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Awareness and Usage of ICT tools among Postgraduate Students' in the University of Ghana and the University of Cape Coast

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Abstract

This paper aims to identify the awareness and utilisation of ICT applications to facilitate research of postgraduate students. With the survey design, 346 respondents were selected out of 4907 postgraduate students from the University of Ghana and the University of Cape Coast using the stratified and convenience sampling techniques to participate in this study. Using the TAM3 theory, the study identified that most students were aware that ICT use in research can facilitate their scientific inquiries. Most students were aware of ICT tools. The results further indicated that ICT tools were well publicised. Again, most of the respondents indicated that they had adequate skills in the use of ICT to conduct research. However, their training in the use of ICT applications was inadequate. The use of ICT tools in research makes it easy for researchers to work with big data and information resources. Therefore, the awareness and publicity of research technologies to students would enhance their usage. Against this background, this paper strongly recommended that publicity of ICT facilities to students should be a priority of the academic institutions. Again, research supervisors should advise students to access and use the ICT facilities that are provided by their institutions in their research activities. It is also recommended that the ICT facilities be marketed to students and promoted extensively through social networks; Training in ICT software should be organised four times each semester.

Keywords: ICT, Technology Acceptance Model, Postgraduate Students, University of Ghana, University of Cape Coast, Universities, Ghana.

1. Introduction

The presence of Information and Communication Technology (ICT) in this era has called for rapid and constant changes in the environment. This technology has affected the way information is looked for, analysed, developed and shared. In businesses and firms, ICT has aided in the reduction of operating costs through outsourcing services to other firms both near and far and in our private lives through sharing and duplicating information which has become faster and cheaper. Information Communication Technology has also reduced the importance of distance in education through the provision of reliable communication applications and services. Additionally, ICT has improved classroom instructions by complementing computer-aided applications and services such as using e-mails in communications between students and lecturers and among students who may engage in research or project work (Lee, 2003).

Most research institutions use ICT to secure their research data, make research results more visible and increase collaboration and sharing among colleagues (Western Sydney University, 2015). Additionally, ICT provides advanced computation capabilities in research including increased speed, improved data storage and management. Again, ICT equips researchers with more information, easy support and sharing of information resources which will increase the quality of research output (UNSW, 2016).

Moreover, the University of Western Sydney has made available research applications to students, faculty and researchers to assist them throughout their research lifecycle and beyond. As research data is produced in the course of the research, these applications provide support to students and researchers during formulating of the research idea, during the research project through computing platforms, and at the end of the research project through archiving research data and licensing data for reuse (University of Western Sydney, 2014).

Thirteen (13) universities and colleges have amalgamated through eResearch Network to fully exploit the benefits of ICT in research. This network will help them to provide support for their students and researchers in their research through collaboration, resource sharing, webinars and custom consultations (Clement & Duinen, 2015).

Every university, irrespective of its purpose, is expected to provide an enabling environment for easy access and the conduct of research. For instance, the University of Ghana provides learning and research support in the form of bursaries, grants, services, scholarships, prizes and modern ICT facilities/infrastructures. For example, graduate students are provided with facilities, services and resources such as research commons, databases, wireless internet connection, conference room, and seminars and presentation rooms. Others include Elsevier eBooks, ProQuest eBook Central, live chat with a librarian, article request form, software installation and institutional repository, online past exams papers and research guides. These are supposed to enhance the research output of graduate students in the university and thereby providing real-life solutions to national and international problems (University of Ghana, 2014).

Moreover, UCC provides students with facilities, resources and services such as study areas, ICT and research training, software installation and internet connectivity to facilitate their research. For example, the UCC Graduate School in collaboration with the library provide e-resources and Mendeley seminar and other ICT related training to graduate students to equip them with the necessary skills needed to complete their studies and researches. These essential skills help graduate students to research and write their theses, dissertations and term papers that are required of them to undertake as a part of their education (University of Cape Coast, 2017).

1.1. Problem Statement

Currently, a lot of emphases has been placed on the use of ICT in research in both academia and industry the world over. This has compelled institutions and industries to invest in these technologies to enhance their input, output and usage by researchers. However, existing literature indicates that research in the adoption, perception and usage of ICT in research is little especially in developing countries (Adeagbo et al., 2016; Ankamah et al., 2018; Borgman, 2006; Meyer & Dutton, 2009).

