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## **GENDER DIFFERENCES IN COMPUTER ACCESS AND LITERACY –AMONG AGRICULTURAL STUDENTS AT UNIVERSITY OF CAPE COAST IN GHANA**

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### **ABSTRACT**

Computer and its related technologies have become a standard and an enabling tool in almost every career worldwide. Therefore the issue of computer access and literacy have become important for higher education and institutions which churns out graduates for the world of work. The Information Communication Technology (ICT) policy of University of Cape Coast, Ghana is to ensure that all graduates acquire proficiency in ICT. ICT literacy and access are components of agricultural curriculum.

The paper presents findings of a study that determined gender differences in computer access and literacy among agricultural students at University of Cape Coast in Ghana. Survey design involving the use of questionnaire was used to collect data for the study. A cluster random sampling procedure was used to sample 144 respondents out the population of 585 undergraduate students in the School of Agriculture. The study concluded that there are gender differences in computer access and literacy among agricultural undergraduates at the University of Cape Coast. The study recommends compulsory ICT proficiency course and a scheme to acquire Personal Computers for students to bridge the computer access and literacy gap.

**Key words:** gender, gender differences computer access, computer literacy, information communication technology.

### **Introduction**

Computer technologies are changing the face of education throughout the world and have the potential of providing more effective teaching and learning tools, serve as the medium to transmit content and encourage more immediate, relevant and authentic learning (Porter, 1997; Hawkins, 2003). Robertson (2002) has argued that computer technology will lead the transformation of education and may be the most important tool to occupy the central position in education once

occupied by books. Effective application of computer technologies in education requires computer literacy and access. Computer literacy and access are important to agricultural education because almost all facets of agriculture use computers.

The School of Agriculture, University of Cape Coast has recognised that the application of Information Communication Technology (ICT) in the field of education, homes and work places has increased over the years. Computing is therefore an important component of the curriculum for agricultural students enrolled at the University. Equal computer access and literacy are provided to all students since they are expected to be computer literate to keep up with the current information society and needs of work.

Computing is perceived by many as belonging to the male domain. The need to assess students' ability to use computers is a central tenet of education and research (Selwyn, 1997). Gender which is a significant factor in predicting an individual's potential interest and involvement in computing has not been explored at University of Cape Coast.

### **Purpose of paper**

The paper presents the results of a study that sought to find out the level of computer access and literacy of agricultural students, so as to provide the critical mass of information required for future improvement of curriculum design and planning. Specifically the study sought to:

1. Examine gender differences in Computer access among agricultural students of UCC in terms of:
  - a) Ownership
  - b) Location of Use
  - c) Frequency of use
2. Determine gender differences of computer literacy among agricultural students of UCC in term of their ability to:
  - a) perform computer operating environment tasks

- b) send e-mailing tasks
- c) perform world wide web tasks
- d) do presentation tasks
- e) perform word processing tasks and
- f) knowledge on software categories

### **Literature review**

Computer literacy is the knowledge and ability to use the computer and its related technologies efficiently. Computer literacy includes the understanding of computer characteristics, capabilities, applications, as well as the ability to use these knowledge in a skilful manner that is productive and suitable to an individual's roles in a society (Simonson, Maurer, Montag-Torardi, & Whitaker, 1987).

Computer access is the ability of an individual to reach and easily obtain computer for use. It is associated with the amount of time spent working with computers (Orpen & Ferguson, 1991), ownership (Brock, Thomsen and Kohl, 1992) and higher levels of literacy (Gattiker and Hlavka, 1992).

Gender is the roles socially assigned by being female or male, girl or boy, woman or man (Zanden, 1990) and learned behaviours expected from members of each sex from the society (Andersen and Taylor, 2004). Many studies have concluded that gender differences affect access and literacy in computing. Males are more likely to use computer than women when equal access is provided (Becker and Sterling, 1987 and Arch & Cummins, 1989). There are differences in the level of confidence in the application of computer skills, interest and perception of the benefits of computers among boys and girls in elementary and secondary schools. The fewer girls than boys have access to computers at school and boys are more self-confident about their potential with computers and perform better than girls in computing tests. (Lancaster ,2007),

According to Volman & van Eck (2001) females tend to be less interested in computers, have less positive views about the value of computing, and report more computer anxiety and less

confidence in their computer abilities. Consequently, girls are often less computer literate than boys (Schaumburg 2001). A number of environmental and social factors such as early exposure to computers, frequency of computer use, parental and peer support for ICT learning which contribute to computer literacy tend to favour boys (Cassidy & Eachus, 2002; van Braak; Vekiri & Chronaki, 2008). Traditionally, girls tend use computer less in their spare time and have more negative attitude towards them (Barnert and Arbinger 1996, Brosnan 1998, Metz-Goeckel et al. 1991, Okebukola 1993, Shashaani 1994). Males dominated computer ownership (Culley, 1986) and are perceived to have higher knowledge about computer functions and disk operating system use (Geissler & Horidge,1993). Males on average spend more hours per week with computers than females. Gender difference in computer literacy was found to diminish with increased computer experience (years and weekly usage) ( Smith & Necessary, 1996).

