

Teachers' Concerns Towards the Implementation of ICT Curriculum in Basic Schools in Kumasi Metropolis

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Abstract

The study sought to assess concerns of teachers regarding the implementation of ICT curriculum in basic schools in Kumasi metropolis. It also examined the relationship between gender and teachers' stages of concerns. A multi-stage sampling procedure was adopted in selecting the sample for the study. The Stages of Concern Questionnaire was modified and used to gather data from 181 male and 165 female ICT teachers. Both descriptive and inferential statistics were used in analysing the data. Results showed that teachers generally had high consequence and informational concerns and low concern at awareness stage. This indicates that teachers were more bothered on the impact of the ICT curriculum on their students and also lacked requisite knowledge and skills in implementing the curriculum. Moreover, the independent sample t-test conducted revealed statistically significant relationship between gender and informational, management, consequence, collaboration and refocusing concerns. It was recommended among others that GES should embark on rigorous educational programmes in order to upgrade teachers' knowledge and skills on the ICT curriculum.

Keywords: Basic school teachers, Gender, ICT curriculum, Teachers' Concerns

INTRODUCTION

Educational environment constantly keeps on changing due to diverse educational needs of society and students, the high expectations from the public, and periodic policy reports demand educational change at the school-based level in local and international contexts (Cheng, 1994). Such demands for change also mean resultant modification or a complete reform in the entire educational curriculum. Oliver (1965) had argued that "curriculum obsolescence occurs at a rapid rate as educational programmes face new demands for intellectual quality amid startling expansions in knowledge" (p.1). Such tremendous expansion of knowledge is gradually taking place across all the educational systems and also all fields of study, and more specifically, in the area of Information and Communication Technology (ICT).

The exponential growth and development in ICTs have brought remarkable changes in this 21st century (UNESCO, 2002). It is an undeniable fact that ICTs play a very important role in the development of every nation these days. This is because growth and development is often induced by the flow of information and this realization has led most countries into knowledge acquisition. In fact, the evolution of ICT has had an impact on the way we live, learn and work. ICT therefore has the ability to change the nature of learning as well as teachers and students in teaching and learning process (UNESCO, 2002). Grimus (2000) argued that the relevance of teaching and studying of ICT in schools, especially at the basic school levels cannot be over emphasized. He further opined that the teaching and learning of ICT at the basic level of education prepares learners to face future development based on proper understanding of issues and 21st century demands. Moreover, ICT can motivate pupils in their learning by bringing variety into the lessons, and at the same time, sustaining teacher's own interest in teaching (Grimus, 2000). Therefore, there is a growing demand on countries and educational institutions to utilise ICT to teach skills and knowledge that students need for the 21st century challenges.

Realizing the effect of ICT on our educational development, government, through the Ministry of Education (MoE) developed ICT in Education Policy to ensure that the Ghanaian education sector provides adequate opportunities for Ghanaians to develop the requisite skills, regardless of the levels of education to benefit fully from this information society. The overall goal of the policy according to Ministry of Education (2008), "is to enable graduates from Ghanaian educational institutions (formal and non-formal) to confidently and creatively use ICT tools and resources to develop requisite skills and knowledge needed to be active participants in the global knowledge economy by 2015" (p.13). The development of ICT in Education Policy is also based on a number of efforts made by the Government through GES, development partners and other private sector agencies covering over 15 years (MoE, 2008). According to MoE (2008), the policy was

influenced by a number of factors, including:

1. World Forum on Education, Dakar (2000)
2. Report of Educational Reforms in Ghana: Meeting Challenges in the 21st Century (2002)
3. ICT in Education Policy Framework: which highlights key issues and expected benefits of ICTs in Education (2002)
4. The Ghana ICT for Accelerated Development (ICT4AD) Policy (2003) that recognises education as a cross-cutting issue within the national framework crucial to the support of the thirteen other national pillars.
5. Ghana Education Strategic Plan 2003 – 2015: Volumes I and II (2003)
6. White Paper on the Report of the Education Reform Review Committee (2004)

