Use of Information and Communication Technology for Teaching and Learning in Ghanaian Universities: Case of University of Cape Coast

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Abstract

The advent of ICT and its integration into our educational system especially at the tertiary level aims to improve the process of teaching and learning and yet it has been very difficult for lecturers to do this. The current study therefore focuses on the use of ICT in the teaching and learning process in Ghana. This study, employing the case study design, sampled 237 respondents comprising 37 lecturers and 200 undergraduate students using multiple sampling procedures. Survey instruments were used to collect data from the University of Cape Coast to ascertain the use of ICT in the university. The study results showed that the university provides some ICT teaching and learning resources even though these resources are not adequate. It also showed that lecturers' prior knowledge and skills in ICT best predicted the extent of ICT integration (by lecturers) in the teaching process (β= .593, p = 0.010). Finally the study revealed that there is a positive significant relationship (r = 0.713; α = 0.05 > p = 0.005) between ICT related courses (ICTRCs) and students' competencies in ICT. The findings suggest that on the part of students, ICTRCs are helping them to improve their ICT skills and knowledge even though the relationship between the variables was found not statistically significant. Based on these findings, it was suggested, among other things, that the computer centre of the university of Cape Coast be adequately resourced to develop instructional materials, and provide computer-based tutorials for lecturers and students to equip them effectively to be able to integrate ICT into their teaching.

Keywords: UCC, ICT, ICTRC, Integration.

Introduction

For many years, the three R's of reading, writing and arithmetic were considered the foundation of the education needed to function in society. Today, Information and Communication Technology (ICT) has, however, assumed a very important role in education and society at large. As a result, it was predicted that knowing how to use a computer will in the near future will be as important as reading and writing [1]. In fact, ICT use in education has constantly been reviewed in countless researches with most recommendations from such researches encouraging its use as well as further researches into specific areas of education. In a statement on the government's policy on ICT [2], the Minister for Communication acknowledged that the Information and Technology Age has provided opportunities for Ghana to mitigate the problems of decade-long stagnation and poor economic performance. He explained further that the process to develop a national ICT for

Accelerated Development (ICT4AD) Policy and Plan was a demonstration of government's commitment to ensure that Ghana became an active partner in the global Information Society and economy [3]. It is not a coincidence, therefore, that promoting ICT in Education – the Deployment and Exploitation of ICTs in Education is seen as the second of the 14 priority focus areas of governmental strategies in developing an ICT-driven economy [3].

The impact of the Information and Communication Technology (ICT) revolution cannot be overemphasized. ICT in this context refers to the technology that employs the use of computers, together with other communication devices such as the internet to search, access, store, retrieve, manage and utilize information to enhance teaching and learning. World economies are rapidly developing, resulting in the interdependence of national economies compared to the conditions years ago. The battle is ongoing to strategically position Ghana with the hope of benefiting from this technological revolution. No wonder the country keeps on attracting foreign investors in the IT field like Affiliate Computer System (ACS), Data Solutions, AQ Solutions and Supra Telecom, into the country. To this end, the Ministry of Education has embarked on a programme to streamline computer studies in all aspects of education. Consequently ICT is assuming a very important position in the development of the Ghana's educational system. The Government's commitment to connect each of the model secondary schools it intends to build in each district of the country to the internet is ample evidence of its willingness to tap into the full benefit of the knowledge explosion era.

The universities in Ghana, considered as the highest educational centres for learning in the country, have been subjected to countless questions concerning their use of ICT. Have universities lived up to expectation regarding the maximum use of ICT, especially considering the fact that Ghana is the first country in sub-Sahara Africa to have had full connectivity. For instance, the University of Cape Coast has 290 lecturers handling a total of 16,783 students [4] resulting in an overall student to lecturer ratio of 58:1. The existing faculties and schools in the University of Cape Coast are the Faculty of Arts, Faculty of Science, Faculty of Education, Faculty of Social Science, School of Business, and the School of Agriculture. Under each faculty are several departments. The three centres - the Centre for Development Studies (CDS), the Centre for Continuing Education (CCE) and the Centre for Research on Improving Quality of Primary Education (CRIPEG) are worth mentioning as new sections of the university's establishments.

