Towards the Access to and Usage of Information and Communication Technology (ICT) in Polytechnic Education

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ABSTRACT
This paper focuses on access to and use of Information Communication and Technology (ICT) in Polytechnic Education in Ghana using the Accra Polytechnic, as a case study. The study assessed the impact ICT has had on teaching and learning in polytechnic education. Using a quantitative survey research methodology, data was collected from twenty (20) lecturers and one hundred (105) students of Accra Polytechnic. The data for the study was analysed using Statistical Package for Social Science (SPSS) version 16. The results of the study revealed that the majority of lecturers (90%) and students (74%) of Accra Polytechnic had access to and use ICT facilities but there were inadequate facilities, little access time and little use of the application software available to them to improve teaching and learning. For these reasons, the promised benefits of ICT in education as illustrated in this paper would only be achieved, if Accra Polytechnic gets enough and new technology, facilitates the right ICT curricula and pedagogies and acquires long-term financial commitments for ICT implementation.

General Terms
Accessibility, ICT, Usage

Keywords
Access, Accra Polytechnic, ICT, Polytechnic Education, Use

1. INTRODUCTION AND BACKGROUND OF THE STUDY
From the earliest times when computers were commercially available, they could be found in use in educational institutions and educators who integrate technology with new teaching practices gained through professional training can transform the performance of the students and use computers to support learning [1][2].

As a result there has always been huge community support for this especially in the USA. A survey conducted by Lemke and Coughlin [3], indicated greatest support for expenditure on ICT in schools when compared with a list of alternative expenditures in education. In Ghana, following the introduction of the new Educational reform, there has been increased support for introduction of ICT facilities in all levels of education.

Over the years, unprecedented Government investment in ICT in schools has been directed at implementing infrastructure and connectivity. An exponential increase in provision of technology resources (including projection technology) has ensued. The focus of national policy has now shifted towards whole school improvement through utilization of ICT resources [4].

Computers and applications of technology have become more pervasive in society. As public awareness grew, this need for computer literacy became extremely influential and many schools purchased computers based on this rationale for which Accra Polytechnic, Ghana is no exception.

Today computers in schools are both a focus of study in themselves (technology education), and a support for learning and teaching (educational technology). Rationales can be presented for both computer literacy and using computers as part of educational technology. However, access to and use of computers in education has long been a challenge in developing countries like Ghana. One would expect that with the education reforms, tertiary institutions, including Polytechnics would witness a massive increase in terms of access to and use of ICT for teaching and learning. Accra Polytechnic which is located in the capital city of Ghana also appears to grapple with this challenge.

Accra Polytechnic is located at the central business district of Accra, Tudu in Ghana. It is adjacent to both the headquarters of the Ghana Trade Union Congress (TUC) and Novotel Hotel, Accra. Accra Polytechnic was established in 1949 as a Technical School and commissioned as Accra Technical Institute in 1957. In 1963, it was renamed Accra Polytechnic under the management of the Ghana Education Service [5].

The Polytechnic Law, 1992 (PNDC Law 321) upgraded the institution to tertiary status and placed it under the Higher Education Council. In 2007, the PNDC Law 321 was reviewed under Act 745 to, among others, award degrees subject to the conditions that its Governing Council may determine. With this mandate, the polytechnic offers a variety of three-year programmes that lead to the award of the HND by the National Board for Professional and Technical Education (NABPTEX) [5]. Currently, Accra Polytechnic is the premier and largest polytechnic in Ghana with a population of about eleven thousand students and five hundred lecturers of different ranking (Accra Polytechnic Strategic Development Plan, 2004-2009, p. 1-3).

The growth of the computer and ICT industry has been on the increase in the last three decades and currently, courtesy the New Educational Reform, it has been integrated into the educational system and many educational institutions have been equipped with ICT for educating their students (Educational Reform Policy, Ghana 2007). In Accra Polytechnic, the school and other stakeholders such as Ministry of Education, Ghana Education Trust Fund (GETFund) has increased access to the use of ICT for lecturers and students. As a result, four (4) Computer Laboratories furnished with hundred and seventy (176) computers for ICT training for students, two (2) Internet browsing centers with a sitting capacity of one hundred and eighty six (186) and a wireless Internet access have been installed within the Polytechnic community. The metamorphosis of Accra polytechnic into a tertiary institution is not limited to curricula and facilities. Students' population has tripled and so has the teaching and non teaching staff. The

growth in students and personnel population resulted in widening the communication gap between those in authority and those down the rank scale. This situation calls for the adoption and use of ICT for administration, teaching and learning in Accra Polytechnic. Hannafin & Savenye [6] believe that the place of ICT in the educational process cannot be underestimated. It is in this light that the rationale for computer literacy is still relevant today as it was in the past. As noted by Welle-Strand and Tjeldvoll [7], the major rationale for having ICT in schools was more concerned with the need to use ICT to improve student learning. The study of how beneficial ICTs are to students in terms of aiding their learning is thus important.