Again, an interaction with some postgraduate students of UG and UCC revealed that they had inadequate training on the use of ICT in research. Some students also complained about the inadequate seminar and workshop on the use of ICT applications in learning and research.

Moreover, it was revealed that some students are not computer literate or do not have ICT skills; hence, their inability to use the ICT applications in their research activities (Ankrah & Atuase, 2018). This problem has led to huge financial losses to these universities since they have invested in ICT infrastructures such as power supply, high bandwidth, storage systems, wide internet connectivity, subscription to electronic resources, provision of research software and hardware yet little use is being made. This low adoption has resulted in delays in reaching research deadlines, low-quality research output, bad citation and referencing, unorganised presentation of data and finally failing to complete research.

These problems have created the need to research into the awareness of and ICT skills of postgraduate students in the use of ICT in the University of Ghana and University of Cape Coast.

1.2. Objectives

The specific objectives of the study are to:

1. To identify whether postgraduate students are aware that ICT can facilitate their research.
2. To find out if the ICT applications used in their institution are well publicised or not.
3. To find out whether postgraduate students have adequate ICT skills used in research.
4. To determine whether postgraduate students are provided with training in the use of ICT in research.

2. Literature review

The spread and adoption of ICT applications use in research among society or groups of individuals is based on the knowledge they have about the innovation. Knowledge, according to the Oxford University Press (2017), is facts, information, and skills acquired through experience or education; the theoretical or practical understanding of a subject. In other words, it is awareness or familiarity gained by experience of a fact or situation. Users' knowledge is, therefore, the awareness, interest, education, experience and eclectic levels of expertise in the use of ICT in research (Adeagbo et al., 2016; Arcila-Calderón et al., 2013; Bradbury & Borchert, 2010; Dutton & Meyer, 2009; Hellmers, 2009; Meyer & Dutton, 2009). From this study, awareness or knowledge in the use of ICT is the least prerequisite needed by users to adopt ICT in their scientific enquires. For example, Meyer and Dutton (2009) noted that 57% of researchers were either 'interested' or 'very interested' in ICT use in research and are willing to adopt it in their inquiries.

Research into the use of ICT in research has taken both qualitative and quantitative approaches. However, the most approach method used web-based or online survey (Arcila-Calderón et al., 2013; Bradbury & Borchert, 2010; Dutton & Meyer, 2009; Meyer & Dutton, 2009). Users' interest in ICT applications use in research has been influenced mainly by the type of research

methods researchers' use in their scientific investigation. For example, Meyer and Dutton (2009) found that the most common research methods are qualitative interviews (57%), desk research (56%), case studies (56%) and surveys (55%). The interest within each methodological approach is relatively high ranging from a low 53% among clinical researchers to a high of 73% among those who do web metrics.

Additionally, the level of knowledge of users is not based on only the level of awareness or interest but by the level of skill or expertise in using the appropriate ICT applications in their inquiries. This level may be sheer awareness of the ICT applications or basic skill in the use of ICT applications to being competent or an expert in the use of the applications. For instance, Bradbury and Borchert (2010) provide a comprehensive range of eResearch practices and skills which they grouped into scholarly communication, collaborative technologies, data management, data collection and management, computation and visualisations applications. Researchers were asked to rate their skill level in each practice. The following scale was used by Bradbury and Borchert (2010) to 'describe their skill' as 'not applicable', 'unaware', 'aware', 'basic skill', 'competent' and 'expert'. Under scholarly communication practices, the skill in which researchers reported the least level of unawareness and highest rate of expert skill level was 'Managing references using Endnote' with 3% and 93% respectively. However, 47% of researchers reported they were unaware of practices related to 'Publishing using Creative Commons Licences' and 34% reported that they were unaware of practices relating to 'Calculating bibliometric Indices'. In Nigeria, Adeagbo et al. (2016) noted that most researchers (80%) do not have organised ways of maintaining reference lists and items to read. However, as low as 20% use Mendeley for this purpose.