In a quest to optimize efficiency in quality delivery of education, UCC has placed premium on ICT and its role to achieve this, since it would be a sine-qua-non for success in this enterprise. It is not surprising therefore that UCC has had to establish an ICT centre with the vision to becoming a Centre of Excellence in Africa. Here, the potentials of ICT are harnessed to serve as a catalyst for effective teaching/learning, research, and the promotion of innovation in education technology. Efforts in this vein, may also perfectly dovetail into the vision of the university's agenda to use ICT optimally with the view to increasing efficiency among both staff and students as well as to fit into the new global information and knowledge based economies (IKEs). The University of Cape Coast ICT policy states among other things the following goals:

i. Make the Computer Board a facilitator and an enabler to provide maximum opportunities to the Computer Centre to lead the thrust in the development of ICT in the university.
ii. Develop an extensive pool of trained ICT manpower at all levels to meet the requirements of the university.

iii. Provide incentives to teaching, professional and technical staff to ensure the development of the university's ICT sector (including software, hardware, and training) and the use and maintenance of ICT infrastructure.

iv. Set up university databases that are reliable, secure, up-to-date and easily accessible.

v. Promote widespread use of ICT applications in faculties and departments for efficient teaching, learning and research.

vi. Producing competent graduates who would be able to meet appropriate standards in the knowledge and understanding required for effective subject teaching, classroom management and students' assessment among others.

This, the university hopes to do by equipping students with requisite knowledge and skills that will make them competent to teach Computer Studies in schools and colleges thereby providing foundation for further education in Computer Science Education in the country. This study primarily attempts therefore to analyze the current state of the use of ICT in the area of teaching and learning, in the context of the University of Cape Coast.

Statement of the Problem. All over the world almost all universities strive to develop a general strategy for ICT and also produce strategies for teaching and learning. Fusing these two areas to produce a central policy for the use of computers in teaching and learning, however, appears to be a reserve for a handful of these universities. Fielden as cited in [5] reveals that there are two different approaches: 'those that have a university wide strategy on the topic and those who consider it as something that everyone is expected to do without allowing for a general push from the top'. Grade and Grade further contends that the use of computers fitted within a lot of universities' strong belief in student-centred learning (SCL) as the most effective way of learning. The use of computers becomes a central plank in this philosophy. Subsequently, universities who have adopted SCL find there is an increasing demand for computer-based materials. The implications of the widespread demand and use of computers in teaching and learning for the various parts of the university bring to mind the key resource – people. Many adults (especially those above 45 years) have had little exposure to PCs until recently. This calls for massive staff training for lecturers and teaching assistants to adequately prepare them for their teaching tasks. In the university of Cape Coast, where the study is set, equipment needed to enhance quality lecture delivery pose another challenge; Laptops, projectors, speakers, among others are still expensive even though prices keep on reducing on the global computer-device market. Students are the worst hit victims in this area. The progress rate at the University of Cape Coast Computer Centre provides enough evidence to opt for a collaborate effort among software providers. In spite of the various strategies and policies put in place at UCC, one ought to give a serious consideration to factors capable of helping the university realize its dreams of maintaining its enviable position as centre of academic excellence in Ghana.

Combing through literature, it has been found that little or even no research has been conducted to delve into this issue of how ICT use can affect teaching and learning in any university in Ghana. This situation motivates the researchers to conduct this study to primarily investigate the use of ICT in teaching and learning in the University of Cape Coast.

Purpose of the study. This study primarily aims at identifying the key effects of ICT use on teaching and learning in the University of Cape Coast. It specifically assessed the ICT teaching and learning resources available for use by students and lecturers and students' perceptions about the use of ICT as a tool for leaning. It also examined the relationship between the programmes being offered by the computer centre and the library of the university on students' competence in ICT in

general. Finally, the study focused on the relationship between prior knowledge/skills of lecturers and their competence in the use of ICT in the university.

Research questions. The relevant question that requires answer is: **"Which ICT teaching and learning resources are available for use by students and lecturers in the university of Cape Coast"**?

Hypothesis. Again, the study hypothesizes that: H_0: The computer literacy programmes offered at the ICT Centre and the information retrieval course offered by the library section of the university do not have any significant effect on students' acquisition of skills/knowledge in ICT and that H_0: There is no variation between lecturers' prior knowledge/skills in ICT and their effective use of ICT to enhance teaching/learning.

