.

Table 7: ANOVA results for years of practice and teachers' familiarity level of instructional technology integration

Experience	Mean	Std. Dev.	Sum of Squares	Df	Mean Square	F	Sig.
1-3 years	2.68	0.55	0.116	3	0.039	0.088	0.966
4-6 years	2.77	0.91	31.324	71	0.441		
7-10 years	2.65	0.68	31.441	74			
11+ years	2.72	0.61					
Total	2.69	0.65					

Source: Fieldwork Data (2023).

The ANOVA results in Table 7 showed that there were no statistically significant differences in mathematics teachers' years of teaching experience and their familiarity level in integrating instructional technology in mathematics teaching [F (3, 71) =0.088, p=0.966] at 0.05 alpha level. Thus, there is an indication to conclude that years of teaching experience did not matter in the familiarity level of mathematics teachers in integrating instructional technology in mathematics teaching in public junior high schools in the Effutu Municipality.

Hypothesis 2

H_{02}: There is no statistically significantly difference between mathematics teachers' demographic variables on their competency level in integrating instructional technology in mathematics teaching.

$H_{2:}$ There is statistically significantly difference between mathematics teachers' demographic variables on their competency level in integrating instructional technology in mathematics teaching.

Table 8: T-test results for male and female teachers on their competency on instructional technology integration

Sex	Mean	Std. Dev.	T	Df	Sig. (2-tailed)
Male	2.91	0.60	-1.575	73	0.119
Female	3.17	0.80			

Source: Fieldwork Data (2023).

As indicated in Table 8 the results depicts that there is statistically significant differences between males and females competency level in integrating instructional technology in mathematics teaching [t(73)=-1.575, p=0.119, 2-tailed] at 0.05 alpha level. Therefore, the results have established that sex was important in determining the competency level of mathematics teachers in integrating instructional technology in mathematics teaching in public junior high schools in the Effutu Municipality.

The differences of age on the competency level of teachers were examined, and the results are presented in Table 9

Table 9: ANOVA results for age and teachers' competency level of instructional technology integration

Age	Mean	Std. Dev.	Sum of Squares	df	Mean Square	F	Sig.
Less than 30	3.09	0.72	2.635	3	0.878	1.862	0.144
30-39 years	3.08	0.71	33.501	71	0.472		
40-49 years	2.89	0.58	36.137	74			
50+	1.55						
Total	3.02	0.70					

Source: Fieldwork Data (2023).

The ANOVA results in Table 9 showed that there were no statistically significant differences in terms of age and their competency level [F (3, 71) =1.862, p=0.144] at 0.05 alpha level across the various age groups. Therefore, there is evidence to conclude that age did not matter in the competency level of mathematics teachers in integrating instructional technology in mathematics teaching in public junior high schools in the Effutu Municipality.

The study further investigated the differences of educational qualification of mathematics teachers on their competency level in integrating instructional technology in mathematics instruction, and the results are shown in Table 10.

Table 10: ANOVA results for educational qualification and teachers' competency level of instructional technology integration

	Mean	Std. Dev.	Sum of Squares	df	Mean Square	F	Sig.
Certificate A	2.88	0.63	0.122	3	0.041	0.080	0.970
Diploma	3.02	0.29	36.014	71	0.507		
Bachelor's Degree	3.02	0.67	36.137	74			
Masters	3.09	1.03					
Total	3.02	0.70					

Source: Fieldwork Data (2023).

The ANOVA results in Table 10 shows that there were no statistically significant differences in terms of mathematics teachers' academic qualification and their competency level in integrating instructional technology in mathematics teaching [F (3, 71) =0.080, p=0.970] at 0.05 alpha. Hence, there is evidence to conclude that academic qualification of teachers did not matter in the competency level of mathematics teachers in integrating instructional technology in mathematics teaching in public junior high schools in the Effutu Municipality.

In determining the differences of years of teaching experience on their competency level of mathematics teachers, the one-way between groups ANOVA was used, and the results are shown in Table 11.

