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USING INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) TO PREDICT TEACHERS PRODUCTIVITY

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ABSTRACT: Information and Communication Technology (ICT) is a broad term that includes all technologies for the management and communication of information. The information needed by a good teacher is very crucial to his or her responsibility such that, tools and technologies that would fast track up the documentation, management and information conduct are not only vital but professionally essential. The value of precision, exactness, wholeness, significance and appropriateness are characteristics of information which ICT systems do breed to meet teacher's information needs. Seeing the critical roles of ICT in the humanity, the main objective of this paper is to investigate ICT usage as predictor of teachers' productivity in Schools/Institutions in Kumasi Metropolis of Ghana. The target population for this study was Teachers in both Government and Private Schools/Institutions in Kumasi Metropolis. Twenty Schools/Institutions made up of Junior High schools, Senior High Schools and Tertiary Institutions such as Teacher and Nursing Training Colleges, Polytechnics and Universities thus both private and Government in Kumasi Metropolis of Ghana was used. Cluster sampling was employ to select respondents across all the Institutions in the Kumasi Metropolis. The population was divided into clusters of Teachers and lectures in fifteen Government Institutions, and teachers and lectures from five private Institutions were randomly selected. The findings of this study have discovered that Schools in Kumasi Metropolis are currently making head ways towards participating in the global acceptance and use of ICT. The paper recommends effective human capacity building and user education programs for sustainable use of ICT in Kumasi Metropolis Schools.

KEYWORDS: *ICT, TEACHERS, PREDICT, PRODUCTIVITY, USAGE*.

INTRODUCTION

Information and Communication Technology (ICT) is a broad term that includes all technologies for the management and communication of information. The role of a modern teacher encompasses a high level of documentation and information processing, storage, and retrieval as a good teacher is supposed to keep good records of his or her students. The information needed by a good teacher is very crucial to his or her responsibility such that tools and technologies that would fast track up the documentation, management and information conduct are not only vital but professionally essential. The value of precision, exactness, wholeness, significance and appropriateness are characteristics of information which ICT systems do breed to meet teacher's information needs. The role of teachers in any civilization is indispensable and any developing country that wants to reach higher height in terms of economy must pay particular attention to it education where the teacher must be at the center of the whole process.

McWilliam and Kwamena-Poh (1975) state that it was not until the last quarter of the 19th century that Ghana began to take first steps towards a state-organized education. Before then informal systems of education had been the main way in which Ghanaian communities prepared their members for citizenship. It is interesting to note that in Ghana the first school

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was the home: the teachers were the parents and the elders in the family. The curriculum was life and learning was by observation.

They also stated the first major purpose of such education was the inculcation of good character and good health in the young members of the community. The second was to give them adequate knowledge of their history, beliefs and culture, thus enabling them to participate fully in social life. It could be seen from the foregoing comment that the purpose of non-formal education since the beginning of the Ghanaian society has been for national development.

Frankly speaking, the functions of a teacher is to help students learn by imparting knowledge to them and by setting up a situation in which students can and will learn effectively. But teachers fill a complex set of roles, which vary from one society to another and from one institutional level to another. Some of these duties are performed in the school, and some in the community. Roles in the school or university include: moderator of learning, councilor or controller of student behavior, Parent auxiliary, Friend to students, Reviewer of achievement, Manager of curriculum, Administrator, Scholar and research specialist, and member of Parents Teachers Association (PTA).Duties in the community also include, Community servant, Substitute of middle-class morality, Proficient in some area of knowledge or skills, Public leader and Mediator of social change.

From the above points it can be seen that the services of teachers are needed in almost all human activities and computers in the teacher's office can assists him/her and are useful for the performance of the following functions, to:

- Check and input student's records and ensure rightness and completeness.
- Prepare presentations for class.
- Analyze student's data to know their performance.
- Use for researching.
- For online teaching.
- Use as a medium for teaching instructions.
- Use for communicating with colleagues teachers to share ideas.

According to Pelgrum (2001), obstacles for ICT implementation include the following:

insufficient number of computers, teachers' lack of ICT knowledge/skills, difficult to integrate ICT to instruction, scheduling computer time, insufficient peripherals, not enough copies of software, insufficient teacher time, not enough simultaneous access, not enough supervision staff and lack of technical assistance.

Similarly, Lewis and Smith (2002) summarized these barriers as limited equipment, inadequate skills, minimal support, time constraints and the teacher's own lack of interest or knowledge about computer.

