ICT and Education: An analysis into Ghana's Universities

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ABSTRACT: Information and Communication Technology (ICT) have become an integral part of all spheres of life. ICT enhances productivity through its application in university education when applied to teaching, research and management. The effective and appropriate use of ICT qualitatively impacts education. Alternatively, if the information and knowledge created and shared are not managed effectively, it can lead to low productivity. Managing academic knowledge is an arduous task and a way of increasing the knowledge bank of academic institutions is through a community of practice facilitated by ICT. Having the right ICT for Ghana's universities will catapult graduates to be competitive in the global space. This research analyses the levels of ICT readiness as a tool for effective university education.

KEYWORDS: ICT, University, Education and Management.

I.   INTRODUCTION

The growing demand and supply of university education in Ghana is phenomenon. Ghana has 6 major public universities and about 50 accredited private universities [20]. In 2007/08 academic year, a total number of 139,768 students gained admission into both public and private universities in Ghana of which 88,445 and 18,278 enrolled in public and private universities respectively [17].

The introduction of private university education in Ghana in the mid-1990s gave the opportunity for increased enrollment. The challenges of marketiation and privatization of higher education requires universities to have adequate intellectual and infrastructure resources for research, teaching and learning if they are to contribute to globalization in university education [15].

ICTs are necessary to facilitate effective research, teaching and learning in universities. The innate desire for human communication has propelled the advancement of communication technologies. Now, communication is faster and easier through the development of communication technologies. ICTs are a pivot around which knowledge society evolves.

In his magisterial account 'The wealth of nations,' mentioned that human development is the greatest resource for wealth creation [28]. ICTs facilitate human development. Effective utilization of ICTs offers the base for information expansion and acquisition for the growth of a knowledge society. ICTs functions as a catalyst for innovation in universities.

ICTs can assist new forms of organization with common culture to increase learning and innovation in universities. A university should be a human institution that may and should produce a person of broad knowledge, critical intelligence, moral decency and social sensitivity. He also explained that universities should be a place for teaching universal knowledge with the attainment of a particular growth of outlook, maturity, thought process and productivity in social and civil discuss. Base on Newman's postulation, the university becomes the fulcrum of this paper to enquire how Ghana's universities produce graduates through the application of ICTs to accentuate its knowledge society for wealth creation.

ICT infrastructural development in Ghana increased from at a rate of 0.4% in 1995 to 2.9% in 2000 when compared to other less developed nations worldwide and its 1.1% for sub-Sahara Africa In order to shorten the digital divide, the government of Ghana and other agencies has increased their ICT infrastructure so that ICT in Ghana can match up with the developed countries.

There has also been huge investment in ICT infrastructure from Internet Service Providers (ISP) and telecom companies like Vodafone, MTN, Tigo among others. Though there is a the huge investment in ICT infrastructure and capacity building in Ghana's universities, the country is still isolated from the Global World because it does not have the critical drive and strategy to tap the maximum potential of ICT for economic development. In Ghana, ICT is still in its infancy despite the fact that Ghana was the first country in sub-Sahara Africa to access internet connectivity [11].

The contributions of ICT to academic knowledge in universities have increased the economic and social

development of societies in Ghana. ICT is impacting on the pedagogical skills in the classroom; enhancing teaching and communication in Ghanaian universities [16].

The ICT revolution including growing knowledge of society has put pressure on universities in Ghana to apply ICT to their teaching and learning methodology in order to meet the challenges of the 21st century University.

In Ghana, university education is a determinant for economic sustainability therefore it is important to empower university students with skills and attitudes which are important for success in this information world [24]. The concern of ICT is the important role it plays in supporting university education. The backbone of ICT is infrastructure development and the lack of it will reflect in the outcome of universities contribution to the knowledge society. If Ghana's universities are to step up their human resource for knowledge society then its ICT must be at par with best practices of the American universities whose sustained relationship with hi-tech industries with successful results in breakthrough of the internet age like Google and Facebook who were students of American universities. Information and knowledge sharing enabled by ICT is the driving force of a modern economy. The way information and knowledge is created and shared can lead to a competitive advantage for universities. Alternatively, if the information and knowledge created and shared are not managed effectively, it can lead to low productivity.