Table 11: ANOVA results for years of practice and teachers' competency level of instructional technology integration

	Mean	Std. Dev.	Sum of Squares	Df	Mean Square	F	Sig.
1-3 years	2.90	0.49	1.778	3	0.593	1.225	0.307
4-6 years	2.65	0.82	34.358	71	0.484		
7-10 years	3.08	0.76	36.137	74			
11+ years	3.15	0.66					
Total	3.02	0.70					

Source: Fieldwork Data (2023).

The ANOVA results in Table 11 shows that there were no statistically significant differences mathematics teachers' years of teaching experience and their competency level in integrating instructional technology in mathematics teaching [F (3, 71) =1.225, p=0.307] at 0.05 alpha level. Consequently, there is evidence to conclude that years of experience of teachers did not matter in the competency level of mathematics teachers in integrating instructional technology in mathematics teaching in public junior high schools in the Effutu Municipality.

DISCUSSION OF FINDINGS

Research Question One

The first research question sought to explore the extent to which mathematics teachers' familiarity level predict their competency level in integrating instructional technology in mathematics teaching. The familiarity construct included in the analysis were access and ownership of digital tools, their frequency of using digital tools and knowledge, their experience with e-learning and the use of instructional activities using ICT. The multiple regression was used to analyze the data. The multiple regression results depicts that familiarity constructs such as access and ownership of digital tools, their frequency of using digital tools and knowledge, their experience with E-learning and the use of instructional activities using ICT collectively contributed 41.0% of the variance in the mathematics teachers' competency in integrating ICT in mathematics teaching which was found to be statistically significant [F (4, 70) =12.179, p<0.05], whiles other factors not included in the study responsible for 59% influence on mathematics teachers' competency in integrating ICT in mathematics instruction. This assertion is in line with Sarfo, Amankwah, Oti-Agyen and Yidana (2016) who revealed in their study that teachers had high level of ICT accessibility and ownership of digital tools, frequency of use which led to their competency and integration of instructional technology in instruction. The results further showed that out of the four indicators of familiarity, it was discovered that access and ownership to digital tools and knowledge of and frequency use of digital tools individually contributed significantly to mathematic teachers' competency of integrating instructional technology in mathematics teaching while the contribution of teachers experience with E-learning and instructional activity using ICT was not significant. In order of magnitude, it was revealed that knowledge

and frequency of use of digital tools and access and ownership of digital tools contributed uniquely to mathematics teachers' competency in integrating instructional technology in mathematics instruction. Therefore, the study concluded that these indicators were critical in determining the competency level among mathematics teachers in public junior high schools in the Effutu Municipality.

Study Hypotheses

Finally, on the study's hypotheses, findings from the first hypothesis showed that there is no statistically significantly difference between mathematics teachers' demographic variables on their familiarity level in integrating instructional technology in mathematics teaching, hence, the null hypothesis was accepted while the alternative hypothesis was rejected. The results conform with Norris, Sullivan, Poirot and Soloway (2003) who found that sex, age, academic qualification and years of experience variables were not a predictor of instructional technology integration into teaching. On the contrary, Broos (2005) also found significant gender differences favoring males than females. Kay (2006) cites with Broos (2005) who found that male teachers had relatively higher levels of instructional technology integration as compared to their females' counterparts.