After the Introduction and Background, Problem Statement, Research Objectives, Significance of the Study and Scope of the Study Sections, the rest of the paper is structured and outlined as follows: Section 2 presents a Review of relevant Literature which includes Information and Communication Technology (ICTs) in Education, Roles, Benefits and Application of ICT in Education and the Emergence, Access to and use of ICT in Education as well as Use of ICT in Developing Countries. Section 3 discusses our Research Methodology. This covered the research design, population of the study, sample size and sampling techniques, instrumentation, mode of data collection, data analysis and presentation of result and limitation of the study. Section 4 elaborates on the data analysis. All data are collected edited, coded and analyzed using quantitative techniques. It also includes findings and summary. The paper is finally concluded with a recommendation in Section 5, based on the findings of the study.

1.1 PROBLEM STATEMENT

There has been a concern over the proper use of ICT facilities and equipments to aid teaching and learning in the educational sector of both developed and developing nations/countries. Since the beginning of the 1990s, educators in the global world have been particularly concerned that very little of the potential of ICT to support learning in schools and training institutions seems to have been realized, despite a sufficient base of installed computers and ICT facilities. A number of studies [8][9][10] have shown that few lecturers or teaching staff of training institutions facilitate substantial student use of ICT. Therefore, while it is a common knowledge that ICT support for learning is essential, it is important for some scientific study to be conducted to assess its impact on access to and use of ICT in Polytechnic Education.

1.2 RESEARCH OBJECTIVES

The following are our specific objectives of the study:

1. To ascertain the level of access to and use of ICT among lecturers and students of Accra Polytechnic.
2. To determine the ways lecturers and students of Accra Polytechnic use ICT in polytechnic education and the impact on teaching and learning in polytechnic education.
3. To identify the extent to which lecturers and students of Accra Polytechnic use internet for effective and efficient teaching and learning.
4. To find out whether lecturers and students of Accra Polytechnic actually have access to ICT facilities and services for academic work.
5. To make recommendations on the integration of ICT in education for consideration by management of Accra Polytechnic, policy makers and stakeholders.

1.3 SIGNIFICANCE OF THE STUDY

Understanding the impact of ICT access and use by lecturers and students at the Polytechnic level in their learning processes would have an interest for students, management of the Polytechnic and Government at large.

In the first place, the student realizing the value or the capabilities of the ICT at his/ her disposal would endeavour to make good use of the ICT time available than using the time for non-academic activities. The management and lecturers of Accra Polytechnic would also benefit from this study. The examination of the impact of the use of ICT in the teaching and learning process would aid management to provide more or increase the ICT facilities in the Polytechnic to enhance teaching and learning.

The last but not the least, Government and other stakeholders can use the findings of this study to assess the benefits of ICT in polytechnic education in order to provide the necessary ICT intervention for enhancing access to and use of ICT for teaching and learning in Accra Polytechnic and other educational institutions.

1.4 SCOPE OF THE STUDY

This study will concentrate on issues bordering on access to and use of ICT in Polytechnic education. The focus of this study will be on the extent to which access to and use of ICT by lecturers and students in Polytechnic education. The scope of the study was limited to Accra Polytechnic, as it will be easier for the researchers to reach his subjects. Ideally, it would have been appropriate to include other polytechnics in the study in order to be able to compare access and use of ICT in various institutions. However, the cost involved in such endeavour, and the time available for the research did not make this feasible.

2. LITERATURE REVIEW

This section reviews literature on Information and Communication Technology. It provides empirical evidence of the benefits and application of ICT in Education. Literature for the study was reviewed under the following themes;

i. Information and Communication Technology in Education
ii. Roles, Benefits and application of ICT in Education
iii. The Emergence and Use of ICT in Developing Countries
iv. Access to and use of ICT in Education

2.1 Information and Communication Technology in Education

According to Pelgrum and Law [11] the issue of 'computers in education' started to become popular in educational policy-making in the early 1980s, when relatively cheap microcomputers became available for the consumer market. They also noted that with regard to the early introduction of microcomputers in education in 1980s, there were high expectations that it would make education more effective and motivating.

Hepp et al. [12] reported that ICTs have been utilized in education ever since their inception, but they have not always been massively present. Although at that time computers have not been fully integrated in the learning of traditional subject

matter, the commonly accepted rhetoric that education systems would need to prepare citizens for lifelong learning in an information society boosted interest in ICTs [11]. Moreover, Kozma and Anderson [13] wrote in their paper "Qualitative Case Studies of Innovative Pedagogical Practices Using ICT" that education is at the core of the knowledge economy and learning society and that correspondingly, the role of ICTs in schools is shifting dramatically. In a similar vein, Wagner and Kozma [14] contend that the promise of ICTs to enhance basic education is a tremendously challenging area of development work today, in both poor and wealthy nations. Regarding the use of ICTs in education, Ezer [15] maintains that 'the ICT for development literature often treats education 'in passing''. Additionally, Ezer [15] notes "Education has a central influence on the idea of ICTs and therefore it must be examined and re-examined in order to gain a better understanding of how ICTs can impact developing countries". According to Ezer [15] much of the descriptive literature related to the implementation of ICTs to pedagogical ends and much is case study based while other research related to the problem domain involves curriculum studies; a sub discipline within the field of education. It should also be noted that direct evidence from the literature reviewed shows that the survey is the most dominant technique used to gather data for ICTs and development studies including the area of education [16].