## **METHOD AND DATA SOURCES**

The study used the survey design in the form of questionnaire to collect data from the respondents. A panel of experts ensured the content validity of the research instrument. The study targeted all undergraduate students enrolled in the B.Sc. Agriculture programme at the School of Agriculture, University of Cape Coast. The School of Agriculture is one of the seven Faculties of the University of Cape Coast, Ghana. The school has five departments namely Department of agricultural Economics and Extension, Department of soil science, Department of Agricultural Engineering, Department of Animal Science and Department of Crop Science. Other support units include research and teaching farm, and technology village. The school currently runs postgraduate and undergraduate programmes leading to award of degrees in B.Sc. Agriculture, B.Sc. Agricultural Extension, and B.Sc. Animal Health.

The student population in the School numbered 585 in 2008/2009 academic when the study was conducted. A cluster sampling procedure based on the levels was used to select the level 200 class out of the four levels in the School of Agriculture. The level 200 constituted the sample size

of 200 out of which 144 respondents returned their questionnaires. The response rate of 72% was deemed adequate for the study.

The SPSS (version 16, 2007) was used to generate statistics to describe the data. The perceived level of literacy were measured on a Likert-type scale ranging from 1 to 3 where 1= poor, 2= good, and 3= excellent. Cronbach's Alpha of 0.8 on scales was deemed consistent for the study. Frequencies and percentages were used to describe access in terms of computer ownership, location and frequency of use of computers. Means, standard deviation and t-test were used to establish the difference in computer literacy.

## RESULTS AND DISCUSSION

### **Gender differences in computer access**

The study revealed that less than one-third (29.1%) of the respondents own personal computers. Of those who owned PCs, 30 (69.8%) were males while 13 (30.2%) were females (Table 1). This indicates that more male respondents have computers than females. This confirms Gunn (2003) study that concluded that women are still less likely than the men to own a computer.

Table 1: Computer Ownership

Ownership	Male	Female	Total
Yes	30	13	43
No	62	39	101
Total	92	52	144

### **Location and Frequency of Access to the Computer**

Table 2 shows that results of the location and frequency of use of computers by students on University of Cape Coast campus. Generally computer access to all students was quite high in all locations except at the departmental laboratory. Computer access is low at the departmental computer laboratories since most access is allowed for postgraduates only. Undergraduates can access computers at both ICT Centre and Socket Works-a private Internet cafe that authorities of UCC have give laboratory for their operation.

The percentage for access were 89.1%, 47.9 %, 68.8%, 56.9%, 75.7% and 67.4% respective for access at residence, department laboratory, ICT Centre, Socket works, private Cafes and friend's residence. Of the respondents who used computers daily, every other day, weekly, monthly or occasionally, more males had access than females. The percentage for total access is shown Table 2.

Table 2: Location and Frequency of use of Computers

Location	Gender	Frequency of Access to Computer						Total Access
		None	Daily	Every other day	weekly	Monthly	Occasionally	
Residence	Male	16	37	12	9	8	10	92
	Female	10	18	6	2	1	15	52
	Total	26	55	18	11	9	25	144
Departmental Laboratories	Male	49	2	1	9	6	25	92
	Female	26	3	3	1	1	18	52
	Total	75	5	4	10	7	43	144
ICT Centre	Male	26	2	1	23	5	35	92
	Female	19	3	2	4	0	24	52
	Total	45	5	3	27	5	59	144
Socket Works	Male	37	2	2	10	3	38	92
	Female	25	5	3	3	1	15	52
	Total	62	7	5	13	4	53	144
Other Private Cafes	Male	20	3	10	22	7	30	92
	Female	15	5	4	7	0	21	52
	Total	35	8	14	29	7	51	144
Friends' Residence	Male	28	7	9	14	3	31	92
	Female	19	5	4	5	1	18	52
	Total	47	12	13	19	4	49	144

### Gender Differences in Computer Literacy

Respondents' ability to use some computer applications including word processing, spreadsheet, presentation software, internet browsing (sending an email, sending and retrieving an attachment), and general operating environment were tested to determine their computer literacy level. Respondents rated their perceived knowledge and level of confidence on Likert type scale from range 1= Poor, 2= Good, 3=Excellent. The ability of respondents to perform computer operating environment tasks is presented in Table 3.