Significance of the study. The researchers of this study are hopeful that the findings of this study are important in the following ways: The country's educational sector would also benefit from the findings because it would enable the sector to put enough measures in place to that ICT serves as a means of improving the quality of life of the people of Ghana is met through education. Also the finding, when well disseminated, would inform and awaken stakeholders in education, such as parents and civil society groups to the challenge in a way that they can contribute significantly to promote the use of ICT in our universities. This work would serve as reference material for future studies on ICT in education.

Delimitation of the study. The study was conducted in the University of Cape Coast. In terms of respondents, the lecturers from the various schools and faculties in the university of Cape Coast were used. Though the study included students who were resident on campus, it excluded non- hall resident students in Amamoma, Apewosika, Kwaprow and Kokwado. In terms of content, the study focused only on the use ICT in teaching and learning at the university level.

Limitations of the study. Biases and the inherent flaws associated with the use of questionnaire as a tool for data collection were some of the setbacks of this study. In some cases, the uncooperative attitude of some of the respondents threatened the data collection efforts of the researchers. Also, the effects of extraneous variables such as ICT support from the university and teachers' perception about ICT programme, for instance could affect the level of ICT use in the university. These variables were not controlled and therefore they could affect the final results of the study. Measures were however taken to minimize the effects of these on the final results of the study.

Overview of literature on teaching and learning. The best education is to be found in gaining the utmost information from the simplest apparatus. Educational technology provides aids, not substitutes for learning. The potential of the computer firstly depends on increasing skills of the learner. In education greater emphasis is put on versatility and adaptability. The computer is valuable primarily as an instrument for accomplishing tasks that are logically distinct from the tool itself. According to Bruner (as cited in [1], we learn from experiencing phenomenal (objects, events, activities, processes), interpreting those experiences based on what we already know, reasoning about them and reflecting on the experiences and the reasoning. This implies that teaching using technology (ICT) should rest heavily on personal experience - practical and hands-on. In the end, the computer, as a technological apparatus, should become a means to an end. It should change the life of the users, as they continuously use it.

In fact, teaching to accommodate different learning styles helps teachers to reach each student during lesson. Students learn more and retain information longer, when they learn in a manner that is comfortable to them. ICT employs the resource-centreed approach to help users gain knowledge by combining both visual and auditory senses; this makes its learning attractive to students. Teachers who employ ICT in teaching must use various teaching strategies in order to

connect the learning style of each student. Information and communication technologies (ICTs) which include radio and television, as well as newer digital technologies such as computers and the Internet have been touted as potentially powerful enabling tools for educational change and reform [6]. When used appropriately, ICT helps to expand access to education, strengthen the relevance of education to the increasingly digital workplace, raise educational quality, and among others, help to make teaching and learning effective and efficient. It for this that reason that people have called for integration of ICT into the curriculum.

Conceptual framework for mapping ICT integration. An activity systems conceptual framework was adapted to map the ICT teacher development landscape. Activity systems are currently widely applied to study technology-based learning and working situations [7, 8]. The use of activity systems supports the idea that ICT needs to be studied within the learning environment and also within the broader social, economic, and policy contexts and dynamics in which it is situated. The purpose for using the activity systems conceptual framework was to build a more detailed account of measures to equip teachers/lecturers to integrate effectively ICT so as to achieve institutional objectives of ICT integration in education. In this vein, a framework was carved from a model that was opined by [7]. In this framework, a survey was developed with broad questions in six key areas relevant to the situational and needs assessment mapping, namely: mandate which referred to the institutional and organizational mandates related to ICT in education and teacher development. The next area touched on the actors meaning people who were involved in the project and the policy objectives which dealt with ICT integration in education and teacher development. The resources required to ensure success of the project such as ICT and non-ICT resources available or required for ICT in education have been critically looked at. Finally, regulatory frameworks dealing with curriculum and development frameworks for ICT integration and the community which concentrates on the public private partnership, networks for ICT in education and teacher development were analysed. An activity system conceptual framework related to this study and couched from [7] has been presented in Figure 1.
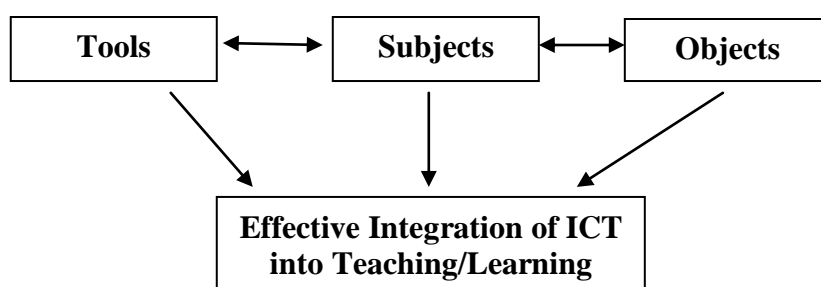