Managing academic knowledge is an arduous task and a way of increasing the knowledge bank of academic institutions is through a community of practice. Challenges such as lack of trust, incentive and poor culture of learning in universities have an overall effect on knowledge sharing. Time constraint, unwillingness among universities to share knowledge and a lack of support and/or participation from management are the challenges of knowledge sharing.

The accumulation of knowledge is the largest percentage of a university's value and since the knowledge is both tacit and explicit residing in the minds of people, and some codified, managing a body of knowledge can pose a challenge [5]. One of the ways to share knowledge is through a community of practice which is when a group of people come together either face to face and/or virtually to share and learn from each other with a motive of increasing their knowledge. Universities in Ghana must address the challenges in knowledge sharing because in the knowledge economy, a university's success is based on the intellectual capacity of its staff and how they respond to changes in the environment. Finding and using knowledge quicker and effectively than other competitors is one of the valuable management practices for universities.

Knowledge workers are assets whose maintenance gives competitive advantage to a university [1].

The levels of information sharing students and staff of a university must be increased. This can be enhanced through ICTs such as students' relationship (both academic and non-academic) management software [27]. This technology will help create innovation in students' affairs management in an era where universities growth is linked to students' satisfaction. Students' value to universities enables management to achieve its objectives. Also the ability to maintain innovation will determine the level of survival of universities in Ghana. Innovative strategies will help universities to leapfrog from the current competition of proliferation of universities in Ghana.

The method of testing and framing of models is called prototyping. Prototype should be designed for local needs and should reflect the challenges and importance on the ground and be relevant to the end users. The challenge in implementing a prototype is about finding the right prototype so that university teachers will appreciate their work naturally and ICT may have an impact on educational innovation [21]. Universities in Ghana should treat prototypes as real projects and get all stakeholders involved so that they can impact their involvement, ownership and commitment to the process and actualization.

For ICT to be successful in Ghana's universities there should be an educational change. Educational change is either internal and/or external. Internal changes are controlled internally whilst external changes are imposed by external forces change requires an original wide involvement as setting goals, planning and controlling by creating an enabling environment necessary to create change [23].

In Ghana, universities are undergoing major changes in the way ICT is being used. Different tools and technologies are being used in learning and solving challenging problems in the universities in Ghana. This has created a lot of chances for lecturers, students and other stakeholders in the universities in Ghana. The National School Board Association enumerated that students who have access to technologies also perform will on standardized tests and various companies like Google and Apple are bringing educational applications which combines techniques with educational materials which increase learning and creates innovative ways of retention than a textbook [12].

Unlike in the past when students' knowledge was limited to the physical presence of lecturers and textbooks now students and lecturers can gain knowledge from electronic gadgets like IPADS. Exposure to technologies by students and lecturers of universities in developing countries enables them to

learn and adjust to the necessary skills to be gained in ICT.

In Ghana's universities, students and lecturers uses the internet as a source of information and technology has been the means of communication in distance education in the universities. Exposure to ICT is a major part of universities education and the increase of ICT for education in the universities demands that students and lecturers are effective and efficient in using all kinds of ICT tools and gadgets. In furtherance of that UNESCO is ensuring that all country should be able to educate their students in ICT with the resource available [30].

The Ministry of Education in Ghana is promoting an agenda by harmonizing ICTs within the various universities as a result of which international and national policy is to ensure that universities management should incorporate ICT use in universities curricular.