2.2 Roles, Benefits and Application of ICT in Education

Jhurree [17] elaborated that, much has been said and reported about the impact of technology, especially computers, in education. Similarly, Hepp et al. [12], stated that literature contains many unsubstantiated claims about the revolutionary potential of ICT to improve the quality of education. They also noted that some claims are now deferred to a near future when hardware will be presumably more affordable and software will become, at last, an effective learning tool. Considerable resources have been invested to justify the place of technology in education, and many research studies have revealed the benefits and gains that can be achieved by students, teachers and administrators [17].

To begin with, Hepp et al. [12] stated the following reasons for the application of ICTs in education:

- **A New Society Requires New Skills**: Due to the fact that ICTs are the preeminent tools for information processing, new generations need to become competent in their use, should acquire the necessary skills, and therefore must have access to computers and networks during their school life.

- **Productivity Enhancement**: Schools are knowledge-handling institutions; therefore, ICTs should be fundamental management tools on all levels of an educational system, from classrooms to ministries of various governments.

- **A Quest for Quality Learning**: Schools should profoundly revise present teaching practices and resources to create more effective learning environments and improve life-long learning skills and habits in their students.

In order to address the questions of "How can ICTs be applied to support education change?" and "How can its application in education in turn support sustained economic development and social transformation?" Kozma [18] suggests the following four types of approaches in general:

i. ICTs are used to improve the delivery of and access to education. This approach can improve education on the margin by increasing the efficiency by which instruction is distributed, but it need not involve fundamental change.
ii. ICTs are the focus of learning. By learning ICT skills, students become better prepared for work that increasingly involves the use of ICTs.
iii. ICTs can be used to improve student understanding, increase the quality of education, and thereby increase the impact of education on the economy.

Knowledge creation, technology, technological innovativeness, and knowledge sharing can contribute to the transformation of the education system and to sustained economic growth and social development. Moreover, Papert [19] identified the following positive effects on students of ICTs in education, these include: enhanced motivation and creativity when confronted by the new learning environments, a greater disposition to research and problem-solving focused on real social situations and more comprehensive assimilation of knowledge in the interdisciplinary ICT.

Furthermore, Kozma and Anderson [13] claim that ICTs are transforming schools and classrooms by bringing in new curricula based on real world problems, providing scaffolds and tools to enhance learning, giving students and teachers more opportunities for feedback and reflection, and building local and global communities that include students, teachers, parents, practicing scientists, and other interested parties. Similarly, Hepp et al. [12] stated that the roles ICTs play in the educational system can be pedagogical, cultural, social, professional and administrative. As a pedagogical tool ICTs provide a new framework that can foster a revision and an improvement of teaching and learning practices such as collaborative, project-based and self-paced learning. The cultural, social and professional roles of ICTs are exercised primarily through an effective use of the vast amount of information sources and services available today via Internet and CD-based content for the entire educational community: students, teachers, administrators and parents. Administratively, ICTs have important roles to play in making school administration less burdensome and more effectively integrated to the official information flow about students, curricula, teachers, budgets and activities through the educational system information pipelines.

According to Wagner and Kozma [14], ICTs can affect the pace at which the learning gap is bridged in developing countries, both domestically and in relation to other nations. The great challenge is to harness the advantages of those technologies, in order to improve the delivery and quality of educational services. Also to accelerate the rate at which knowledge is distributed and learning chances and outcomes are equalized throughout society.

2.3 The Emergence and Use of ICT in Developing Countries

Ogunsola [20] asserts to examine the Information and Communication Technology (ICT) revolution and the concept of globalization as they affect developing countries. Globalization as one of the reasons for possible widening of the gap between the poor and the rich nations was examined and the emerging concept of "digital slavery" was carefully evaluated.

A number of countries especially those in the developed

world and some in developing countries are putting in place policies and plans designed to transform their economies into an information and knowledge economy and either already have in place comprehensive ICTs policies and plans or are at an advanced stage of implementing these programmes across their economies and societies. Some of these countries see ICTs and their deployment for socio-economic development as one area where they can quickly establish global dominance and reap tremendous payoff in terms of wealth creation and generation of high quality employment. On the other hand, some other countries regard the development and utilization of ICTs within their economy and society as a key component of their national vision to improve the quality of life, knowledge and international competitiveness. As Faye [21] has pointed out, ICTs are offering even less developed countries a window of opportunities to leapfrog the industrialization stage and transform their economics in to high value-added information economies that can compete with the advanced economics on the global market. Technological innovation has contributed to globalization by supplying infrastructure for trans-world connections. According to Ajayi [22], the revolution taking place in ICTs has been the central and driving force for the globalization process. Both developed and less-developed countries cannot afford to miss out on the opportunities these technologies are creating. In practice, globalization benefits those with technology, resources, contacts, information and access to markets. It has a negative impact on the poor. The prediction is that the gap between the new winners and losers within the world economy order dominated by an Information and Knowledge Economies will be much larger than the development gap that now exists between the advanced nations and the less developed nations. African countries are at risk of being further marginalized if they fail to embrace these technologies to transform their economies.

