

## **GENDER METAMORPHOSES IN THE USE OF ICT TOOLS: A CASE STUDY AT OFFINSO COLLEGE OF EDUCATION**

**William K. Nantwi and Amaniampong Adjei**

Offinso College of Education, Offinso, Ghana

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**ABSTRACT:** *The role of Information and Communication Technology (ICT) in education cannot be overemphasized, hence teachers as agents of education are expected to acquire the essential skills to help train the 21<sup>st</sup> century child to survive in the current competitive and technologically driven world. The study aimed at the impact of ICT on Male and Female student-teachers in Colleges of Education in Ghana. The Mixed research design which takes into consideration the various factors that influence ICT access and usage in Colleges of Education was used. It outlines the various factors that militate against successful integration of ICT tools in teaching and learning. The extent to which student-teachers are embracing technology in their learning have been analysed. The study used questionnaire and participatory observation of classroom activities to collect data from hundred and forty (140) Student-teachers at Offinso College of Education. The findings show no significant difference in access and usage of ICT tools among male and female student-teachers. The study revealed lack of technical support and maintenance as a significant impediment to the development of ICT in the College of education. However, there was no significant difference in access and use of ICT tool since student-teachers share similar backgrounds.*

**KEYWORDS:** Gender, ICT, Education, ICT tools, Teaching, Learning, Technology, Student-Teachers, Ghana.

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### **INTRODUCTION**

Information and Communication Technology tools are digital infrastructures such as computers, laptops, desktops, data projector, software programs printers, scanners and interactive teaching box, mobile phones and gaming devices. Information and communication technologies (ICT) are set of technological tools and resources used to transmit, store, create, share or exchange information (IGI Global, 2018). Today, teachers should develop lessons that teach learners content knowledge and assist them to develop 21<sup>st</sup> century skills taking into consideration the TPACK Model (Technology, Pedagogy and Content Knowledge) so that they can think effectively, actively solve problems, and be digitally literate. The preparation of teachers in the educational uses of technology in the current digital age appears to be a key component in almost every improvement plan for education and educational reform programs (Adegbenro et al., 2015). These technological tools and resources also include computers, the Internet (websites, blogs, web 2.0, google+, google classroom, collaborative learning tools, EMIS and emails), live broadcasting technologies (radio, television and webcasting), recorded broadcasting technologies (podcasting, audio and video players, and storage devices) and telephony (fixed or mobile, satellite, video-conferencing, etc.) (UNESCO, 2011). Information Communication Technology (ICT) has great potential in changing the way the Teaching is done and how students learn. ICT help expand educational opportunities, enhance the quality of teaching and learning, sustain life-long learning, and improve efficiency and effectiveness in management. How each country utilizes ICT depends largely on the countries' ICT readiness in the area such as infrastructure, policy in ICT in education, teachers' competency, and

pedagogical use when integrating ICT into the classroom (Siribodhi, 2004). ICT is particularly well suited to transmitting knowledge, particularly to students who are not already highly motivated to learn and well versed in the art of using and interpreting information. Internet use for gathering information, and the role of information itself as a tool for cognitive development and improving problem-solving skill. The Internet can be used as a major medium for accessing learning software, and for networking with other learners and teachers. Today, computers are ubiquitous in developed country schools and universities and are rapidly spreading to developing country classrooms. Many learning tools have been developed for these computers, from learning games to computer assisted instruction software to teacher assisting software. It is believed that girls tend to appreciate clear instructions and an interesting subject more than boys, whereas boys appreciate pictures and competition more than girls (Heemskerk & Volman, 2008). The above mentioned differences support the idea that the use of a particular educational tool in class might affect boys and girls differently. In other words, educational tools may be less inclusive to either boys or girls, which in turn might result in different learning experiences and different learning results. The aim of this study is to investigate the relationship between the inclusiveness of ICT tools in classroom practice and the different learning experiences of female and male student-teachers in colleges of education. The research consists of a qualitative study that comprises the analysis of particular ICT tools, their use in the classroom, and related experiences of students (Heemskerk, Dam, & Volman, 2009). A number of studies in recent years have sought to understand gender similarities and differences in access and usage of ICT tools. Gender and technology studies have found that men and women adopt and use technology differently (Gefen & Straub, 1997; Venkatesh & Morris, 2000). Male's decisions to use technology are more strongly influenced by their perception of usefulness, while female's decisions are based more on perceptions of the technology's ease of use (Venkatesh & Morris, 2000). Definitely, males and females may view the same mode of communication with ICT tools differently. Females are said to use the phone mainly for social reasons like maintaining relationships while men use it for maintaining employment contacts, professional and other work related issues. The study by Zainudeen and Iqbal (2007) found little difference in the purposes for which phones were used. Huyer and Hafkin (2007) state: 'A range of socio-economic and political factors affect and frame the gender divide, including social and cultural barriers to technology use; education and skills levels; employment and income trends; media and content; privacy and security and location/mode of access'. Looking at internet knowledge, usage and having an email address while keeping factors such as age, education, income, rural area, status of employment, membership of a social network and country differences constant, reveals that a significant gender effect can be detected for knowledge about the internet, usage and possession of an email address (Gillwald, Milek, & Stork, 2010). The study seeks to examine the accessibility and usage of ICT Tools among student-teachers, assesses the impact of ICT Tools on performance of student-teachers and evaluate female participation in ICT as against their male counterparts. How accessible are ICT tools to Student-teachers at Offinso College of Education? What is the impact of ICT tools on teaching and learning in the College? What is the female participation in ICT as against their male counterparts?