Kwacha (2007) also noted that the most common problems associated with the effective implementation of ICT are lack of qualified ICT personnel, cost of equipment, management attitudes, inconsistent electric power supply, inadequate telephone lines, particularly in rural areas and non-inclusion of ICT programmes in teacher's training curricula and at the basic levels of education.

According to Aina (2004), ICT has become an important field for all information professionals. This is because of its relevance and application to tasks in libraries and information centers. He further explained that the major application of ICT to information professionals is in the areas of networking, online searching, CD-ROM technology, library automation and the Internet.

Odunewu and Olashore (2009) also reported that information and communication technologies have been dominant in information provision, processing and handling. Through the use of internet, a user is able to access through ICT bibliographic and full text information in several millions document descriptors used for describing the documents needed.

For ICT to be noteworthy there must be outcome, yield, productivity or throughput. Throughput/productivity in economic term is described as output per hour. In the manufacturing sector the process of calculating throughput is straight forward while in the service industry it is more difficult to calculate. This is so because; it is difficult to compute exactly how throughput or productivity should be calculated.

For instance, how does one measure the productivity of a teacher? Do we measure the amount of salary he or she receives, the number of topics he cover at the end of each period, the number of hours he can teach or perhaps, the number of passes by his students in his subject during internal or external examination? Usually, productivity is defined as yield per hour worked.

Research suggests that there is wide variation in the productivity of teachers, yet traditional measures of teacher quality (i.e., education, degrees, and certification status) are not strongly associated with student achievement. This would suggest that the measures of teacher quality most commonly used by school districts are missing the mark in identifying highly effective teachers. Hanushek and colleagues (2005) and Ballou and Podgursky (2000), for example, found that uncertified teachers perform, on average, at roughly the same level as certified teachers. Hanushek and Rivkin (2004), Murnane (1975), and Ehrenberg and Brewer (1994) found that earning a master's degree has negligible impact on teacher effectiveness, with some exceptions for subject-specific degrees.

According to Harris et al (2010), Measurement of teacher productivity in both education research and in accountability systems is often based largely on estimates from panel-data models where the individual teacher effects are interpreted as a teacher's contribution to student achievement or teacher value-added. The theoretical underpinning for these analyses is the cumulative achievement model developed by Boardman and Murnane (1979) and Todd and Wolpin (2003). However, the assumptions necessary to derive empirical models from the general structural model are generally unstated and untested.

However, there should be consensus on how teacher's productivity should be measured. The substratum of this paper is the application of ICT which is an input that could improve work productivity of the teacher. This study will therefore endeavor to find out, ICT use as predictor of teachers productivity in Schools in Kumasi Metropolis of Ghana.

OBJECTIVES

Seeing the critical roles of ICT in the humanity, the main objective of this paper is to investigate ICT usage as predictor of teachers' productivity in Schools/Institutions in Kumasi Metropolis of Ghana.

SPECIFIC OBJECTIVES

1. Detect the available of ICT resources in the Education Service of Kumasi Metropolis.
2. Define the extent to which ICT resources are used for Teachers' productivity in Schools/Institutions in Kumasi Metropolis of Ghana.
3. Ascertain areas of ICT use in Schools/Institutions in Kumasi Metropolis of Ghana.
4. Ascertain the problems associated with ICT use in Schools/Institutions in Kumasi Metropolis of Ghana.

METHODOLOGY

The target population for this study was Teachers in both Government and Private Institutions in Schools in Kumasi Metropolis of Ghana. Twenty Institutions made up of Junior High schools, Senior High Schools and Tertiary Institutions such as Teacher Training colleges, Nursing Training , Polytechnics and Universities both private and Government in Kumasi Metropolis of Ghana were used as shown in table 1.

Cluster sampling was employ to select respondents across all the Institutions in the Kumasi Metropolis. The population was divided into clusters of Teachers and lectures in fifteen Government Institutions, and teachers and lectures from five private Institutions were randomly selected. These governments Institutions are; Kumasi High School, Yaa Asantewaah Senior High, Prempeh College, Opoku Ware Senior High, St. Louis Girls Senior High, Kumasi Anglican Senior High, Bantama Adventist Senior High , Kumasi Senior High and Technical School,University of Education Winneba Kumasi Campus, Kumasi Polytechnic, Wesley Teacher Training college,Komfo Anokye Nurses Training, Kumasi Girls Senior High ,State Girls Junior High, and State Experimental Junior High School . The Private Institutions also include; Christain Service University College, Garden City University College, Joy Standard College, Vicandy Junior High and Cambridge Junior High. In each of the selected Institutions, Teachers were purposefully selected based on availability and use of ICT resources in their homes and offices.