2.4 Accessibility and use of ICT in Education

Brewer et al. [23] claim in the paper, "The Case for Technology in Developing Regions" that novel ICT has the potential for great impact in a variety of fields ranging from healthcare to education to economic efficiency. However, they do not propose that ICT offers a panacea for the complex problems facing nations on the path to economic development. On the contrary, at best, ICT can enable new solutions only when applied with a broad understanding and a multidisciplinary approach. According to Brewer et al. [23], ICT projects have four main technology needs: connectivity, low-cost devices, appropriate user interfaces (UI), and power. Rural connectivity is a challenging prerequisite in most ICT projects. Although wireless has broad use in urban areas, most rural areas are without coverage. The low population density in rural areas (even in the US) limits the ability to deploy base stations profitably.

According to a UNESCO [24], study of global education, several attempts have been made to integrate ICT into rural and low-income urban schooling. By combining technology with sound educational principles and teaching practices, many of these initiatives have demonstrated increased learning. Numerous pragmatic issues have an effect on ICT projects, including design and deployment strategies, transition planning, and the use of open source software. To Brewer et al. [23], ICT can play a large role in addressing the challenges of developing regions and that there is a real need for innovative research. The needs of developing regions are both great and unique, and thus lead to a rich and diverse research agenda. Moreover, as these needs are different from those of industrialized nations, market forces will continue to meet them at best accidentally. Because the needs are great, we must do better. Providing ICT for developing regions is not easy, but it is uniquely rewarding. Annan [25] encourages the ICT research community to take on the challenge and hopes the industry will broaden its horizon and bring more of its remarkable dynamism and innovation to the developing world" .

Tondeur et al. [26] retain in their study that the link between national curricula and the use of ICT in primary education has been explored. In particular, the study has pointed to the relative importance of a national ICT curriculum in the context of a decentralized educational system. Although the results in this study cannot be generalized beyond the target population of Flemish Primary Schools, the present study can inspire states and regions where a similar incongruence is being observed between ICT-related national curriculum initiatives and the current level of adoption of integrated ICT use. From the research findings, it is to be concluded that the aspirations of national educational authorities in view of establishing ICT competencies does not automatically result in changes in classroom practices. According to [26], Curriculum Frameworks can even be in conflict with the characteristics of the local school system (e.g., school policy, school culture and teacher beliefs). They also suggest that teachers have hardly been involved yet with regard to the integration of ICT competency frameworks. Analysis of the interviews with the principals indicates a lack of communication between school principals and teachers concerning the implementation of ICT in the school. The development of a school-based ICT plan that translates nationally defined ICT-competencies in terms of school-based operational objectives is presented in [26] as a more promising approach. The development of an ICT plan gives stakeholders the opportunity to reflect on their particular educational use of ICT.

3. RESEARCH METHODOLOGY

As stated in our research objectives, the study investigated accessibility and use of ICT facilities at the Accra Polytechnic. This section presents a detailed account of the methodology used for the research. It includes the research design, population and sample size, sampling technique, instrumentation, mode of data collection, method of data analysis and presentation of results, fieldwork problems and limitations.

3.1 Research Design

Based on the nature of our research objectives, a survey design was most appropriate in answering the specific questions in this paper. In survey, the approach is either qualitative or quantitative. The choice of either of these approaches is determined by the tool used in collecting data in the study. As indicated by Kvale [27] and Mikkelsen [28], the overall success of research is determined by the choice of research method. Thus, the choice of a survey method was important to the overall success of the research. Specifically, the study adopted a quantitative survey approach because of the following reasons:

i. It is credited for its flexibility in asking questions and its analysis of responses.
ii. It provides for a comprehensive examination of people's attitude towards specific issues.

iii. It affords the researcher(s) the opportunity to gather broad and quantifiable data.
iv. It allows a small sample to be selected and then used to generalize the findings of the large group.

3.2 Population of the Study

The research was conducted by collecting data from third-year students and lecturers of Accra Polytechnic. This was because the third-year students had enough access to and use of ICT facilities available to them as well as the lecturers. The total population was two thousand, eight hundred and forty six (2,846), comprising two thousand six hundred and eighty-eight (2,688) students, one hundred and fifty-eight (158) lecturers or academic lecturers.

Table 1. Population and Sample Size

Respondents	Population	Sample size	Sample Percentage (%)
Third Year Students	2,688	105	5
Lecturers	158	20	13
Total	**2,846**	**125**	**18**

Source: Academic Affairs and Human Resource Department of Accra Polytechnic (2011)

3.3 Sampling Techniques

The sample in this study comprised of third year students and lecturers of the Accra Polytechnic. A total of one hundred and twenty five (125) participants will be used. Convenience sampling method was used to select participants. This is because only participants who will be interested in the study will be given the questionnaire.