## **METHODOLOGY**

The mixed methods research design thus both quantitative and qualitative research methods were used to explain and interpret data analytically and statistically.

### **Quantitative Research design**

Better Assessment aid ACAP (2012) explains that Quantitative research methods are characterised by the collection of information which can be analysed numerically, the results of which are typically presented using statistics, tables and graphs. Quantitative research methods attempt to maximize objectivity, reliability, and generalizability of findings, and are typically interested in prediction. Integral to this approach is the expectancy that a researcher will set aside his or her experiences, perceptions, and biases to ensure objectivity in the conduct of the study and the conclusions that are drawn. Key features of many quantitative studies are the use of instruments such as tests or surveys to collect data, and support on probability theory to test statistical hypotheses that correspond to research questions of interest. Quantitative methods are frequently described as deductive in nature, in the sense that inferences from tests of statistical hypotheses lead to general inferences about characteristics of a population.

### **Qualitative Research design**

Qualitative data are often textual observations that portray attitudes, perceptions or intentions. Conclusions made from collected qualitative data take the form of informed assertions about the meaning and experience of certain (sub) groups of affected populations. The key contribution of qualitative data is that it provides information about the human aspect of the emergency by acknowledging context to the priority needs of affected populations and with it respecting the core principle of needs based assistance and ownership by affected populations. Qualitative methods of research and analysis provide added value in identifying and exploring intangible factors such as cultural expectations, gender roles, ethnic and religious implications and individual feelings. According to Leedy and Ormrod (2005) qualitative research is typically used to answer questions about the complex nature of phenomena, often with the aim of describing and understanding the phenomena from the respondents' point of view.

### **Population**

Population in this context constitutes the First and Second year student-teachers of Offinso College of Education. The population was defined in terms of content, gender, accessibility and convenience. The content is defined in respect of the changing trend of the use of ICT tools/products. There are three hundred and fifty (350) students in first year and four hundred and ninety (490) students in second year. The College holds virtually equal number of male and female students with the male slightly more than the females students. The College also boast of student-teachers with diverse ethnic or cultural and socio-economic backgrounds. These provided empirical data for finding credible answers to the research questions. Once it was challenging and unpractical to work with the entire population the researchers resorted to sampling.

### **The sample and sampling**

The researchers opted for first and second year students who are studying various courses including Information and Communicative Technology. In all, One hundred and forty (140) students from eight hundred and forty (840) students from first and second year were selected from the population with simple random and convenient sampling techniques. The sampled population included seventy (70) male and seventy (70) female student-teachers. The findings from this sample were generalized since the populace had similar characteristics. Each respondent served as an entity and all the respondents were regarded as the sample frame. Their

attributes were relevant to the research problem. Simple random sampling technique was relied on where every unit of the sample had equal opportunities of being selected.

### **Data Collection Instruments**

Collection of data is relevant in every research work. The data facilitate the testing and resolving research questions. There were many approaches and techniques necessary for acquiring of data for this study. These approaches were the various research instruments which were used to gather, describe and quantify the data. Data collection instruments used by the researchers were questionnaire, and observation methods.