Figure 1: Modified Activity System Conceptual Framework of ICT Integration into Teaching and Learning Couched from [7]

Relating this framework to this study, it can be said that integrating ICT into teaching at the university level would require tools to work with. These tools could be some of the institutional provisions such as provision of computer labs, accessories, internet facilities among others to ensure a smooth take off of the integration process. It entails subjects who are mainly computer centre

coordinators, lecturers, students, university authorities and other stakeholders. It also encapsulates the roles and responsibilities of lecturers and students. The last ingredient in the integration process is the objects of the integration. It answers the question about what is to be integrated which touch on ICTRCs, curriculum aligned to ICT literacy to maximize learning.

Availability of ICT teaching and learning materials. According to [9], teaching and learning materials are classified as visual, audio and audio-visual. The computer is one example of an audio-visual aid found to be useful in teaching and learning. The curriculum cannot be easily implemented without them. Extensive research has been conducted by researchers in the past on the use of ICT in for teaching and learning. On their part, [1] described teaching and learning materials as programmed materials, which give the learner or the teacher elements of a subject in sequential order. These materials provide immediate feedback to both the teacher and the learner. Examples are programmed textbooks, teaching machines and computers. The computer provides an extensive interactivity when used as an instructional resource. They further suggested a need for the use computer equipment during lessons since the physical aspect of the educational requirement takes into account the development of psychomotor skills such as communication, ability to take accurate measurement, recording of observation and other manipulative skills. These materials mentioned are outlined in the Senior High School (SHS) Integrated Science syllabus issued by the Curriculum Research and Development Department (CRDD) of the Ghana Education Service (GES). In the university of Cape Coast, various attempts have been made to make students proficient in ICT. The establishment of the computer centre in 1977 was a major boost for computer literacy in the university. The Japanese government also made a tremendous contribution towards developing ICT in this university. The establishment of the Japanese International Cooperation Agency (JICA) laboratory in the 90s when computers were hard to come by cannot be overlooked. Though all these attempts were helpful, the major breakthrough came in the year 2003 when the university's ICT centre was established to provide ICT education and research to the entire student body.

Teachers' prior competency skills in ICT and teaching effectiveness. In almost all countries in the region, including emerging countries, teachers in primary, secondary and tertiary levels are being trained in the use of information and communication technologies (ICTs) in education with varying degree and scope [10]. It was observed that an increasing number of countries are now undertaking training to develop skills in the use of ICT in teaching and other school activities, including classroom management, to ensure the teachers bring their skills to actual classroom teaching. For example, Malaysian teacher training objectives are all directed towards developing the skills of teachers to use ICT in teaching in Malaysian schools [11]. It is not surprising that teachers who have had a kind of prior knowledge and skills in ICT, all things being equal would optimise the use of it to the benefit of their students. The importance of ICT training comes from the fact that it adds value to the processes of learning, and in the organization and management of learning institutions [11]. Circumstances vary between countries and between schools within a country, and implementation factors have therefore to be taken into account when designing ICT curricula [10]. A research report by [11] explained that teacher's competency as a result of their prior knowledge and skills in ICT, is positively correlated to teacher's success in the teaching and learning process. The results indicate that Malaysian teachers have a high level of ICT competency due their prior knowledge in ICT. This means that these teachers are able to use most ICT tools such as using computers, preparing slides to present their lessons, using internet to search for the updated information, designing simple web sites etc. [11]. The results also indicate that Malaysian teachers, as result of this advantage, have a high level of confidence level in using ICT. By virtue of

this, they trust that they can use ICT tools perfectly and that they are able to integrate these tools to their teaching process. The results finally show that Malaysian teachers have a high level of satisfaction toward ICT training programmes since this competence allows them to teach very well using ICT.