3.4 Data Collection Instruments

The main measuring instrument to be used for this study is the questionnaire. According to White (2000), the questionnaire is an important tool, which is useful for eliciting information on a specific problem from knowledgeable informants. The use of questionnaire was appropriate because, it provided the opportunity for respondents to express their opinions and views freely. It also guaranteed the anonymity of the respondents, leading to unbiased data. Thus, the questionnaire allowed respondents to relax and provide information they will not provide during interview survey, thereby allowing the researchers to obtain more data.

The questionnaires were made up of both open-ended and close ended questions and were administered to students and lecturers. Bryman [30] argued that probing can be very important when open-ended questions are asked. The most important goal of a survey research is to let the respondent have his say, to let him tell the researcher what he means and not the other way round. Open-ended questions therefore give the chance of allowing for detailed responses and also for flexibility. Unstructured, free-response questions allow respondents to state what they know and think. However, in open-ended questions, respondents may respond too much or too little. The main advantage of close-ended questions is that it is easy to answer and takes little time. Another advantage is that answers are easy to compare and computerize since all responses fall into predetermined categories. All questionnaires were self administered with assistance from two colleagues/assistants. The questionnaire was divided into four sections. Section A was on demographic information on respondents and section B covered access to ICT facilities with section C dwelling on the Use of ICT to aid learning and teaching as well as section D on the Access and Use of the Internet.

3.5 Mode of Data Collection

In accordance with research ethics, institutional approval was sought from selected organizations before data collection began. After institutional approval was granted, the consent of participants was sought before questionnaires were administered to them. Response rate is very important in research and to ensure a good and acceptable response rate in this study, the following measures were incorporated in the data collection.

First, a verbal pre-survey consent was sought from the heads of department to announce the intention of using their Department for the study, and to ask for assistance and cooperation. Secondly, an appointment schedule was drawn in consultation with the lecturers that has consented to be part of the study. Finally, the questionnaire was administered to participants who consented to participate in the study. The researchers administered the questionnaire with the help of two assistants.

Prior to the actual collection of data, the questionnaire was pre - tested to find out whether the questionnaire would be able to help gather the information needed for the research work. Subsequently the researchers used the pilot study to check if there were data collection problems.

3.6 Ethical Considerations

The Standard ethical considerations were observed in the conduct of this study. As such the questionnaire did not request any form of identification. Also, the participants were assured that information received would be treated as confidential as possible and will not be used for any other purpose than what it is intended for.

3.7 Method of Data Analysis and Presentation of Results

The data was sorted out according to the various respondents involved in the research. The data was then coded using the Statistical Package for the Social Science (SPSS) and/or Excel software. Information gathered from the data was analysed and presented descriptively. Tables below will be used, specifically cross-tabulation, to show type of respondents against their responses. The entire results as depicted below were organized and presented under four main themes namely, access to ICT, use of ICT, state of ICT facilities and challenges in using the ICT facilities for teaching and learning.

3.8 Problems Encountered/Limitations

For security reasons there was not much detailed information pertaining to student academic performance as well as were students' unwilling to respond to the questionnaire. However, the researcher employed the assistance of two lecturers who helped administer the questionnaire during lecture periods. Sometimes finance became a problem, having to buy some materials as well as time was also a problem; the researchers had to combine office activities with field work.

4. DATA ANALYSIS AND DISCUSSION OF FINDINGS

This section deals with the analysis of data collected from the distribution of the questionnaire. One hundred and twenty five

(125) respondents drawn from lecturers and students were used as the sample size. This section is characterized by using tables for the analysis of lecturers and students' responses under each of the five objectives. It is then followed by a discussion per table and then a conclusion was drawn. SPSS is the software that was used for the development of the tables for the data analysis.

4.1 Demographic Information

The respondents were asked for their demographic information. The demographic information provided was made up of information on their ages, gender, student programmes of study and departments which are lecturers affiliated to.

4.1.1 Age Distribution of Respondents

The responses received showed that 60 (57%) of students were amid 22 and 24 years followed by 35 (33%) of those above 24 and 10 (10%) were between 19 and 21 years. On the other hand, the majority of lecturers (85%) were 30 years and above and 15% were below 30 years. It can therefore be inferred that the majority of the lecturers and students fell between the ages of 36-40 and 22-24 years respectively.

Table 2. Gender Distribution of Lecturers and Students

Gender	Lecturers		Students	
	Frequency	Percentage	Frequency	Percentage
Male	14	70%	61	58%
Female	6	30%	44	42%
Total	**20**	**100%**	**105**	**100%**

Table 2 depicts the gender distribution of both lecturers and students' respondents. 70% and 58% were male respondents of lecturers and students respectively whilst 30% lecturers and 42% students were female. It can therefore be deduced that the questionnaire has been distributed proportionally to avoid gender bias because the population of both lecturers and students have more males than females.

4.2 Students Access to Computer Laboratory Facilities

Table 3 indicates that 74% of students have access to the Polytechnic's computer laboratories whilst 26% did not.