#### **Observation**

Observation is one of the oldest methods of data collection. Literally, observation means a method of data collection that employs vision as its main means of data collection. In this observational studies the researchers collected data on the use of ICT tools by student-teachers by watching them and listening and recording what they observe rather than asking questions. In general, the degree of the observer's involvement in the study varies from no participation to full participation. The researchers adopted the non-participant observation techniques. In non-participant observation, observers study their subjects from outside the group without becoming a part of the environment of the observed.

#### **Questionnaire**

The questionnaire consisted of a list of questions or statements relating to the aims of the study, and research questions to be verified and answered, to which the respondent were required to answer by writing. In all, twenty (20) questions were set for respondents to answer. The respondents were first briefed about the need to be objective in their answers.

#### **Administration of Instruments**

The researchers made effort to distribute the questionnaire themselves since work of this magnitude requires direct collaboration with the participants. The respondents were first informed and given copies of the questionnaire to answer after guidance from the researchers.

#### **Data collection procedures**

Since the mixed research method (qualitative and quantitative research method) was required for the study, Questionnaire, and observation were the main data collection instruments that were used. The researchers established a friendly rapport with the respondents and this proved very useful as it motivated the respondents to provide relevant data. The respondents were guided to give candid opinions about the questions they were asked. The researchers directly observed the students to obtain information necessary for the study.

#### **Data analysis plan**

The data collected were put together and analysed in relations to the research questions and objectives using deductive methods, descriptive and inferential statistics. Moreover, Interpretations were made and conclusions drawn, from which recommendation were made.

### Analysis and discussions of findings

In the observation, the various activities of the student-teachers monitored. Generally, almost all the students-teachers use one phone or another. It is the tool for communication with families and friends on campus. Different types of phones including smart and conventional analogue are used by the students. For the purposes of the reliable mobile network service most of the students use two chips (Sim Cards) from different telecommunication operators with MTN being the most widely used telecommunication network on campus. Among the students observed, 92.85% use smart (android) phone and 7.14% use conventional analogue phones. There are no strict rules to prevent the use of mobile phones on campus apart from keeping it mute or off during the instructional period. Other Communication tools such as laptop and radio are sparingly used by the students. Students use their mobile phones to listen to radio programmes especially sports. Less than 10% of the entire student population use laptops for their assignments, playing music and watching movies. Internet research is mostly done on mobile phones to complete tasks and projects assigned to students. However, the use of PowerPoint presentation by students is not often encouraged by tutors probably due to the unavailability of the necessary equipment that facilitate effective use of such tools as laptop and projectors. Though students are often motivated to search for additional information for the various topics and subtopics in their course outlines, students often use their phones for social media activities thus chatting, sending and receiving photographs and messages. The use of ICT Tools in learning is expected to have positive effects on students learning experiences and results, but then social media seem to overshadow the learning effects. Both male and female students exhibit the same characteristics and there are no indications that the use of technology in education still affect females and males differently in the College of Education. It appeared that female students used more sophisticated tools but the technical skills applied to the use of these gadgets is often possessed by males as they are often consulted for minor problems or challenges associated with installation of mobile apps and other related issues. It is not surprising, however, that almost all males observed appeared to be very inquisitive, and fast in operating the tools. To summarize, no significant difference in the use of ICT tools was identified in terms of ideas and knowledge in ICT, Income and educational background but it appeared that males students yearn to always practice.

The following presents the statistical analysis of data obtained from the respondents.

**Table 1: Sex of students (Respondents)**

Sex	Population	Sampled	Percentages
Male	472	70	14.83%
Female	368	70	19.44%
<b>Total</b>	<b>840</b>	<b>140</b>	<b>16.66%</b>

The table above shows the population and sampled population of the respondents. In all, 70 out of the 472 males forming 14.83% of the male's population were selected while 70 out of 368 female's making 19.44% of the female's population were used.

**Research Question one (1)**

- i. How accessible are ICT tools to Student-teachers at Offinso College of Education?