As a result of the aforementioned, in the year 2007, the Government of Ghana through the Ministry of Education introduced new educational reform. This was the second of two major educational reforms implemented in the country since independence in 1957; the first was launched in 1987 (Cobbold & Ani-Boi, 2011). The new educational reform was the Government's response to recommendations made by a committee that was appointed to review the entire educational structure in order to make it relevant to societal needs. The development of ICT at the basic education level, which is the focus of this study, is defined as the first eleven years of formal education to which every child in Ghana is entitled as a right to equip him/her to function effectively in society (MOE, 2008). It is composed of two years of kindergarten, six years of primary education, and three years of junior high school (JHS) education (2:6:3). The 2007 educational reform among others brought the following changes:

1. Introduction of new subjects such as Information and Communication Technology (ICT);
2. Introduction of new teaching methodology and curriculum materials such as textbooks and syllabi as well as new teaching and learning materials;
3. Increase in daily contact hours – from four and half hours to five hours (Ministry of Education, Youth and Sports, 2004).

The introduction of ICT curriculum therefore requires that teachers have to learn new knowledge and skills, use new teaching methods, techniques and strategies as well as to work for more hours. These, together with the increase in pupil enrolments resulting from the implementation of capitation grant, the school feeding programme, free textbooks and uniform distribution as well as the special emphasis given to girl-child education, all add to the teachers' roles and responsibilities. However, the school environment in which the teachers work, particularly the classroom conditions and non-adequacy and non-availability of educational resources (computers, projectors, internet facilities etc) remain unchanged. All these presumably make the teachers a bit sceptical about the ICT curriculum (Cobbold & Ani-Boi, 2011).

Stenhouse (1975) elucidated the effect of new curriculum, argued that “genuine innovation begets incompetence. It deskills teachers and pupils alike, suppressing acquired competencies and demanding the development of new ones” (p. 170). This indicates that once new curriculum is introduced, teachers have to do new things in new ways. The demands and pressures associated with new curriculum implementation especially ICT, make teachers express a lot of concern about issues of resources and directions (Hall & Hord, 2006). It is therefore the responsibility of curriculum planners, designers and educational authorities to pay particular attention to teachers' concerns in order to introduce innovations into the teaching of ICT at the basic school level.

Theoretical Framework: Concerns-Based Adoption Model (CBAM)

This study was designed within the framework of the concerns-based adoption model (CBAM). The CBAM which was developed from Fuller's concern theory of teacher development i, is theoretical model for identifying the concerns of individuals during the implementation of educational or curriculum change. According to Anderson (1997), CBAM is a methodology for the measurement, description and explanation of different aspects of the implementation of circular and instructional innovation. He further described the model as “the most robust and empirically grounded theoretical model for the implementation of educational innovations to come out of educational change research in the 1970s and 1980s” (p.331). The CBAM is guided by the following assumptions: (1) change is a process; (2) change is individual; (3) the perceptions and feelings of individuals are crucial to successful implementation; (4) individuals proceed through stages in their feelings about perceptions of, and level of skill in use of an innovation; and (5) change facilitators must proceed systematically, assess regularly, and provide support continually (Marsh & Willis, 2007).

The CBAM is a complex multi-dimensional framework and it comprises of stages of concern, levels of use and innovation configuration. Stages of Concern (SoC) component assesses the various concerns of teachers express in the process of implementing curriculum; Levels of Use (LoU) which tracks what teachers actually do during the implementation process and Innovation Configuration (IC) deals with whether the operational use of a new innovation is consistent with developers intentions (Hall & Hord, 2006). This implies that both SoC and LoU are concerned with the personal attitude, perception and activities teachers have or undertake in the light of

implementing curriculum. However, the IC assesses attributes of the curriculum change that enable it to succeed. The SoC component, which is basis for this study, tracks the feelings of teachers as they become involved in the implementation process. Hall, George and Rutherford (1979) defined concern as “the composite representation of the feelings, preoccupation, thought and consideration given to a particular issue or task” (p. 5). Van den Berg and Ros (1999) explained concerns as “the questions, uncertainties, and possible resistance that teachers may have in response to new situations and/or changing demands” (p.880).