ICT in Ghana universities have influence a lot of social and economic transformation in the universities. It has brought the realization of a vision of linked global society and various governments and the World Bank have put the idea of ICT in their development agendas [3].
ICT has transcend over geographical limitations and provided a channel for the underrepresentation in society which has influenced the formation of the social, political and cultural traditions of students and lecturers in Ghana's universities. With ICT there has between changes in the curriculum content, instrumental methodology and students and lecturers relationship and students get involve in their own learning by generating their own knowledge [21]. In developing countries the main backbone of competitiveness is the skills of the workers at all stages likewise in the universities, the determinant of its success depends on the technological skills of the students and lecturers [14].
The motivating factor for integrating ICT in education at the universities is of the premise that ICT help students in their reasoning and overcoming their cognitive challenges and involve them in learning activities that they were not capable of before. ICT has a strong impact on the educational curriculum development in the universities in Ghana and also engaging students to learn some innovative skills [26].
ICT in Ghana's universities has also changes the lives of people with disabilities. ICT has helped people with disabilities to be taken away from poverty and exclusion which are characterised of them. ICTs and assistive technologies can help Special Education Needs (SEN) students to pursue formal education [22]. In Ghana, the University of Education, Winneba (UEW) gives ICT training for SEN students and also trains SEN teachers as well.
ICT has become a bank of academic knowledge with the support of ebooks and elibrary [24]. The

implementation of ICT in Ghana universities is a way to help bridge the margin between the rich and poor and also the digital divide thus those who have access and control of technology and those who do not. This form of gap bridging is known as the technological dualism between developing and developed countries [2].

Universities in Ghana have created the platform for the use of ICT by fostering information and change among the local scientists in collaboration with researchers in other universities in the world. In view of this a Wide Area Network (WAN) known as the Research and Educational Network (REN) was established in year 2000 with the help of the World Bank Infodev Project. Fibre Optic is the main infrastructure used by REN and it's being participated by all the major public universities and other government agencies like the Ghana Atomic Energy Commission, and Centre for Scientific and Industrial Research (CSIR) all in Ghana [11].

II. RESEARCH QUESTIONS

By examining the state of ICT in Ghana's universities and how effective and efficient they are to reach the standards of contributing to globalisation in universities hence the following questions below guided the research:

I. What are the interpretations given to the importance of ICT in Ghana's universities?

II. What are ICT infrastructure and intellectual challenges of Ghana's universities and what models they apply and how its application takes place in practice?

III. How do they evaluate its effectiveness and what kind of improvements do they suggest in terms of globalisation standards?

IV. Must there be institutional cultural change in Ghana's universities as a strategy towards the growth of its knowledge society?

III. METHODOLOGY USED

The study area consisted of 1 public and 2 private university in Ghana. The study was carried by qualitative data gathering techniques as: unstructured face-to-face interviews with 10 students, 5 lectures and 3 staffs through visits to their campuses.
Case study is an empirical inquiry into a modern phenomenon in its real life context when the boundaries between the phenomenon and context are not cleared and in which multiple sources of evidence are used [29]. Observations of ICT infrastructure in Ghana's universities in the study area gave an insight into the quality of ICT resources for research, teaching and learning as elements of quality education. All ethical considerations were practiced by the research as it is fundamental to research methodology of any human participants [8].

Ethical standards are safeguards that ensure research data is collected with participants' informed consent, protect researchers and participants personal detail, identity and wellbeing.

IV. CHALLENGES ASSOCIATED WITH ICT USAGE

In spite of the huge investment in ICT infrastructure by the universities in Ghana and other Internet Service Providers (ISPs) in order to bridge the digital divide, universities in Ghana are still distanced from the global village because they do not have the passion strategies to tap the maximum resources of ICT for the socio-economic development of the country.

Firstly, ICT projects are not molded to the local situation in the universities. There is the distinction between design and reality which he referred to the margin where the technology was developed and used [18]. In order for ICT projects to be feasible in Ghana's universities, they have to be adjusted to the local conditions and with the usage of appropriate technology so that project improvement can be achieved [2]. Thus ICT success in the universities will depend on the appropriate design of software and hardware relating to the requirements of the universities.

The lack of ownership of technology is the cause of ICT project failure in the universities in Africa [4]. Also the lack of the right ICT products which are not designed to meet the needs of the university students and lecturers can become a challenge to access to ICT related products [14].

Furthermore, the lack of adaptation of ICT resources for SEN learners in the Ghanaian universities is reason for their absence from ICT revolution. There is the need for ICT to be adjusted to meet their emotional and social development, cognition and learning, behavioural sensory, communication and interaction.