More importantly, the source of knowledge or expertise in the use of ICT in research initiatives is diffused in various ways. In an academic environment, knowledge is acquired through seminars/colloquiums, workshops, conferences and symposia. Others include research outputs,

one-on-one consultations, emailing news, providing online access to resources (Adeagbo et al., 2016; Bradbury & Borchert, 2010; Dutton & Meyer, 2009; Hellmers, 2009; Meyer & Dutton, 2009).

The use of technology in research diffuses faster among a population when they have the necessary skills needed to utilise that innovation in their research activities. Training is the main avenue in which researchers can acquire the necessary skills needed to use ICT facilities in research. Training, according to the Oxford University Press (2017d), is the action of teaching a person a particular skill. In other words, it is learning the skills necessary to do a job or an activity.

Training is essential because it provides users with scientific knowledge and skills in guidelines for research knowledge which includes avoidance of plagiarism and guidance on predatory publishing; and good scientific practices like the use of online communication applications, geographically distributed collaboration, good research data management, improved data collection and analysis techniques, use of visualization applications, use of efficient and effective computation applications and increase the support of ICTs use in research in all disciplines especially in the Social Sciences (Adeagbo et al., 2016; Arcila-Calderón et al., 2013; Bradbury & Borchert, 2010; Dutton & Meyer, 2009; Hellmers, 2009; Meyer & Dutton, 2009). For example, the significance of training in the use of ICT in scientific enquires is noted by Arcila-Calderón et al. (2013) in their research on the 'eResearch on Media and Communications: Attitudes, Tools and Practices in Latin America Researchers' that more than half of respondents that is 52.85% consider that further information and training in eResearch very necessary. Similarly, Dutton and Meyer (2009) reported that three quarters (77%) of researchers believe that more training is needed in eResearch.

Precisely, Bradbury and Borchert (2010) in their study on eResearch practices and skills noted various levels of request for training in specific eResearch skills. They reported that in scholarly communication practices a high of 25% of researchers requested training in calculating bibliometric indicators; under training request for data collection and analysis, 45 respondents requested training in both statistical analysis software and survey software; 12.2% of respondents requested training in the use of spread-sheet which is one of the skills under research data management; with the use of visualisation applications and computation applications, 34 researchers requested training in photo-editing suite and using spread-sheet respectively. However, no or inadequate training will mean that researchers will not use or will use less technology in their research. For example, Adeagbo et al. (2016) found that 80% of researchers do not use any appropriate reference management tool in their research because they do not have any formal training in the use of this tool. Arcila-Calderón et al. (2013) reported a similar lack of or inadequate training among researchers.

Training of researchers on the use of ICT in research may come in various ways depending on the geographical distribution of researchers and their previous knowledge or skill in the use of ICT applications (Adeagbo et al., 2016; Arcila-Calderón et al., 2013; Dutton & Meyer, 2009; Meyer & Dutton, 2009). Some of how researchers learn or acquire new technologies which will help them to employ or manage their research activities are through postgraduate and post-doctoral training, workshops, seminar sessions, conferences, continuous professional development programmes, personal training, one-on-one consultations, expert phone support and reading manual/ technical books. Others include assistance from a colleague or an expert, online documentation, forum and blogs, and webinars and demonstrator projects (Adeagbo et al., 2016; Arcila-Calderón et al., 2013; Bradbury & Borchert, 2010; Dutton & Meyer, 2009; Meyer & Dutton, 2009). For instance, Bradbury and Borchert (2010) noted that 77.2% of respondents nominated ‘attending a training session’ as the most preferred means of learning

new technology. Again, they added that 62.8% of the respondents chose 'trying to figure it out yourself by playing with technology' as the second most desired way of acquiring new skills, however, they believe that this reflects the independent nature of research and researchers.

3. Methodology

This study used the survey methodology. With this approach, 346 respondents were selected out of 4907 postgraduate students from the University of Ghana and the University of Cape Coast using the stratified and Convenience sampling techniques. Out of the 346 copies of a questionnaire handed out, 304 copies were taken back which represented an 87.7% response rate. Questionnaires were used mainly to collect data and SPSS was used to analyse data.