Hall et al (1979) conceptualised that teacher concern regarding curriculum implementation is a developmental construct, consisting of a total of seven sequential stages. The stages are:

- Stage 0 – Awareness: The individual has little or no knowledge of the innovation and therefore, indicates little or no concern and involvement in the innovation.
- Stage 1 – Informational: The individual shows general awareness of the innovation and positive interest in learning more about it, especially about substantive aspects such as general characteristics, effects and requirements for implementation, in a selfless manner. In this stage, the individual seems unworried about his or her relation to the innovation.
- Stage 2 – Personal: The individual is uncertain about the demands of innovation, personal adequacy to meet those demands, and his or her role with the organisation. There are also concerns about potential conflicts with existing structures or personal commitments.
- Stage 3 – Management: the individual’s attention is focused on the processes and tasks related to efficiency, organisation, management, scheduling and time demands.
- Stage 4 – Consequence: The individual focuses attention on the impact of the innovation on students within the teacher’s sphere of control. Particular attention is centred on relevance of the innovation for students; evaluation of students’ outcomes, including performance and competencies; and changes needed to increase students’ outcomes. If positive effects on student learning are observed, teachers are likely to continue to work for the implementation.
- Stage 5 – Collaboration: The individual focuses on the coordination and cooperation with others on the use of the innovation.
- Stage 6 – Refocusing: The individual evaluates the innovation and explores more universal benefits from it, including the possibility of making changes for improvement, or considers replacing the existing form of the innovation with a more powerful alternative (Cheung & Ng, 2000; Hall & Hord, 2006).

Cheung and Ng (2000) further grouped the seven stages of teacher concerns into three: self-concerns (awareness, informational and personal); task concerns (management) about innovation; impact concerns (consequence, collaboration and refocusing) regarding students. According to Hall et al. (1979), every teacher’s concerns about curriculum implementation progress through these seven SoC. Teacher can experience several SoC concurrently, but there are differential degrees of intensity. Thus, teachers progress from self-oriented concerns through task-oriented to impact-oriented concerns. According to Hord (1990), even though each of the stages is distinct, they are not mutually exclusive.

Teacher Concerns in Implementing Curriculum

The application of CBAM is gaining interest and is also a well-researched model which describes how people progress as they learn about innovation and the stages of that process. Consequently, so many researchers have employed CBAM to assess teachers’ concerns. For instance, using descriptive survey design approach, Cobbold and Ani-Boi (2011) investigated primary school teachers’ concerns about implementing the 2007 educational reform in Ghana. The stages of concerns questionnaire was adapted and used to gather data from 316 primary school teachers in the Cape Coast metropolis. The results indicated that teachers had high personal and management concerns, and low informational concerns. These results therefore indicated that primary school teachers in the Cape Coast metropolis were more concerned about the impact of the reform on learners. Similarly, Kwarteng (2009) assessed status of accounting curriculum implementation by using CBAM in Ashanti and Central Regions of Ghana. The study which employed descriptive survey design, among others found that accounting teachers had their first and second high concerns at awareness and personal stages respectively with low concern at refocusing stage

Cheung and Ng (2000) investigated primary school teachers’ concerns about Target-Oriented Curriculum (TOC) in Hong Kong. The study applied 22-item Stages of Concern Questionnaire and the data were collected from 1622 primary school teachers. It was found that most teachers whether they were teaching TOC or not, showed peak concerns at the third stage that focused on management of TOC. The finding implied that teachers were most worried about issues as efficiency, time demands, organization, scheduling and the best use of resources.

Teachers' Concerns and Gender

The previous studies on the relationship of gender and teachers' concerns are not conclusive. While other studies reported significant difference between gender and teachers' stages of concerns (Alshammari, 2000; Ani-Boi, 2009), other previous studies found no significant difference (AL-Rawajfih, Fong and Idros, 2010; Hawes, 1993; Roxie, 2005). Hawes (1993) explored the concerns of the Keene State College faculty members about the implementation of a microcomputer network. The study found that no significant relationship existed between teachers' stages of concern and gender. In a study, Cetinkaya (2012) investigated mathematics teachers' concerns about the reformed 6th grade mathematics curriculum in Turkey. Among others, the study sought to examine whether success of the use of the reformed programme differed based on the personal characteristics of teachers like gender. Results revealed that female teachers reported a higher level of concern in collaboration stage about the mathematics curriculum however; male teachers reported a higher level of concern in awareness stage compared to female teachers.