Table 3. Access to Computer Laboratories by Students

Access to computer Labs by Students	Frequency	Percentage
Yes	78	74%
No	27	26%
Total	**105**	**100%**

It can therefore be deduced that majority of students have access to the polytechnics' computer laboratories and ICT resources.

4.3 Access of ICTs in Polytechnic Offices

Table 4 also indicated that 90% of lecturers have access to ICT system in their offices, however, only 10% responded that they have no access to ICT facilities. It can therefore be construed that majority of lecturers have access to ICT facilites in the Polytechnic.

Table 4. Access of ICTs in Offices

Access to ICTs in Offices	Frequency	Percentage
Yes	16	90%
No	4	10%
Total	**105**	**100%**

4.4 Departments of Lecturers and Students

From Table 5 below, 30%, 5%, 30%, 15%, 20% and 10% of lecturers were affiliated to Accounting, Marketing, Purchasing & Supply, Secretaryship & Management, Computer Science, and Engineering Departments respectively. 32%, 20%, 18%, 9%, 9% and 12% of the students were also affiliated Accounting, Marketing, Purchasing & Supply, Secretaryship & Management, Statistics and Engineering Departments respectively.

Table 5. Department of Lecturers and Students

Departments of Lecturers and Students	Lecturers		Students	
	Frequency	Percentage	Frequency	Percentage
Accounting	6	30%	34	32%
Marketing	1	5%	21	20%
Purchasing & Supply	4	20%	19	18%
Secretaryship & Management	3	15%	9	9%
Computer Science	4	20%	-	-
Statistics	-	-	9	9%
Engineering	2	10%	13	12%
Total	**20**	**100%**	**105**	**100%**

4.5 Level of Use of Computer Laboratories by students

Responses to the extent to which students visit the computer laboratories is depicted below in table 6. From Table 6, 64% of students visit the laboratories occasionally whiles 4% visit on daily or bi-weekly basis. It can therefore be concluded that, majority of students visit the laboratories intermittently followed by those who visit weekly.

Table 6. Level of use of Computer Laboratories

Visit to the Computer Laboratories by Students	Frequency	Percentage
Daily	4	4%
Bi-weekly	4	4%
Weekly	30	28%
Occasionally	67	64%

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Daily	4	4%
Bi-weekly	4	4%
Weekly	30	28%
Occasionally	67	64%
Total	**105**	**100%**

4.6 Purpose of Visiting the Computer Laboratories

The researcher delved into finding out the Purpose of Visiting the Computer Laboratories by students, the responses are shown in Table 7.

Table 7. Purpose of Visiting the Laboratories by Students

Purpose of Visiting the Computer Laboratories	Frequency	Percentage
ICT lectures, Coursework, Assignments and Personal work	5	5%
Coursework, ICT lectures, Personal work	8	7%
ICT lectures and Assignments	5	5%
ICT Lectures and Personal work	7	7%
Personal work	10	10%
ICT lectures	70	67%
Total	**105**	**100%**

Table 7 indicates that 70 (67%) students visit the laboratories for ICT lectures whereas only 5% use it for personal work. In conclusion, it can be presumed that majority of respondents visit the computer laboratories purposely for ICT lectures or computer literacy class.

Also, to find out what students do when they visit the computer laboratories, the findings revealed that about 77% use the facilities for computer literacy class. It can be concluded that students were limited to utilizing the computer laboratories for enhancing teaching and learning.

4.7 Satisfaction with the Presence ICT Facilities by Lecturers and students

To ascertain whether respondents were satisfied with the present ICT facilities, table 8 indicated that 80% of lecturers and 70% of students said they were not satisfied against 20% and 30% of lecturers and students respectively. Therefore be concluded that majority of both lecturers and students were not satisfied with the present ICT facilities available to them for use in teaching and learning.

Table 8. Satisfaction with the present ICT facilities

Satisfaction With the Present ICT	Lecturers		Students	
	Frequency	Percentage	Frequency	Percentage
	4	20%	32	30%
No	16	80%	73	70%
	20	**100%**	**105**	**100%**

4.8 Usage of Application Softwares by Lecturers and Students

Table 9 illustrates that 14 (65%) and 75 (67%) lecturers and students respectively have the skills to use word processing and spreadsheets against 5% and 4% respondents who can use more than 3 office programs. It is therefore clear that both lecturers and students have been using only 2 programs hence limited in the use of the programs for academic work.

Table 9. Application Software Used by Lecturers and Students

Programs that lecturers and students use	Lecturers		Students	
	Frequency	Percentage	Frequency	Percentage
Word Processing	10	50%	50	48%
Spreadsheets	4	20%	18	17%
Databases	1	5%	1	1%
Presentations	1	5%	5	5%
Word Processing and Spreadsheets	14	65%	75	67%
Word Processing, Spreadsheets and Presentations	1	5%	4	4%
More than three	1	5%	7	7%

To find out on the uses of the programs available to students, the research findings also indicated that 75% of students use the programs for assignments and ICT practical training whilst 9% use it for class work and their personal work. Therefore it can be inferred that majority of respondents use the programs solely for practical training and assignments during computer literacy class hence help students in teaching and learning.