3.1. Theoretical Framework

The study was based on the Technology Acceptance Model (TAM) theory. The theory makes an effort in identifying the determinants involved in computer acceptance in general, examining a variety of information technology usage behaviours and providing a parsimonious theoretical explanatory model (Bertrand and Bouchard, 2008). TAM was put forward by Fred D. Davis in his doctoral dissertation in 1989 that, "system use is a response that can be explained or predicted by user motivation, which in turn is directly influenced by external stimulus consisting of the actual system's features and capabilities" (Chuttur, 2009).

Moreover, TAM is presently the highly used IT adoption model employed by many researchers. However, it has received many critiques for the lack of actionable guidance to practitioners (Venkatesh & Bala, 2008).

Opportunely, TAM has developed and evolved over the years to imitate its shortcomings. This effort lead to the extension of TAM to TAM2 which involves constructs that moderate the

perceived usefulness. Additionally, TAM3 was developed out of TAM2 by combining it with the model of the determinants of perceived ease of use. This means that TAM3 is an all-inclusive model of determinants of perceived usefulness and perceived ease of use developed over the year from TAM research and study. Thus, integrating ICT in one's research is analogous to adopting new technology.

4. Results

Knowledge acquisition is an essential aspect of development for every human being. Awareness of ICT applications that facilitate research is the first step that postgraduate students need to use these applications in the research activities. Thus, students' awareness of ICT applications provides them with a better chance and more motivation to utilise them to satisfy their research needs. Following this, the respondents' views were sought to ascertain if they were aware that ICT can facilitate their research. Table 1 represents the responses received.

Table 1 User's knowledge of the use of ICT in research

Awareness	**UG**		**UCC**		**All**	
	No.	**%**	**No.**	**%**	**No.**	**%**
Yes	188	92.2	95	95.0	283	93.1
No response	16	7.8	5	5.0	21	6.9
TOTAL	**204**	**100.0**	**100**	**100.0**	**304**	**100.0**

Table 4.4 shows responses of postgraduate students indicating their awareness or not that ICT can facilitate their research. In general, 283(93.1%) respondents indicated that they were aware that ICT can facilitate their research while 21(6.9%) of them did not respond to this enquiry. In UG 188(92.2%) of respondents were in the affirmative that ICT can facilitate their research as compared to 95(95.0%) in UCC. However, UG and UCC had 16(7.8%) and 5(5.0%)

respondents respectively who did not respond to this enquiry. Therefore, it can be affirmed that the majority of postgraduate students were cognizant that ICT could facilitate their research.

4.1. Students' Awareness of ICT Facilities Used in Research

Approachability and usage of ICT in research improve significantly when students are made aware. The provision of adequate information on the various types of ICT applications in academic institutions provides students with the means to satisfy their research needs. This effort particularly enables students to have basic knowledge about the different ICT applications in their institutions to seek and access information. For this reason, respondents were asked to indicate the ICT applications they were aware of in their institutions. Respondents could select more than one response. The responses are displayed in Table 2.

Table 2 Students' awareness of ICT facilities used in research

Awareness of ICT Facilities	**UG**		**UCC**		**All**	
	No.	**%**	**No.**	**%**	**No.**	**%**
E-journals	188	92.6	80	80.0	268	88.2
OPAC	43	21.2	13	13.0	56	18.4
Internet resources	184	90.6	83	83.0	267	87.8
Email	170	83.7	84	84.0	254	83.6
Online databases	173	85.2	68	68.0	241	79.3
SPSS	170	83.7	90	90.0	260	85.5
Institutional repositories	95	46.8	42	42.0	137	45.1
NVivo	75	36.9	21	21.0	96	31.6
Reference managers	124	61.1	37	37.0	161	53.0
Video conferencing	93	45.8	48	48.0	141	46.4