AL-Rawajfih et al. (2010) examined teachers' stages of concerns in Jordan Discovery Schools on the integration of e-learning into their teaching. A total of 350 teachers were selected through stratified random sampling from all Secondary Discovery Schools in the four districts (strata) of the capital, Amman. The findings from the study indicated that overall, discovery school teachers were dominantly at the stage of "personal" on the different stages of concerns. Also, male and female teachers did not show any difference in any of these categories of concerns.

In tracking primary school teachers' concerns in Cape Coast metropolis about the 2007 educational reform in Ghana, Ani-Boi (2009) administered SoCQ to 316 (153 male and 163 females). The study revealed that male teachers reported high concerns at consequence and management stages with low collaboration concern while female teachers expressed intense concerns at personal and collaboration stages with low informational concern. Again, the ANOVA test conducted showed that female teachers had more management concerns than their male counterparts. Roxie (2005) also investigated teacher concerns regarding the implementation of the phase three software programme – CLASSROOM xp, InterGrade Pro and Blackboard 5.5. The study also among others considered difference in teacher concerns and gender. Results indicated that teachers had three high concerns related to awareness, personal and management. The ANOVA test result showed no significant difference between teacher concerns and gender.

In studying the developmental stages of concern of 312 teachers toward implementation of the Information Technology curriculum in Kuwait, Alshammari (2000) found that teachers had first and second high concerns related to collaboration and personal stages respectively. Teachers also reported low concerns at the management and awareness stages. In relation to teacher gender, the analysis of group profile indicated that females had high concerns at the collaboration and informational stages, with low concern related to awareness. Males reported collaboration and refocusing concerns, with minimal management concern. Both females and males reported collaboration as their intense concern. The study also reported a significant difference between male and female at management and refocusing stages. Marso and Piggie (1989) examined the concerns of 220 males and 950 females about teaching. The study found that females had higher impact concerns (consequence, collaboration and refocusing) about the pupils and more positive toward teaching than their male counterparts.

From the above previous studies reviewed it is obvious that not many studies have been conducted in Ghanaian context on the teachers' concerns about the implementation of ICT curriculum and the relationship between the teachers' and gender. In addition, it is not also clear that the information on the influence of gender on teachers' concerns is not conclusive. Some studies revealed that gender has effect on teachers' concerns (Alshammari, 2000; Ani-Boi, 2009) whereas other studies contradict this observation (AL-Rawajfih et al., 2010; Hawes, 1993; Roxie, 2005). This current study attempts to address this issue again within the context of a new setting. Specifically, the study examines teachers' concerns regarding the implementation of ICT curriculum in basic schools in Kumasi metropolis. Also, it investigates whether gender has effect on the teachers' concerns. On this basis, the following research questions and hypothesis have been formulated to the guide the study.

1. What are teachers' concerns toward the implementation of ICT curriculum in the basic schools in Kumasi metropolis?
2. Are there significant relationship between teachers' concerns and gender?

Hypothesis

H₀: There is no significant relationship between teacher concerns and their gender.

METHODOLOGY

Research Design

The study employed cross-sectional descriptive survey design. Since the study sought to assess on-going teachers' concerns about the implementation of ICT curriculum, the survey research approach was deemed appropriate. According to Asamoah-Gyimah and Duodo (2005), the survey approach is appropriate for

conducting a study into on-going process.

Participants

The participants for the study were ICT male and female teachers selected from both public and private basic schools in Kumasi metropolis of Ashanti Region of Ghana. A multi-stage sampling approach was used in selecting 390 teachers from the target population of 1390 ICT teachers. First, the basic schools in Kumasi metropolis were categorised into two: private and public. Based on this stratification, a simple random sampling (lottery) method was used to select 65 schools across all of the nine sub-metros within Kumasi metropolis. From these schools selected, purposive sampling method was used to 390 public and private school ICT teachers to form the sample for the study. The selection of 390 participants represented 28% of the teachers and this was in line with the suggestion of Asamoah-Gyimah and Duodo (2005) that for quantitative studies, a sample size of 10% to 30% of the target population is sufficient for generalisation purpose.