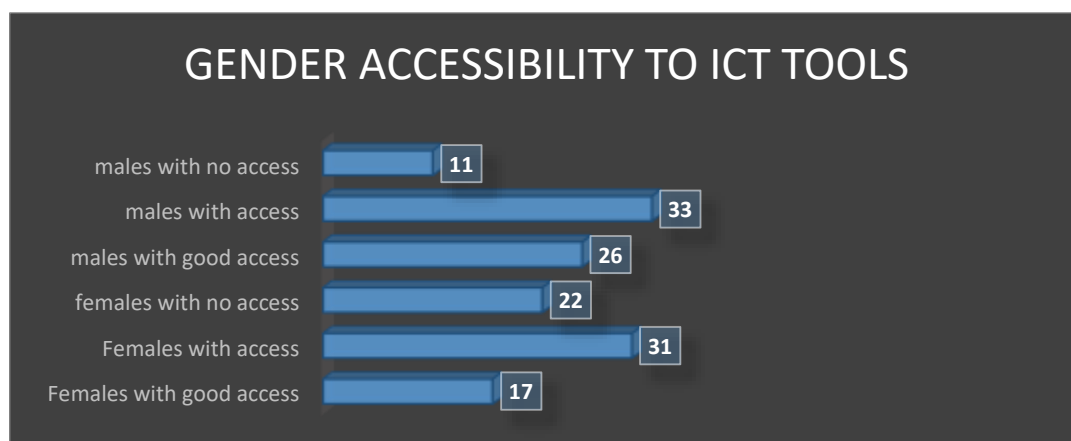
**Table 2. Accessibility in the use of ICT tools**

Sex	Good access	Access	Not access
Male	26(37.14%)	33(47.14%)	11(15.71%)
Female	17(24.28%)	31(44.28%)	22 (31.42%)

Accessibility to ICT tools depends on the kind of tools used by the individual students. The College use limited range of ICT peripherals, mainly desktop computers and projectors in the ICT lab, these gadgets cannot be found in the various classrooms. Lack of technical support and maintenance is a major impediment to the teaching and learning of ICT in the College. The student – computer ratio in the college stands 10:1. There is no internet facility on campus, therefore students are forced to search for educational materials on their phones and this makes it difficult for those who cannot afford smart phones and laptops to find additional information to what their tutors give them in class apart from visiting libraries. Those who can afford smart phones also face difficulty with having to purchase expensive data from their service providers.

Indications from table 2 suggest that 26 males representing 37.14% of the total respondents finds ICT tools very accessible and 33 of the respondents making 47.14% of the male respondents said, they have access to ICT tools and 11 out of the 70 males constituting 15.71 indicated that they have no access to the use of ICT tools. Considering the above statistics, majority of the male students find the use of ICT tools accessible. Again, according to the statistics, 17 females making 24.28% of the females said they have very good access to ICT tools, whilst 31 constituting 44.28% have access and 22 forming 31.42% female students do not have access to the use of ICT tools. In conclusion, majority of the female and male students of Offinso College of Education have access ICT tools through the use of their personal smart phones.

**Fig. 1. Gender accessibility to ICT tools**



## Research Question 2

### *What is the impact of ICT tools on teaching and learning in the College?*

In the College of Education curriculum ICT is studied by only second year students. This means, First year students do not study ICT in their first and second semesters until they reach second year. Students barely get the opportunity to use ICT tools in their learning, henceforth the impact of ICT tools is not immediately felt. Out of the 140 respondents, 95 making 67.85% of the sampled population do not use ICT Tools to complete assignments whether in group or individual. Again, 119 constituting 85% indicated that they do not use ICT tools in the classrooms or ICT lab as majority of the desktop computers at the laboratory are defunct and non-operational. Student have no access to online educational materials that serve as a vehicle for 21<sup>st</sup> century research, educational and professional development. There is no provision of internet facility on campus which is a panacea for overreliance of students on tutor for knowledge. There are no additional textbooks (softcopy and hardcopy) to what tutors supply to students



**Plate 1 & 2. Majority of the desktop computers at the ICT laboratory are defunct and non-operational.**

The plates above show students and a tutor in the ICT laboratory during instructional period. As seen, most of the desktop computers in front of the teachers are obsolete. This situation leaves students with no option than to absorb concept abstractly defeating the principle of learning by doing. This situation hinders the quality of teaching and learning as students become passive participants. Students battle with overcrowding due to inadequacy of modern furniture and proper seating arrangement. Eventually, student-teachers are not able to acquire the prerequisite skills needed to integrate technology into their teaching to enhance the quality of lesson delivery after they graduate.