4.9 Using ICT in Teaching Courses

To find out the extent to which lecturers use ICT in teaching subjects in different courses areas. The responses were analyzed in Table 10.

Indications from Table 10 shown that 85% and 76% of lecturers and students respectively responded that ICT was not used by lecturers in teaching their subjects against 15% of lecturers and 25% of students respectively. It is therefore revealed that majority of lecturers do make petite use of ICT tool in their teaching.

Table 10. Use of ICT in Teaching Courses

Using ICT in Teaching	Lecturers		Students	
	Frequency	Percentage	Frequency	Percentage
Yes	3	15%	25	24%
No	17	85%	80	76%
Total	**20**	**100%**	**105**	**100%**

4.10 Access to Polytechnic's Internet

As to whether respondents have access to the Polytechnic Internet services, 75% and 88% of lecturers and students respectively responded 'Yes' whilst 25% of lecturers and 12% of students responded to 'No'. Hence, it can be concluded that majority of both lecturers and students have access to the Polytechnic's Internet and as a result, have access to and use of the polytechnic's Internet.

4.11 Use of Social Websites

Table 11 shows that 70% of lecturers and 83% of students use social websites whereas 30% and 17% lecturers and students respectively responded to 'No'. For this reason, it can be concluded that both lecturers and students visits social websites.

Table 11. Use of Social Websites by Lecturers and Students

Use of Social Websites	Lecturers		Students	
	Frequency	Percentage	Frequency	Percentage
Yes	14	70%	87	83%
No	6	30%	18	17%
Total	**20**	**100%**	**105**	**100%**

4.12 Knowledge of Internet Search Tool

Table 12 also shows that 75% of lecturers and 63% of students responded 'No' indicating that they have little or no knowledge of internet search tools whilst only 25% and 37% of lecturers and students respectively have knowledge of internet search tools. Hence, it implied that most lecturers and students have no of knowledge on the internet search tools and therefore cannot make a very good use of the internet for research.

4.13 Purpose of Using Social Websites

Table 13 depicted that 60% and 70% of lecturers and students respectively chat with friends against 5% of lecturers and 10% of students chats with colleagues on academic work. It clearly has shown that majority of lecturers and students surfed social websites to chat with friends rather than for academic work.

Table 12. Knowledge of Search Tools by Lecturers and Students

Level of Knowledge of Internet Search Tools	Lecturers		Students	
	Frequency	Percentage	Frequency	Percentage
Yes	5	25%	39	37%
No	15	75%	66	63%
Total	**20**	**100%**	**105**	**100%**

Table 13. Purpose of Using Social Websites by Lecturers and Students

Purpose of Using Social Website	Lecturers		Students	
	Frequency	Percentage	Frequency	Percentage
Chat with colleagues on	1	5%	10	10%
Chat with friends	12	60%	73	70%
Looking for new friends	4	20%	9	9%
Having fun	3	15%	13	12%
Total	**20**	**100%**	**105**	**100%**

4.14 Usefulness of ICT in Education

To establish the fact that lecturers and students are aware of the important role ICT plays in enhancing teaching and learning hence its usefulness in Polytechnic education, table 14 shows that 90% of lecturers and 94% of students responded 'Yes' against 10% and 6% of lecturers and students respectively responded 'No'. For that reason, it can be deduced that both students and lecturers are aware of the importance and usefulness of ICT in polytechnic education.

Table 14. Usefulness of ICT in Education by Lecturers and Students

Usefulness of ICT in education	Lecturers		Students	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Yes	18	90%	99	94%
No	2	10%	6	6%
Total	**20**	**100%**	**105**	**100%**

4.15 Discussions of the Research Findings

The section discusses the findings of the study. The findings of the study discussed were based on the main objectives of the

study which were to ascertain the level of access to and use of ICT among lecturers and students, to determine the ways lecturers and students use ICT in polytechnic education and the impact of ICT on teaching and learning in polytechnic education, to identify the extent to which lecturers and students use internet for effective and efficient teaching, to find out whether lecturers and students actually have access to ICT facilities and services for academic work and to make recommendations on the integration of ICT in education for consideration by management of Accra Polytechnic, policy makers and stakeholders.

4.15.1 Level of Access to and use of ICT Among Lecturers and Students

The research findings revealed that both lecturers and students have access to ICT facilites in the Polytechnic, its use was however limited. It was also comfirmed from the findings that students visit or have access to the computer laboritories intermiitently and have limited time accessing and use the facility. Moreso, the students only use the labs for ICT lectures or computer literacy class. Furthermore, students use only word processing and Spreadsheets programs when they visit the computer laboratories. Finally, it was revealed that both lecturers and students were not satisfied with the present ICT facilities available to them for use in teaching and learning because the facilities were not adequate. consequently students were limited to access and less time to use of the ICT facilities, and as a result, have no impact on teaching and learning.