Instrumentation

The data collection instrument was a 35-items survey questionnaire which was adapted from the SoCQ (Hall et al. 1979) to ascertain the teachers' concerns toward the implementation of ICT curriculum in basic schools in Kumasi metropolis. The questionnaire was in two sections: A and B. section A sought background information on the respondents like gender whereas section B of the questionnaire elicited teachers concerns in relation to awareness, information, personal, management, consequence, collaboration and refocusing. The 35-items were measured on four point Likert scale ranging from Very true of me now 4, Somewhat true of me now 3, Not true of me now 2 and to Irrelevant 1.

Procedure for Data Collection

The questionnaires were personally administered to the respondents by the researchers in their respective schools after permissions and informed consents have been sought from the school heads and respondents respectively. The purpose for the study was made known to the respondents and they were not compelled to take part in the study and therefore at anytime they could opt out if they so wished. Hence, respondents were instructed to respond to the items independently and as such the distributed questionnaires were collected after one week. In all, 390 questionnaires were administered however, 363 of them were retrieved. Thus, the return rate was 93.1%. But 17 respondents did not respond to the items correctly, hence their questionnaires were not used for the analysis. This means that 346 respondents were part of the study.

Data Analysis Procedure

The answered questionnaires were screened to identify those that were not properly filled. The data were therefore analysed using SPSS 16.0 version. Specifically, descriptive statistics such as means and standard deviations and inferential statistics like independent sample t-tests were conducted to analyse the data.

RESULTS

Research Question One: What are the basic school teachers' concerns regarding the implementation of ICT curriculum in Kumasi metropolis?

Table 1: Descriptive Statistics of Teachers Stages of Concerns

Concerns	Mean	Standard Deviation	Rank
Awareness	8.18	2.97	7
Informational	10.13	3.11	2
Personal	9.91	2.80	4
Management	9.01	3.04	6
Consequence	10.56	3.42	1
Collaboration	9.86	3.09	5
Refocusing	9.96	3.45	3

The results presented in Table 1 show the descriptive statistics regarding concerns of teachers in relation to awareness, informational, personal, management, consequence, collaboration and refocusing. It was indicated that generally teachers' concerns were more intense at the consequence ($M=10.56$; $SD=3.42$) and then the informational ($M=10.13$; $SD=3.11$). However, they reported low concern at awareness stage ($M=8.18$; $SD=2.97$).

Research Question Two: Are there significant difference between teachers' concerns and gender? This research question sought to ascertain the difference between the male and female teachers' regarding their concerns. To find this, an independent sample-t-test was performed to test for the difference and also find out how significant the difference was.

Table 2: Gender Differences in Teachers' Concerns

Subscale	Gender	N	Mean	SD	df	t	Sig
Awareness	Male	181	8.34	3.11	344	1.054	.293
	Female	165	8.01	2.80			
Informational	Male	181	9.61	3.50	344	-3.356	.001*
	Female	165	10.70	2.49			
Personal	Male	181	9.63	2.99	344	-1.945	.053
	Female	165	10.22	2.56			
Management	Male	181	8.65	3.20	344	-2.331	.021*
	Female	165	9.41	2.82			
Consequence	Male	181	10.07	3.53	344	-2.948	.003*
	Female	165	11.14	3.21			
Collaboration	Male	181	9.53	3.07	344	-2.117	.035*
	Female	165	10.23	3.08			
Refocusing	Male	181	9.50	3.42	344	-2.616	.009*
	Female	165	10.47	3.23			

* significant at 0.05 level

From Table 2, the independent sample t-test conducted to ascertain any significant relationship between teachers' concerns and gender revealed the relationship at informational ($t=1.054$; $p<0.05$); management ($t=-2.331$; $p<0.05$); consequence ($t=-2.948$; $p<0.05$); collaboration ($t=-2.117$; $p<0.05$) and refocusing ($t=-2.616$; $p<0.05$) concern stages.