Table 3: Mean, standard deviation and t-values of respondents' ability to perform tasks related to computer operating environment

Tasks	Gender	N	Mean	Std.	T-value	Sig. (2-tailed)
Creating and opening a simple text document	Male	92	2.54	0.72	5.62	0
	Female	52	1.71	1.05		
Saving a document in a new file and in an existing file.	Male	92	2.68	0.66	3.65	0.000
	Female	52	2.19	0.95		
Closing a document	Male	92	2.60	0.81	4.90	0
	Female	52	1.85	1.00		
Printing a document from a list file option.	Male	92	2.52	0.82	4.92	0
	Female	52	1.77	0.98		
Using the print preview option before printing	Male	92	2.42	0.84	5.20	0.
	Female	52	1.63	0.93		
Retrieving an existing document, edit and save in new file.	Male	92	2.52	0.83	4.91	0
	Female	52	1.75	1.03		
Using RENAME to change the name of a file.	Male	92	2.33	0.94	3.42	0.001
	Female	52	1.75	1.03		
Accessing and using the HELP function	Male	92	2.08	0.87	2.98	0.003
	Female	52	1.62	0.93		
Installing and using a new software program without much help.	Male	92	2.00	0.85	4.13	0
	Female	52	1.40	0.80		

Means were computed on a scale that ranges from 1-3, where 1=Poor, 2=Good, 3=Excellent

With regards to their abilities in performing tasks involving manipulation of documents (operating environment), both male and female respondents rated their competencies to be good or excellent (means ranged from 1.65 to 2.68). The only exception is the installing and using a new software program without much help that females perceive their competency to be poor

(mean=1.4, s.d= 0.799). Therefore is the need for users to acquire competency in this area. In the past, software installation was done either by the Computer Professionals or experienced end-users but with more and more software becoming user-friendly and intuitive, this is likely to change in the nearest future. In all cases there were significant differences between the ratings for males and females. Males rated themselves higher than their female counterparts indicating gender differences with regards performing computer operating environment tasks.

With respect to the ability to work with email and browsing (Tables 4), both males and females rating were good. This could be due to the fact that these are mostly used tasks performed on the internet. However, male ratings were higher than their female counterparts.

Table 4: Mean, standard deviation and t-values of respondents' ability to perform Internet task

<b>Tasks</b>	<b>Gender</b>	<b>N</b>	<b>Mean</b>	<b>Std.</b>	<b>T-value</b>	<b>Sig. (2-tailed)</b>
Composing and sending an E-mail message	Male	92	2.18	0.838	3.362	0.001
	Female	52	1.67	0.944		
Sending and receiving E-mail message with attachment	Male	92	2.05	0.894	2.155	0.033
	Female	52	1.71	0.957		
Utilizing E-mail, news groups or other web browser applications to obtain information on a selected topic.	Male	92	2.01	0.92	2.213	0.028
	Female	52	1.65	0.947		
Accessing a specific Web page (URL) and search the Web using a variety of tools.	Male	92	2.08	0.855	3.034	0.003
	Female	52	1.62	0.911		
Accessing, Utilize, and research resources through the World Wide Web	Male	92	2.17	0.779	3.681	0
	Female	52	1.63	0.95		

Means were computed on a scale that ranges from 1-3, where 1=poor, 2=good, 3=excellent

Males rated themselves higher (mean= 2.04) in terms of creating and using a simple presentation documents than females (Table 5). However, both rated their abilities to add animation to presentation to be poor.

Table 5: Mean, standard deviation and t-values of respondents' ability Presentation tasks



<b>Tasks</b>	<b>Gender</b>	<b>N</b>	<b>Mean</b>	<b>Std.</b>	<b>T-value</b>	<b>Sig. (2-tailed)</b>
Creating and using a simple presentation	Male	92	2.04	.84	3.58	.000
	Female	52	1.48	1.02		
Creating animation	Male	92	1.24	.54	2.06	.041
	Female	52	1.04	.59		

Means were computed on a scale that ranges from 1-3, where 1=poor, 2=good, 3=excellent

Table 6 highlights the fact that both males and females rated themselves to be good in their abilities to perform basic word processing tasks. This may be due to the fact that word processing is the first software application package to be learnt and the most used for it typing assignments, emails, chatting and the like. Still the ratings of male respondents were significantly different from than female respondents.