For the relationship between teachers' competency (TC) as a result of their prior knowledge and skills and teachers' confidence and success towards using ICT (CL), the results indicate positive relationship between teacher's prior knowledge and skills in ICT and their competency toward using ICT in the teaching situation. This means that the more teachers' have prior knowledge and skills in ICT (competency) the more confident they become in integrating ICT in their teaching with much success in their schools [12, 13].

ICT related courses (ICTRC) and students' performance. With the rapid usage of ICT resources (i.e. internet), ICT based teaching-learning applications and course are considered effective alternatives to traditional teaching methods in that they provide students unlimited opportunities to demonstrate mastery of contents taught [14, 15, 18, 16]. However within institutions of learning, new courses have been generated, one of which is the teaching and learning of ICT Related Courses (ICTRCs) like Computer Science, Software Engineering, Computer Education, Computer Engineering Information Retrieval and others. Some researchers have also confirmed that there is also low enrolment for ICTRC. This was so because students shun ICTRCs as a discipline when given an option of courses to study in their institutions. Other empirical studies have shown some relationship between ICTRC and students' competencies in ICT. Others too posited that positive relationship exists between taking ICTRCs and students' ICT performance [17, 18].

Methodology

The primary aim of this study was to assess the use of ICT for teaching and learning in the University of Cape Coast (UCC). The research design employed here was a case study in the form of a descriptive survey to look into the phenomenon of ICT use in the university of Cape Coast. The design used afforded the investigators the opportunity to collect data for the purpose of answering the research questions or for testing the hypotheses of the study.

This study targeted all lecturers and undergraduate students from public universities in Ghana. The accessible population however comprised lecturers and undergraduate students in the university of Cape Coast. The survey took into consideration the geographic location of students and made a fair sample of students in all the six halls of residence namely Adehye Hall, Atlantic Hall, Casely Hayford Hall, Kwame Nkrumah Hall, Oguaa Hall, and VALCO Hall.

The study used a total of 237 respondents who were sampled from all faculties and schools purposive technique. Of this number, 200 were undergraduates. Then, 37 lectures were also selected using a convenient procedure. With respect to the selection of halls of residence, faculties and schools, the stratified random sampling procedure was used to identify the sub-groups with regard to study programmes. The same technique was employed to ensure that students from single-sexed halls and mixed-sex halls were fairly represented and included in the study. The researchers then adopted the simple random technique to sample final elements from the halls and from the faculties and schools. These included the Faculty of Science, Faculty of Social Science, Faculty of Education, School of Business, School of Agriculture and the Faculty of Arts. The quota sampling was finally used to sample students from all levels (Level 100=50, Level 200=50, Level 300=50 and Level 400=50).

The main instruments used for the research were questionnaires because they offer a considerable and objective view on issues. The researchers, after explaining the purpose and rationale of the study to the lecturers and students, left the research instruments with them and were later collected later (some an hour and others the next day).

The descriptive statistics were analysed by descriptive statistics such as frequencies, percentages, means etc. whereas the multiple regression analysis was performed to gain insight into the associations among the variables. The inferential statistical tools were used to ascertain the extent to which independent variables could predict efficient use of ICT in the university of Cape Coast. To do the analysis, Statistical Package for Social Sciences (SPSS) was used.

Results and Discussion

The study sought to investigate the use of ICT in teaching and learning in University of Cape Coast. In doing so, an assessment was made of the availability of ICT resources and materials for the enhancement of teaching and learning, the perception of students and lecturers towards the use of ICT in teaching and learning, and the extent to which the university's ICT is been utilized to enhance students' learning. The study also examined the relationships between ICTRC and students' skills in ICT and the results are presented.

Biographic Data of Respondents. The total number of respondents was 237, which comprised 200 students and 37 lecturers. On the student side, the males were 112(56.0%) and the females being 88(44.0%). Students from all faculties in the university were involved in the study. These are Arts 23(11.5%) students, Agric 21(10.5%), Business 36(18%), Education 54(27%), Science 39(19.5%), and Social Science 27(13.5%).