DISCUSSION

The study on the profile of basic school teachers' concerns regarding the implementation of ICT curriculum indicated that generally teachers' concerns were more intense at the consequence and informational stages with low concern at awareness stage. Teachers high concern at consequence stage implies that teachers are no longer interested in how the curriculum will affect them instead they are more concerned with how the curriculum will impact on their students. This finding is not consistent with Alshammari (2000). Alshammari found that primary school teachers reported their high concern at collaboration stage when implementing the Information Technology curriculum in Kuwait. Moreover, the intense concern of teachers on informational stage indicates that the teachers needed more information about the ICT curriculum. In this stage, perhaps the teachers wanted information about the structure and implementation of the ICT curriculum without being drowned in details and they also wanted to know how the curriculum would affect them as well. This finding corroborates with Cetinkaya (2012). Cetinkaya in a study found that teachers implementing reformed sixth grade mathematics curriculum in Turkey had high informational concern. This current finding is quite alarming since teachers lack requisite knowledge about the fundamental components of the ICT curriculum like classroom activities and also about the expected roles of teachers and students in teaching and learning process. Again, this finding is worrying since the ICT curriculum has been implemented in basic schools for about seven years. According to Van den Berg and Ros (1999), curriculum implementation might take from three to five years for teachers to move from self-concerns (like informational) to higher stages of concern.

Furthermore, the fact that scores in consequence and informational concerns were high and low awareness concern imply that teachers actually cared about the ICT curriculum and as a result they are interested in improving the impact or effect of the ICT curriculum on their students. This finding contradicts the previous studies of AL-Rawajfih et al., 2010, Cheung and Ng (2000), Cobbold and Ani-Boi, 2011 and Kwarteng (2009). For example, Kwarteng reported that accounting teachers in Ashanti and Central Regions of Ghana had their first and second high concerns at awareness and personal stages respectively with low refocusing concern.

An independent sample t-test conducted to ascertain any significant relationship between teachers' concerns and gender revealed statistically significant relationship at informational, management, consequence, collaboration and refocusing concern stages. An independent sample t-test results shown in Table 2 indicated no significant difference in teacher awareness concerns about the ICT curriculum and their gender ($t = 1.054$; $p > 0.05$). This implies that, teachers' gender has no effect on their awareness about the curriculum. That is both male and female teachers have similar awareness concerns. This finding is supports previous studies of AL-Rawajfih et al. (2010), Hawes (1993) and Roxie (2005) that gender is totally independent of teachers' concerns at awareness.

At the informational stage, the independent sample t-test results reveal statistically significant relationship between teacher level of information about the ICT curriculum and their gender ($t=1.054$; $p<0.05$). Its implication is that, how well teachers are informed about the details of the ICT curriculum is dependent of their gender. Based on the scores presented in Table 2, female teachers have a relatively higher ($X=10.70$; $SD=2.49$) informational concerns than their male ($X=9.61$; $SD=3.50$) counterparts. Even though, gender plays a

significant role in teachers' personal concerns about how adequacy in terms of knowledge and skills, in meeting the demand of the ICT curriculum, at the personal concerns stage, independent sample t-test results displayed in Table 2 find that there is no significant difference between the concerns of teachers and their gender ($t = -1.945$; $p > 0.05$). This suggests that teachers' concerns about the effects of the ICT curriculum on their professional status and changes in their roles and responsibilities by the ICT curriculum have no bearing on their gender. This result is consistent with previous findings of AL-Rawajfih et al. (2010), Hawes (1993) and Roxie (2005).

From Table 2, the independent sample t-test results indicate a statistically significant relationship between teachers' concerns and gender at the management stage ($t = -2.331$; $p < 0.05$). This means that teachers' gender plays a significant role in their ability to manage the ICT curriculum. In order to determine which category of gender has high or low management concerns; teachers' mean and standard deviation differences in relation to gender were extracted. Based on the results shown in Table 2, female teachers are more likely to have a high management concerns ($X = 9.41$, $SD = 2.82$) than male teachers ($X = 8.65$, $SD = 3.20$). This finding is consistent with the results of empirical studies of Alshammari (2000) and Ani-Boi (2009). Ani-Boi tracked concerns of primary school teachers' about implementing 2007 educational reforms in Ghana, which reported that there was statistically significant relationship between teachers' concerns and gender at management concerns and as such female teachers had a high management concerns than their male counterparts.