The second hypothesis states that there is no statistically significantly differences between mathematics teachers' demographic variables on their competency level in integrating instructional technology in mathematics teaching. According to the stated hypothesis, sex, age, academic qualification, years of teaching experience with respect to the findings showed that there were no statistically significant differences of age, academic qualification and years of experience of mathematics teachers in their competency level in integrating instructional technology in mathematics instruction. Thus, there is evidence to conclude that age, academic qualification and years of experience of teachers did not matter in the competency level of mathematics teachers in integrating instructional technology in mathematics teaching in public Junior High Schools in the Effutu Municipality. The findings agree with Agbatogun (2010) that teachers' response to acquiring knowledge, skills and competence in the manipulation of ICT is on the rise without academic qualification prejudice. Contrary, these results are in variance with the findings of Atkins and Vasu (2000) which states that attitude of teachers towards the acquisition of ICT literacy skills and integration depreciate as they attain high academic qualifications. Also, Hammerschaig and Izhaki (1997) in their studies confirmed that age is one of the factors that affect the use of ICT resources in teaching and learning. The outcome of this study makes it evident that teachers' teaching experience has no mutual relationship with teachers' competence in ICTs. The number of years spent in the teaching profession may not determine competence in the use of ICTs since computer is not used by the teacher to teach and there are no other school activities that require teachers to be using the ICT on regular basis. instructional technology competence can only be influenced by the extent to which teachers expose themselves to adequate use of the ICT particularly outside the school hours. This finding is not in agreement with Ojo (2006) which reported that the greater the relevant experience in a given field or performance of an act, the easier the learning of fresh ideas in that particular field or performance of related action. Schools having more teachers with five years and above teaching experience achieved better results than schools having more teachers with less than five years teaching experience (Adeyemi, 2011).

Study Findings

How teachers' familiarity level predicts their competency level in integrating ICT in mathematics teaching

The first research question examined the extent to which mathematics teachers' familiarity level predict their competency level in integrating instructional technology in mathematics teaching. The findings revealed that familiarity level of mathematics teachers in instructional technology integration were good predictors of their integration. Consequently, it is important to note that knowledge and frequency of use of

digital tools and access and ownership of digital tools contributed uniquely to mathematics teachers' competency with integrating instructional technology in mathematics teaching which accrued a total percentage of 41% variance of mathematics teachers' competency where as other factors not included in this study were responsible for 59% influence on mathematics teachers' competency in integrating instructional technology in mathematics instruction. It is inferred from this finding that generally familiarity level of mathematics teachers in instructional technology were good predictors of their integration of instructional technology in mathematics teaching in public Junior High Schools in the Effutu Municipality.

The Hypotheses

The first hypothesis shows that there is no statistically significantly difference on the familiarity level of mathematics teachers' integration of instructional technology in mathematics teaching based on their sex, age, academic qualification and years of teaching experience, hence, the null hypothesis was not rejected. The findings from the second hypothesis revealed that there were no statistically significantly differences in competency level of mathematics teachers in integrating instructional technology in mathematics teaching based on sex, age, academic qualification and years of experience, hence, the null hypothesis was not rejected.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The purpose of the study was to explore the influence of teachers' familiarity of instructional technology on competency in integrating instructional technology in mathematics teaching in the Effutu Municipality of the Central Region of Ghana. Two research questions were anchored in exploring the influence of teachers' familiarity on competency in mathematics instruction. The study utilizes the correlational design underpinned by the quantitative research approach. The accessible population of the study comprised of all seventy-five professionally trained public junior high schools' mathematics teachers. The survey method was used to involve all the seventy-five public Junior High Schools mathematics teachers in the Municipality of the study. The descriptive and inferential statistics were used to analyse the data. The Findings were presented with respect to the two research questions as stated in the study.

In conclusion, it is evident that instructional technology integration has the potential to significantly increase efficiency and effectiveness for both mathematics teachers and individual students. With critical analysis of results on the influence of instructional technology integration in mathematics instruction, it is clear that familiarity of personnel with ICT tools and concepts is of paramount significance for successful integration. Based on these, it is recommended that stakeholders of education should therefore invest resources in training personnel at the junior high school level in order to realize the full potential of instructional technology integration. Additionally, more research needs to be conducted to better understand how technology can help mathematics teachers fulfil their goals and how to facilitate this integration. Finally, public junior high schools' mathematics teachers should direct their efforts towards improving on their familiarity of ICT on competency in the integration of instructional technology in mathematics teaching.

Suggestions for further studies

I proposed that the study is replicated in all second cycle institutions of the pre-tertiary education in the Effutu Municipality to explore the influence of teachers' familiarity on competency in integrating instructional technology in mathematics instruction. This will help develop a district-wide strategic interventions to improve on mathematics teachers' familiarity on competency in integrating instructional technology in teaching in the entire municipality.

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