According to Table 2, e-journal was the overall highest ICT product that postgraduate students were aware of and it accounts for 268(88.2%) while online public access catalogue (OPAC) was the least with 56(18.4%). In UG, e-journal was the highest ICT product students were familiar with, accounting for 188(92.6%) as opposed to SPSS with 90(90.0%) in UCC. In contrast, OPAC was the lowest in UG and UCC with 43(21.2%) and 13(13.0%) respectively. Other results in UG comprised internet resources 184(90.6%), email 170(83.7%), online databases 173(85.2%), SPSS 170(83.7%), institutional repositories 95(46.8%), NVivo 5(36.9%), reference managers 124(61.1%) and video conference 93(45.8). On the contrary, in UCC the following were the responses for the rest: e-journals 80(80.0%), internet resources 83(83.0%), email 84(84.0%), online databases 68(68.0%), institutional repositories 42(42.0%), NVivo 21(21.0%), reference managers 37(37.0%) and video conference 48(48.0%). Postgraduate students were most familiar with e-journals and internet resources.

4.2. Publicity of ICT Applications Used in Research

The publicity of ICT applications use in research has become a prerequisite to most universities and research institutions. This helps to highlight ICT resources and services to students and researchers. Publicity functions as a driving force of increased accessibility to ICT applications to students. In line with this, the views of respondents were requested to find out if the ICT applications used in their institution are well publicised or not. Table 4.6 represents the opinions of respondents about the publicity of ICT applications.

Table 3 Publicity of ICT applications used in research

Publicity	**UG**		**UCC**		**All**	
	No.	**%**	**No.**	**%**	**No.**	**%**

Yes	155	76.0	50	50.0	205	67.4
No	40	19.6	50	50.0	90	29.6
No response	9	4.4	-	-	9	3.0
TOTAL	**204**	**100.0**	**100**	**100.0**	**304**	**100.0**

In general, Table 3 shows that 205(67.4%) responded that the ICT applications were well publicised while 90(29.6%) responded that they were not well publicised. However, there were 9(3.0%) respondents who did not respond. Specifically, the favourable responses in UG were 155(76.0%) as opposed to 50(50.0%) in UCC. However, 40(19.6%) of the respondents in UG provided negative responses as compared with half of the respondents that is 50(50.0%) in UCC. In UG, however, 9(4.4%) of the respondents did not give any answer whereas in UCC all respondents offered responses to this enquiry. It can, therefore, be deduced that ICT applications, in general, were well publicised however publicity in UCC was less as opposed to UG.

4.3. ICT Skills and Training

The respondents were asked to indicate whether they had adequate skills to use ICT to conduct research. The responses are represented in Table 4.

Table 4 ICT skills and training

ICT skills	**UG**		**UCC**		**All**	
	No.	**%**	**No.**	**%**	**No.**	**%**
Yes	161	78.9	74	74.0	235	77.3
No	39	19.1	23	23.0	62	20.4
No response	4	2.0	3	3.0	7	2.3

TOTAL	**204**	**100.0**	**100**	**100.0**	**304**	**100**

As can be seen from Table 4, most of the respondents, that is, 235(77.3%) indicated that they had adequate skills in the use of ICT to conduct research, while 62(20.4%) of them said they did not. Again, the least that is, 7(2.3%) respondents did not respond as to whether they had adequate skills in the use of ICT or not. Respondents had adequate skills in the use of ICT to conduct research.

4.4. Importance of Training

The opinions of respondents were sought as to the importance of training in maximising the use of ICT in research. Table 5 shows the responses from respondents.

Table 5 Importance of training

Importance of training	**UG**		**UCC**		**All**	
	No.	**%**	**No.**	**%**	**No.**	**%**
Yes	197	96.6	95	95.0	292	96.1
No	4	2.0	1	1.0	5	1.6
No response	3	1.5	4	4.0	7	2.3
TOTAL	**204**	**100.0**	**100**	**100.0**	**304**	**100.0**

It is shown in Table 5 that the majority of respondents that is, 292(96.1%) responded affirmatively in that training was important in maximising the use of ICT in research as opposed to 5(1.6%) respondents who indicated no This means that most postgraduate students valued the role of training in increasing their ICT skills.

4.5. Training in the Use of ICT facilities in Research

The researcher asked the respondents to indicate the ICT facilities that their institutions provided training in. Table 6 represents the results of their responses.