The independent sample t-test results displayed in Table 2 show statistically significant relationship between teachers' consequence and gender ($t = -2.948$; $p < 0.05$). The indication is that teachers' concerns regarding the relevance of the ICT curriculum on the students learning outcomes is determined by their gender. In order to determine which category of gender has low or high consequence concerns, teachers mean and standard deviation differences in relation to gender were extracted as shown in Table 2. Comparing teachers means and standard deviations with regard to their gender, it clearly seen that female teachers have high consequence concerns ($X = 11.14$; $SD = 3.21$) than male teachers ($X = 10.07$; $SD = 3.53$). This result is consistent with previous finding of Marso and Piggie (1989) who reported that female teachers had high consequence concern than their male counterparts.

Teachers' collaboration concerns as indicated by the independent sample t-test results presented in Table 2 reveal a significant relationship between teachers' collaboration concerns and gender ($t = -2.117$; $p < 0.05$). It means that teachers' desire and interest coordinating their activities with other teachers and school in order to enhance the implementation of the ICT curriculum is dependent of their gender. From the descriptive statistics, female teachers are more likely to collaborate with other teachers ($X = 10.23$; $SD = 3.08$) than their male counterparts ($X = 9.53$; $SD = 3.07$). This finding once again confirms empirical result of Marso and Piggie (1989). Perhaps a reason for this finding can be found in Ani-Boi's (2009) assertion that women in general talk a lot as compared to their male counterparts, therefore they are more likely to discuss things that pose a challenge with other people.

Results presented in Table 2 revealed that there is significant relationship between teacher refocusing concerns and their gender ($t = -2.616$; $p < 0.05$). This result implies that teachers' concerns about the ICT curriculum are function of their gender. Based on the descriptive statistics provided in Table 2, female teachers are more likely to evaluate the ICT curriculum including the possibility of making changes for improvement ($X = 10.47$; $SD = 3.23$) than male teachers ($M = 9.50$; $SD = 3.42$). This finding agrees with previous study of Marso and Piggie (1989) who found that females had high refocusing concerns than males. It is also consistent with observation of Alshammari (2000) that there was significant relationship between female and male teachers at refocusing concern stage.

The stage by stage analysis of the independent sample t-test results presented above shows that five out of the seven stages of teacher concerns do revealed statistically significant relationship between their concerns and gender with exception of the awareness and personal stages. Thus, the null hypothesis which states that there is no statistically significant relationship between teachers' concerns and their gender is partially not supported.

CONCLUSION

The study revealed that generally teachers had primary and secondary concerns at consequence and informational stages respectively with low awareness concern. This therefore implies that teachers have impact oriented questions which bothered on the effect of ICT curriculum on the students and also lack requisite knowledge on the curriculum that will enable them to implement it successfully, even though they are aware of its existence in the basic schools. Again, the independent sample t-test conducted showed that there are significance differences between teachers' concerns (informational, management, consequence, collaboration and refocusing) and their gender. This indicates that identifying and understanding teachers' concerns are equally important as identifying gender variable in developing interventions for effective implementation of the ICT curriculum.

RECOMMENDATIONS

Based on the findings and conclusions, the following recommendations are made:

1. Because the results of this study revealed that teachers experienced consequence and informational concerns, the Ghana Education Service (GES) are recommended to embark on rigorous training programmes for the teachers to upgrade their knowledge and skills about the ICT curriculum so as to reduce these concerns for effective implementation.
2. In planning and implementing the educational programmes for the teachers to upgrade their knowledge and skills on ICT curriculum, the trainers should take into consideration the gender of trainees as gender to some extent has effect on teachers' concerns.
3. For effective implementation of the ICT curriculum, continuous monitoring and assistance are recommended for the GES officials.
4. This study adopted a cross sectional descriptive survey which tracked concerns of teachers at a given time. Since implementation is a process and teachers' concerns change over time, further studies should include a longitudinal study to follow the changes in teachers' concerns over time. Also, the other two dimensions of the CBAM (SoC and IC) should be included in further research.
5. Further research should address the relationships between stages of concern and other variables such as teachers' age, qualifications, school type, professional training and years in implementing the ICT curriculum.

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