Another challenge for ICT development in the universities in Ghana is the problem of infrastructural development. Infrastructural development is the key for universities students and lecturers in developing countries to close the digital divide with those of the developing world [6]. The high cost of setting up ICT in the universities in Ghana including the acquisition of hardware and software, the setting up of telecom networks and the maintenance of repair infrastructure is impossible for government of developing countries [2]. Governments of developing countries are concerned of policy formulation and policies which is meeting the basic needs of the poor.

Transaction cost is the technical hardware specifications, launching of the international tender, the analysis of the providers offers, the shipping, transport and customers among others makes the transportation cost for ICT projects very high and affordable to universities in developing countries [4].

Also in many developing countries more than half of the population lives on $10 a day, so many potential users of ICT can't afford any form of ICT access[14]. This becomes a challenge for students and lecturers in the universities to purchase ICT products.

Another problem of ICT use is the development of computer related ergonomics in the universities. The lack of adjustable furniture in the various computer laboratories in the universities is the main obstacle in promoting healthy ICT in the universities. Over the last two decades furniture in the universities computer laboratories have not been suitable for students and lecturers [30]. Majority of students and lecturers do not have sufficient training in ergonomics. There is insufficient physical environment in the computer laboratories to assist students and lecturers using computer inhibits the knowledge of teachers of the risks and strategies of ergonomics. A university education system is a rich pool of human intelligence, so the lack of not educating the teachers and students on ergonomics will not encourage them to use ICT in their own way and so natural champions will not emerge out of them [21].

Finally, there is the challenge of monitoring. Innovation in technology has brought more harm than good to students and lecturers in the universities by not making students independent thinkers but rather depend on thinking [12]. Students now use various ICT search engines to find information unlike in the past when they had to be creative and do their own thinking.

V. MANAGEMENT THEORIES USED

Technology Acceptance Model (TAM) is a major model to forecast the acceptance and use of technology and the importance is to the level that the user feels it will increase his work performance. With TAM, students in the universities were able to use technology with less assistance. TAM was also effective because it was based on the attitude of the students in the universities which describe the students feeling in doing something. Attitude also influenced the behavioural motive for the technology to be used and eventually the motives influenced the technology use. Also the technology increase their skills and academic work of about 70% of respondents in this research.

Constructive Technological Assessment (CTA) is the other model to be chosen because ICT is not only technological but also involves social and institutional factors. 75% of respondents in this research said they will prefer to get involved in the designing and construction of the ICT set-up so that they can also add their inputs. There is no connection of ICT building from a local perception [18].

VI. CONCLUSIONS AND RECOMMENDATIONS

This research assesses the usage of ICT in universities in Ghana. Based on the findings of this research, conclusion was drawn to the effect that there has been some improvement in ICT usage the universities in Ghana, but there are also challenges which makes it impossible for the universities in Ghana to bridge the digital divide hence widening the global information revolution.

An appropriate application of the management models adopted in this research is TAM and CTA and a careful implementation of the recommendations will bring a change in ICT education in the universities. ICT education among lecturers in the university must be stepped up and cultivate the habit of making use of computers in lecturing various subjects. This will enable students to use ICT to solve problems [9].

Also in order to solve the problem of CTA policy makers, computer designers from Ghana should be involved in the design and manufacturing of ICT products purposely made for the Ghanaian environment. This will help bridge the design and reality gap. Local adaptation is really the key to ICT project success in Ghana's universities and it will be necessary to adopt the CTA model unlike the developed world where ICT is configured to their specification.

More so, as part of the CTA challenges, the problem of computer related ergonomics which is the lack of adjustable furniture in the various universities should be addressed. The furniture and workstations should be configured with Ghanaian students in mind [19].

Furthermore, as part of the measure to minimise ICT brain drain from Ghana, the government and private sector must institute incentive measures that will retain ICT professionals to stay and work in the country's universities in order develop ICT education [14]. The developed countries have made progress in ICT due to their ability to maintain ICT professionals hence they are able to assemble enough ICT engineers and scientists to pursue complex ICT projects.

Finally policy makers should institute policies, strategies and interventions which will ensure efficient and effective ICT interventions in Ghana's universities.

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