Table 6 Training in the use of ICT applications in research

Training	**UG**		**UCC**		**All**	
	No.	**%**	**No.**	**%**	**No.**	**%**
E-journals	115	59.6	60	61.9	175	57.6
Internet resources	98	50.8	56	57.7	154	50.7
Online databases	122	63.2	50	51.5	172	56.6
MS Word	75	38.9	61	62.9	136	44.7
OPAC	68	35.2	12	12.4	80	26.3
MS Excel	75	38.9	44	45.4	119	39.1
Institutional Repositories	51	26.4	25	25.8	76	25.0
Libguides	11	5.7	-	-	11	3.6
Mendeley	135	69.9	62	63.9	197	64.8
Endnote	85	44.0	31	32.0	116	38.2

On the whole, it is obvious from Table 6 that most of the postgraduate students that are, 197(64.8%) reported that their institutions provided them training in the use of Mendeley in their research activities compared to 11(3.6%) respondents who had training in Libguides. Moreover, 175(57.6%) and 172(56.6%) respondents indicated they had training in e-journals and online databases respectively. This means that most postgraduate students had the necessary training to use ICT applications in their research.

4.6. Frequency of Training

Respondents were required to indicate how often their institutions provided them with training in the use of ICT in research. This is illustrated in Table 7.

Table 7 Frequency of training

Frequency of training	**UG**		**UCC**		**All**	
	No.	**%**	**No.**	**%**	**No.**	**%**
Very often	19	9.3	10	10.0	29	9.5
Often	54	26.5	6	6.0	60	19.7
Once in a while	115	56.4	81	81.0	196	64.5
Not at all	7	3.4	2	2.0	9	3.0
No response	9	4.4	1	1.0	10	3.3
TOTAL	**204**	**100.0**	**100**	**100.0**	**304**	**100.0**

On the whole, it can be seen from Table 7 that most of the respondents that are, 196(64.5%) indicated that once in a while, their institutions provided them with training in the use of ICT in research as opposed to 9(3.0%) respondents who reported that their institutions did not provide them with training at all. Again, 29(9.5%) respondents said their institutions organised training very often while 60(19.7%) respondents agreed that their institutions often provided them with ICT training. Both universities offered ICT training to postgraduate students occasionally.

4.7. Effectiveness of Training

The researcher asked respondents to state whether the training they had received was adequate. Responses are illustrated in Table 8.

Table 8 Effectiveness of training

Effectiveness of training	**UG**		**UCC**		**All**	
	No.	**%**	**No.**	**%**	**No.**	**%**
Yes	92	45.1	32	32.0	124	40.8
No	90	44.1	60	60.0	150	49.3
No response	22	10.8	8	8.0	30	9.9
TOTAL	**204**	**100.0**	**100**	**100.0**	**304**	**100.0**

It can be seen from Table 8 that the highest number of respondents that are, 150(49.3%) were negative in their response that the ICT training received was inadequate as opposed to 124(40.8%) respondents who agreed that it was adequate. Meanwhile, 30(9.9%) of them did not respond. However, in UG the number of affirmative responses that is, 92(45.1%) were slightly higher than negative responses 90(44.1%). On the contrary, in UCC 32(32.0%) respondents were positive in their response that the ICT training received was adequate whilst 60(60.0%) respondents indicated that the ICT training received was inadequate. Generally, it can be deduced from the analysis that postgraduate students yearn for more ICT training. Nonetheless, ICT training in UG is relatively more effective than that of UCC.

4.8. Discussion of Results

Awareness of ICT applications in the facilitation of research is when students or researchers have knowledge or expertise about the availability of ICT applications that can be used to accelerate and ease research activities. Access and usage of ICT applications are ubiquitous among students who have prior knowledge of their availability. Thus, the first objective of the study sought to find out whether postgraduate students were aware that ICT could facilitate their research. The findings revealed that most of the postgraduate students were aware that

ICT could facilitate their research. This finding corresponds with the findings of Meyer and Dutton (2009) who noted that most researchers are aware of ICT use in research and are willing to adopt it in their research.