4.15.2 Use of ICT by Lecturers and Students in Polytechnic Education

To establish the extent to how Lecturers and Students use Programs, It was revealed from the study that lecturers and students have the skills to use only word processing and spreadsheets it therefore pointed out that both lecturers and students use only 2 programs hence they were limited to the use of the programs for academic work. Furthermore, it was found out that respondents use the programs solely for practical training and assignments during computer literacy class hence have no impact on students in their teaching and learning process. Additionally, the extent to which lecturers use ICT in teaching subjects in different courses areas was an area of concern to the researcher, the responses revealed that lecturers do make petite use of ICT tool in their teaching and for that matter ICT has little or no impact on teaching and learning.

4.15.3 Extent to Which Lecturers and Students Use Internet

As to whether respondents have access to the Polytechnic Internet, the research shows that both lecturers and students have access to and use the Polytechnic's Internet. Though responses revealed that respondents have access to the inadequate internet facilities, the research paper revealed that both lecturers and students visits social websites and spent more time surfing these sites. More so, for the researchers to found out how respondents' use social websites, the findings confirmed that they chat with friends rather than chatting with colleagues on academic work resulting in no impact on teaching and learning. Also, the research has showed that respondents have no knowledge of internet search tools therefore, cannot make use of the internet for research and other educational materials to enhance teaching and learning process. In order for the researchers to establish whether lecturers and students were aware of the important role ICT plays in enhancing teaching and learning or its usefulness in Polytechnic Education, the study shows that respondents were aware of the importance and usefulness of ICT in polytechnic education.

In summary, the findings revealed that though lecturers and students have access to and use the ICT facilities available to them, they have little access to and usage, therefore they have no impact on teaching and learning because the ICT facilities are in adequate.

5. CONCLUSION, FUTURE WORK AND RECOMMENDATION

5.1 Conclusion

The purpose of the research was to ascertain the impact of access to and use of ICT in polytechnic education. The study to the research demonstrated that ICT in spite of the high initial cost in providing ICT facilities have not helped improve the quality of teaching and learning in polytechnic education. Learners can pursue their studies at their convenience and were not limited by geographical or time constraints. This was of particular benefits to people who faced barriers to learning such as living in remote locations.

Secondly, ICT opens the windows to the world of learning, allows a new society to require new skills, productivity enhancement and a quest for quality learning. ICTs are transforming schools and classrooms by bringing in new curricula based on real world problems, providing scaffolds and tools to enhance learning, giving students and teachers more opportunities for feedback and reflection, and building local and global communities that include students, teachers, parents, practicing scientists, and other interested parties.

In conclusion, the experience of introducing more and different ICTs in classrooms and other educational settings suggest the full realization of the potential educational benefits of ICT. There is the need for effective integration of ICT into polytechnic educational system. Indeed given enough initial capital, getting more and new technology, improving curriculum and pedagogy towards ICT, institutional readiness, teacher competence and long-term financial commitments among others are also very vital for effective integration of ICT into Accra Polytechnic.

5.2 Recommendations

We recommend the following based on the above research findings:

- **Adequate Provision of ICT Resources**
  The government and other stakeholders should supply the various Polytechnics in Ghana with facilities such as more computers with network facilities, wider covered broadband internet access to augment access and use of ICT. This would enhance the use of ICT (educational technology) in the teaching-learning process.
  The government, management and other stakeholders should supply the various Polytechnics in Ghana with the needed teaching devices to make the teaching-learning process effective and efficient. There should be the provision of more time and access to resources to enable lecturers and students to make a wider use of the ICT facilities, in addition, to collaborative development and refinement of pedagogic strategies involving use of ICT in course(s) teaching; integrating ICT into departmental schemes of work.

- **Compulsory use of ICT in teaching**
  It should be mandatory that ICT and other educational technology devices are used for teaching and learning.

- **Regular in-service training**
  Regular and effective in-service training and incentives should be organized to upgrade and encourage lecturers to fully integrate ICT into teaching and learning. Students should be educated more during fresher's orientation on the use of ICT in education and its role in teaching and learning.

- **Comprehensive ICT policy**
  Every Polytechnic in Ghana needs Information and Communication Technology (ICT) Policy document that clearly outlines its vision, specified expectations from lecturers and students, technicians, monitoring and evaluating team. The ICT Policy document should also outline how the Polytechnics intend to deploy Information Communication and Technology (ICT).

5.3 Suggestions for Future Research/ Improvement

This paper suggests that, this research can be replicated in different Polytechnics in other parts of the Ghana, so that the significance of access to and use of ICT in Polytechnic Education will be known to all educationist to improve facilities and encourage lecturers and students to make use of ICT throughout all Polytechnics in the country.
Further research can be made in the following areas:

- The level of knowledge and the role of management on Information and Communication Technology (ICT) in Education in polytechnics in Ghana.
- The level of knowledge of lecturers of ICT integration into education and the extent to which the lecturers can help implement it.
- Factors Affecting the Wide Use of ICT and Educational Technology in Polytechnic Institutions in Ghana.

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