Research Question 1. The descriptive statistics reveal that a majority of the lecturers 24(64.9%) indicated that they have computers and other gadgets such as public address systems and projectors at the faculty or department for their use. Thirteen 13(35.5%) of them however stated there are no such facilities for their use in their respective departments/sections. In the same vein, of the 200 students who were surveyed, 172(86%) of them intimated that they had some ICT learning resources such as computers, internet facilities, public address systems, and projectors in the university even though the rest 28(14%) said they did not have any ICT learning resources in the university. The finding here supports the outcome of a research that was conducted by [9] . In that work, [9] posits that teaching and learning materials are classified as visual, audio and audio-visual. The computer is one example of an audio-visual aid, and has been found to be a useful tool in teaching and learning. The curriculum cannot be easily implemented without them. There is therefore the need to use computer equipment during lessons since the computer provides an extensive interactivity when used as an instructional resource.

Testing Hypothesis 1. Table 1 was used to help the researchers test the hypothesis and to find out how students' acquisition of ICT skills/knowledge could be predicted by ICTRCs they pursue in the university. Testing for significance was done at .05 level (two-tailed).

Table 1: Regression Analysis Predicting Students' ICT Acquisition Skills from ICTRCs.

Model	Unstandardized Coefficients			Standard Coefficients	
	B	Standard Error	*Beta*	t	*Sig*
1. (Constant)	8.238	3.175		2.595	.219
ICT Lit. Program	.593	.362	-1.357	-1.637	.010
Inforet	.259	.397	.133	.740	.641

Source: Field Data (2009)

As can be gleaned from Table 1, the importance of each of the independent variables (IV) predicting students' ICT skills/knowledge is assessed through the reported t statistic and its associated *p*-value. The R, which indicates the correlation, was found to be 0.44 (indicating a weak linear relationship among the two independent variables). The R^2 was found to be 0.512 and therefore means that 51.2% of the variance in skills/knowledge in ICT was accounted for by the courses students take from the ICT centre and the Inforet that is mounted for them by the university library. In other words, the two variables (the ICTRCs) explained 51.2% of the variability in students' ICT skills/knowledge acquisition.

The statistics from Table 1 show that of all the two independent variables, only the ICT literacy course is significantly related to students' acquisition of ICT skills/knowledge. (β= .593, *p* = 0.010). The write up looks like $F(1, 35) = 8.642$, $p < 0.05$ (or: $F(1, 35) = 8.642$, $p = 0.010$). This suggests that each one point increase in ICT literacy course undertaken by the student from the ICT centre is associated on average with 0.593 point increase in their acquisition of ICT skills/knowledge. Mathematically, the regression equation for the analysis is $\hat{Y}=8.23+0.593X_1+0.259X_2$, where $\hat{Y}$ represents students' ICT skills/knowledge acquisition, X_1 for ICT literacy course undertaken by the student from the ICT centre and X_2 represents Inforet course taken from the library section. By this, for any one increase in acquisition of ICT skills/knowledge, there is a corresponding increase in ICT literacy course of 0.593 and increase in Inforet of 0.259. It is clear that the best predictor of students' ICT acquisition skills/knowledge is the ICT courses run for them by the ICT centre of the university. The Inforet courses they take from the library section, though is positively correlated with students' ICT skills acquisition, the relationship exists as a result of chance.

The results concur with the findings of a research conducted by [17]. His research found that the relationship between ICTRCs, once taken by student, affect their ICT competencies and usage in the learning process even though he noted that it is a vital area of research due to the fact that there are conflicting natures of results from researches that focus on ICTRC and students' competencies in ICT. There have been diverse research studies on students' effective learning of ICTRC. In doing so, he studied the effects of ICTRC on students' ICT performance with a sample of 53 minority prospective teachers and students.

Testing Hypothesis 2. It became necessary to test hypothesis 2 to find out whether there is a correlation between lecturers' prior knowledge/skills and their effective use of ICT to enhance student learning. In doing this, we used the correlation as shown in Table 2. The *p-* values as compared with the alpha value derived from the statistic to obtain the significance of the relationships.