The levels of awareness of the different ICT facilities used in research by postgraduate students differ. In this study, it was found out that most postgraduate students were aware of ICT facilities such as e-journals, internet resources, email, online databases, SPSS, institutional repositories, NVivo, reference managers (Endnote and Mendeley), and video conferencing. However, they had a low awareness level of the Online Public Access Catalogue (OPAC). This finding coincides with that of Bradbury and Borchert (2010) who opined that most researchers were aware of and have basic to expert skills in reference managers, communication applications and open access journals. This means that the high awareness level of ICT facilities as stated by the postgraduate students related to individual ICT facilities that their institutions provided for them. Perhaps, this forms the basis for postgraduate students stating that ICT facilities were not well-publicized. The low levels of awareness of other ICT facilities like OPAC and institutional repositories may be due to low publicity by their institutions. Adeagbo et al. (2016), and Bradbury and Borchert (2010) are indeed right when they recommended that knowledge of ICT use in research is mostly acquired through seminars, colloquiums, workshops, conferences and symposia. Therefore, it is paramount for both universities to seriously consider using such platforms to increase publicity of their ICT applications to students and researchers.

As one of the objectives of the study, postgraduate students were asked to indicate whether they had adequate skills to use ICT to conduct research. Postgraduate students may recognise some ICT facilities as useful or easy to use depending on their acquired skill in the use of such

facilities. It was found out that, most postgraduate students had adequate skills in the use of ICT to conduct research. This finding compares favourably with the findings of Bradbury and Borchert (2010) who noted that most students and researchers have basic to expert skills in the use of ICT applications in scholarly communication practices, collaborative technologies, data management practices, visualisation applications and computational applications. It could be deduced that postgraduate students from both universities have adequate skills in the use of ICT to effectively and efficiently conduct research.

Data gathered indicated that most postgraduate students had training in Mendeley, e-journals, internet resources and Microsoft Office. This finding is in line with that of Bradbury and Borchert (2010) who reported that most students and researchers had training in the use of reference managers (Endnote), videoconferencing, online survey software and open-source software. This implies that training sessions at both institutions were very effective however more training sessions should be directed towards other ICT applications such as online public access catalogue (OPAC) and institutional repositories. This will, therefore, ensure a higher usage of ICT facilities in research by postgraduate students. Again, this will guarantee value for money since both universities had invested huge sums of monies in purchasing or in subscription charges of these ICT facilities.

On the issue of frequency of training in the use of ICT in research, it found that the training opportunities offered in both institutions happened occasionally. This could be one of the contributing factors to the low patronage of the ICT facilities in both universities. This confirms the argument put forward by Bradbury and Borchert (2010) who reported that the increase of training in some new ICT facilities such as Enabling Virtual Organisations (EVO), Key Survey, Data Repository and Photo-editing suite would ensure frequent usage among students and

researchers. Thus, UG and UCC should provide regular and more intensive training sessions in the form of awareness-raising seminars and hands-on workshops to postgraduate students in the techniques in using the ICT applications in research.

5. Conclusions

The study revealed that most postgraduate students were aware that ICT use in research can facilitate their scientific enquires. However, most of them had low awareness of the use of online public access catalogue (OPAC). Therefore, it is being recommended that marketing and promotion of ICT facilities to postgraduate students should be a priority of the academic institutions. Besides the conventional methods of creating awareness of ICT facilities use in research such as orientation, institutional websites, library programmes, and seminars/workshops, academic institutions need to promote the use of ICT in research significantly through the use of popular social networks such as Facebook, Twitter, WhatsApp, Snap Chat, Instagram and Google Plus. With this approach, postgraduate students would be aware of the various forms and types of ICT facilities that are provided by their institutions. Again, research supervisors should advise postgraduate students to access and use the ICT facilities that are provided by their institutions in their research activities.

The study found out that the ICT training that postgraduate students received is inadequate to make maximum use of ICT facilities use in research. It is recommended that training in the use of ICT applications should be organised four times every semester and it should be more interesting, exciting and student-centred. This will help reduce the over-dependence of postgraduate students on library staff for information. Moreover, there should be retraining of continuing postgraduate students to upgrade their knowledge of information searching. Again,

specialised training sessions should be given to postgraduate students who use specific ICT applications in their field of study or research.

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