### **Student's performance**

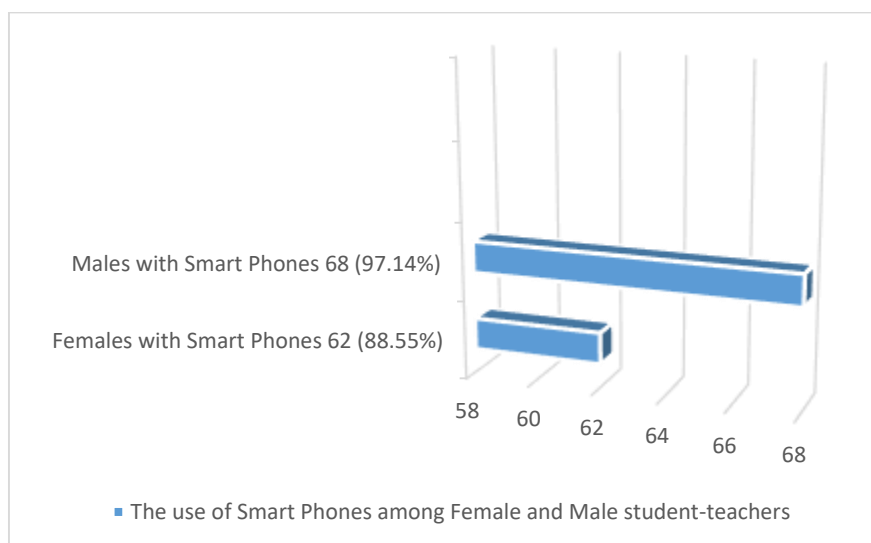
Student's performance in the end of semester ICT examination have been phenomenal. Averagely, over 80% of student-teachers obtain grade A to D+ every year. This performance is probably due to the fact that, examination do not test students practical knowledge in ICT as test items that involve true/false options, fill in, and multichoice are given to candidates.

### Research Question 3

What is the female participation in ICT as against their male counterparts?

There is almost equal participation in the use of ICT tools among female and male students. Majority of the students use mobile phones to access internet but for social media purposes. Statistically, 130 of the 140 thus 92.85% of the students sampled use smart phones which is the leading ICT tool commonly used by the students. In this, 62 female student-teachers out of the 70 sampled use smart phones and 68 males from the 70 also use smart phones. This is represented in the chart below.

**Fig. 4. The use of Smart phones among Male and Female student-teachers**



As seen in the figure above, male students are a little ahead of their female counterparts in the use of Smart phones which is the common tool used by student-teachers for information finding and communication purposes. The use of computers, cameras, projectors, scanners, printers, and other tools that support learning is virtually non-existent in the college. Student-teachers solely rely on books that are provided by tutors or found at the library.

### CONCLUSION

The study examined the accessibility and usage of ICT Tools among student-teachers and also assessed the participation of ICT tools among male and female students. Apparently, access to and usage of ICT tools have the potential to improve the ability of student-teachers and our education sector but this opportunity is highly uneven and relatively untapped. The limited access to the full range of ICT tools by student-teachers in Colleges of education does not look good for the future. The student-computer ratio stands at 8:1, this affects the quality of teaching and learning as students are not able to acquire the practical knowledge and skills needed to train the 21<sup>st</sup> child. Lack of technical support and maintenance is a significant impediment to the development of ICT in the College. Laptop computers and mobile phones usage are necessary ICT tools that enhance learning but only miniscule number of Male and Female



students own computers and have Internet connections in school and at home, only relatively small numbers are able to access the Internet on their phones. Since student-teachers share similar backgrounds, the differences in access to ICT tools is insignificant.

## RECOMMENDATION

The researchers have outlined measures necessary for the integration and sustenance of ICT tools in teaching and learning in the Colleges of Education in Ghana. Firstly, the infrastructural development thus establishing modern ICT laboratories to facilitate ICT education is highly commended. Regular In-service training on the integration of ICT tools into teaching and learning for all tutors in the colleges will be a step in the right direction. Internet connectivity that is accessible by all student-teachers will improve students' research skills. Provision of ICT materials such Books and other relevant devices is highly encouraged. Enough computers and other ICT tools must be made available for students in schools and at home. Lastly, there must be enough furniture in the classrooms and laboratories must be designed to support learning. Technical support and maintenance must be regularly. Lastly, student-teachers must be given the opportunity to study ICT from first year to enable them acquire the needed skills.

## Suggestions for Future Research

In future, studies could be conducted into the pragmatic and innovative ways of acquiring ICT tools needed to improve the quality of teaching and learning. Unavailability of ICT tools is a major challenge encountered by student-teachers and if this challenge can be overcome, it is a step forward to enhance students' learning. Again, a study into viability of integrating Gamification in the various curriculum to help polish up student-teachers skills to be able to train the children in the future could also be explored.

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