Table 2: Correlation between Lecturers' ICT knowledge/skills and Effective use of ICT in Teaching

Correlations

		Effect. Teach.	Prior ICT Skill
Effect Teach.	Pearson Correlation	1	.713
	Sig. (2-tailed)		.005
	N	37	37
Prior ICT Skill	Pearson Correlation	.713	1
	Sig. (2-tailed)	.005	
	N	37	37

N=Sample size; (two-tailed)

From Table 2 it is obvious that the result is statistically significant. The write up is, $r(37) = 0.713$, $p < 0.05$ given $\alpha = 0.05$ and p −value =0.005. Since p −value is less than α, the result is statistically significant. The null hypothesis is thus rejected and a conclusion made that, there is a variation between lecturers' prior knowledge/skills in ICT and their effective use of ICT for teaching. The correlation coefficient, (r =0.713) shows a strong positive correlation between prior lecturer knowledge/skills in ICT and effectiveness of using ICT in the teaching process.

The findings lend support and give credence to earlier researches that have been conducted in most countries including emerging ones in Africa and Asia on the need for teachers to acquire some skills in the use ICT in order to effectively use them [10, 11,]. According to the UNESCO report, teachers in primary, secondary and tertiary levels are being trained in the use of information and communication technologies (ICTs) in education with varying degree and scope. It was observed that an increasing number of countries are now undertaking training to develop skills in the use of ICT in teaching and other school activities, including classroom management, to ensure that teachers bring their skills to actual classroom teaching. For example, for instance, Malaysian teacher training objectives are all directed towards developing the skills of teachers to use ICT in teaching in Malaysian schools [11]. It is not surprising that teachers who have had a kind of prior knowledge and skills in ICT, all things being equal would optimise the use of it to the benefit of their students. The importance of ICT training comes from the fact that it adds value to the processes of learning, and in the organization and management of learning institutions [11].

Conclusion and Recommendation

Lecturers lack the technological know-how to efficiently integrate ICT into their teaching. Encouraging lecturers to integrate ICT into their teaching may help equip them with the skills and make them literate with the knowledge they require for effective integration of ICT in teaching. Universities would have to redouble their efforts to integrate ICTRCs such as informational retrieval courses into the curriculum. Practical ICT sessions would have to be introduced and measures taken to reduce class sizes to render these sessions effective. Just as elsewhere, teachers

have a high level of ICT competency due their prior knowledge in ICT [11]. Ghana ought to learn from the examples of other countries if she wants to develop to catch up with the ever increasing global advancement in the technology. In most cases, ICT resources are used by lecturers in their lessons delivery even though these resources are not enough. In fact, teaching to accommodate different learning styles helps teachers to reach each student in the learning process. Students learn more and retain information longer, when they learn in a manner that is comfortable to them.   ICT employs the resource-centred approach to help users gain knowledge by combining both visual and auditory senses; this makes its learning attractive to students. Lecturers who employ ICT in teaching must use various teaching strategies in order to connect the learning style of each student. Information and communication technologies (ICTs) which include radio and television, as well as newer digital technologies such as computers and the Internet have been touted as potentially powerful, enabling tools for educational change and reform. Therefore, the university management should do all within their means to provide more ICT teaching resources to enhance quality education delivery on our campuses. The computer centres when given face-lifts would increase the stock of ICT resource materials for use by lecturers and students.

In respect of the outcome, some recommendations have been made to improve the infusion of ICT in the teaching and learning process in our universities. Since a sizeable number of lecturers and students do not possess their personal computers, it is suggested that universities provide computers, especially lap tops in lecturers' offices. Then, a policy should be put in place to enable students acquire computers on hire-purchase. And billing them over a three year period could result in all or at least most students acquiring their personal computers. Again, university authorities should provide the essential conditions such as adequate hardware, software and media for use by lecturers and students. In other words, adequate ICT resources should be added and upgraded to allow for their maximum use. Government should make available resources to the universities to train adequate instructors to meet the ICT needs in the field of education. The computer centre of the university should be adequately resourced to develop instructional materials, including computer based tutorials, on-line updates of lectures to be delivered in class. Lecturers should develop innovative ways of addressing challenges in ICT for teaching and learning. Also, in making students ICT literate, lecturers should use ICT to communicate with students by giving them assignments to submit their project reports online. Government should critically look at general overhaul (review) of the entire education system to align it with market demands. The revision process should be inclined towards technology literacy approaches for acquisition of basic ICT skills. In sum, this study suggests, among other things, that the computer centre of the university of Cape Coast be adequately resourced to develop instructional materials, and provide computer-based tutorials for lecturers and students to equip them effectively to be able to integrate ICT into their teaching.

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