Table 6: Mean, standard deviation and t-values of respondents' ability to perform Word Processing tasks

<b>Task</b>	<b>Gender</b>	<b>N</b>	<b>Mean</b>	<b>Std</b>	<b>T-value</b>	<b>Sig. (2-tailed)</b>
Setting and changing left, right, top and bottom margins;	Male	92	2.25	0.89	3	0.003
	Female	52	1.77	1.00		
Underlining, boldfacing, and italicizing text as it is being typed;	Male	92	2.3	0.94	2.4	0.017
	Female	52	1.9	1.00		
Using a blockage function;	Male	92	2.27	0.89	3.5	0.001
	Female	52	1.71	1.00		
Moving and copying text to other parts of a document	Male	92	2.47	0.82	4.2	0
	Female	52	1.83	0.99		
Deleting text from a document	Male	92	2.42	0.80	3.8	0
	Female	52	1.85	1.00		
Using SPELL CHECK and correct errors in the document	Male	92	2.22	0.88	2.6	0.01
	Female	52	1.81	0.97		
Selecting and altering font style and size	Male	92	2.3	0.80	4	0
	Female	52	1.69	1.04		
Saving a block of text as a separate document	Male	92	2.28	0.88	4	0
	Female	52	1.65	0.97		
Reformatting margins, spacing justification and tabs within documents	Male	92	2.11	0.81	3.5	0.001
	Female	52	1.6	0.89		

Creating a simple table	Male	92	2.11	0.83	2.3	0.024
	Female	52	1.77	0.90		
Copying tables to a separate document	Male	92	2.09	0.82	3.9	0
	Female	52	1.5	0.96		

Means were computed on a scale that ranges from 1-3, where 1=Poor, 2=Good, 3=excellent

In Table 7, general capabilities of other application packages such as Spreadsheet, Database Management Systems, Graphic programs, and On-line bibliographic databases are presented. Both males and females considered their competencies with the use of the above mentioned software packages to be poor. With exception of Database Management Systems, there was no significant difference in gender capabilities.

Table 7: Mean, standard deviation and t-values of respondents' Knowledge other software categories

<b>Computer Software Categories</b>	<b>Gender</b>	<b>N</b>	<b>Mean</b>	<b>Std</b>	<b>T-value</b>	<b>Sig. (2-tailed)</b>
Spreadsheet	Male	92	1.23	.52	1.74	.085
	Female	52	1.08	.48		.
Database Management Systems	Male	92	1.32	.55	2.43	.017
	Female	52	1.08	.59		
Graphic programs	Male	92	1.35	.56	1.73	.086
	Female	52	1.17	.62		
On-line bibliographic databases	Male	92	1.24	.52	1.57	.119
	Female	52	1.10	.53		

Means were computed on a scale that ranges from 1-3, where 1=Poor, 2=Good, 3=excellent

Table 8: Mean, standard deviation and t-values of the overall Computer Literacy of respondents

<b>ICT literacy</b>	<b>Gender</b>	<b>N</b>	<b>Mean</b>	<b>Std</b>	<b>T-value</b>	<b>Sig. (2-tailed)</b>
Overall	Male	92	1.58	.29	4.46	.000
	Female	52	1.30	.47		.

Means were computed on a scale that ranges from 1-3, where 1=Poor, 2=Good, 3=excellent

Table 8 presents the overall computer literacy of respondents. This estimated from the composite mean of all the Computer software categories namely the word processing, spreadsheet, presentation software, internet browsing, and general operating environment. The results indicate

that there is a significant gender differences in computer literacy. While the overall male student competency was good, that of the female was poor. This may be due to the fact that more male than female owned computers and again spend more time with the computer than female. This is in agreement with Gattiker and Hlavka (1992) who indicated that access to a computer is known to be associated with higher levels of computer literacy.

## CONCLUSIONS AND RECOMMENDATIONS

The study has shown that there are gender differences in computer access and literacy levels among undergraduate agricultural students of the University of Cape Coast. The differences are evident in computer ownership, ability to perform specific tasks on productivity software application packages, and the number of hours spent on computers. The study concludes that there exist significant differences in computer access and literacy level among agricultural students. Male respondents are more computer literate than female respondents. This has implication for all undergraduate Agricultural students at University of Cape Coast. As a way of rectifying the gender gap in computer access and literacy, the study recommends the following:

- a) The computer proficiency course for first year students should be made as a compulsory or core course for all first year students.
- b) The female students of UCC especially those studying MEd (ICT), BSc Computer Science, BEd Computer Science and BSc Information Technology should be encouraged to form a club whose purpose is to train other female students to become computer literates. It has been established that peer tutoring demonstrates effectiveness in facilitating progress in the general education curriculum (Cohen, Kulik & Kulik, 1982).
- c) There are 250 and 150 PCs at ICT Centre and Socket Works respectively for a student population of 18,000 making PCs density in the UCC is very low. Therefore more avenues for computing should be provided.
- d) Students had more access to computers in their halls than any other locations surveyed. In this regard, a scheme should be established by the university's authorities or the Student

Representative Council (SRC) whereby students acquire PCs on high-purchase. If possible with special concession given to female students since few owned PCs. Also, the Ghana Government decision of one laptop to a child should be extended to students in the Tertiary institutions since they will join the working world very soon where computer literacy is a must requirement in most places. When these are done it may go a long way to increase students' access to computers.

- e) Since practice makes perfect, assignment should be submitted in electronic form and occasionally students should be required to make presentation with PowerPoint.

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