Questionnaire was the only process used for data collection for this study. A total of 755 questionnaires were administered to the twenty selected Institutions, out of which 650 were responded and returned, giving a response rate of 86.1%.

Table 1: Schools and Institutions in Kumasi Metropolis of Ashanti-Ghana

S/N	NAME OF SCHOOL/INSTITUTION	NUMBER OF TEACHERS
1	KUMASI HIGH SCHOOL	64
2	YAA ASANTEWAAH GIRLS HIGH SCHOOL	48
3	PREMPEH COLLEGE	30
4	OPOKU WARE SENIOR HIGH SCHOOL	32
5	ST.LOUIS GIRLS SENIOR HIGH SCHOOL	26
6	KUMASI ANGLICAN SENIOR HIGH SCHOOL	30
7	BANTAMA ADVENTIST SENIOR HIGH SCHOOL	16
8	KUMASI SENIOR HIGH/TECHNICAL SCHOOL	20
9	UNIVERSITY OF EDUCATION WINNEBA- KUMASI	60
10	KUMASI POLYTECHNIC	34
11	WESLEY TEACHER TRAINING COLLEGE	62
12	KOMFO ANOKYE NURSES TRAINING	34
13	KUMASI GIRLS SENIOR HIGH SCHOOL	32
14	STATE GIRLS JUNIOR HIGH SCHOOL	14
15	STATE EXPERIMENTAL SCHOOL	12
16	CHRISTAIN SERVICE UNIVERSITY COLLEGE	58
17	GARDEN CITY UNIVERSITY COLLEGE	64
18	JOY STANDARD COLLEGE	10
19	VICANDY JUNIOR HIGH SCHOOL	02
20	CAMBRIDGE JUNIOR HIGH SCHOOL	02
TOTAL		650

RESULTS AND DISCUSSION

The data gathered was analyzed using percentages and frequencies based on a number of variables. These variables include; demographic information about the respondents, availability of ICT equipment and resources, areas of ICT use in teaching/lecturing; regularity of ICT use and level of teachers/lectures' productivity.

Table 2: Age Distribution Variety of Respondents

Age Distribution Variety	Frequency	Percentage
20-30	367	56.46
31-40	184	28.31
41-50	56	8.62
51-60	26	4.0
61-70	13	2.0
71+	4	0.62
TOTAL	650	100

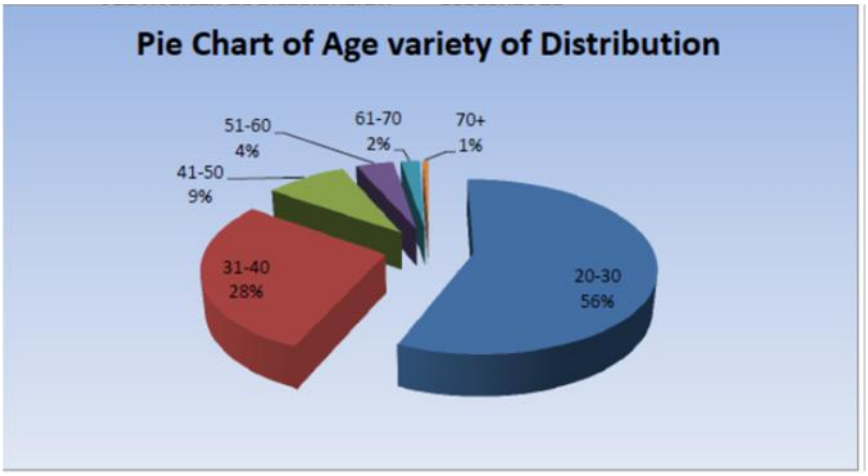

Figure 1 shows the age distribution variety of the respondents.

Table 2 and figure 1 shows the age distribution variety of the respondents. The data shows that 368 (56.46%) of the respondents are between 20-30 age range, 184 (28.31%) are between 31-40 age range, 56 (8.62%) between 41-50 age range, 26 (4.0%) between 51-60 age range, 13(2.0%) of the respondents were 61-70 years and 70 above had a little below 1 %. It can be concluded from the data that the mid age group used more ICT facilities than other groups. This may be due to the fact that their level of responsiveness whereas the older age group respondents rank the smallest.

Table 3: Distribution of Respondents according to where level that they are teaching/lecturing

Level of teaching/lecturing	Frequency	Percentage
Junior High Schools	30	4.62
Senior High Schools	308	47.38
Tertiary Institutions	312	48.0
TOTAL	650	100

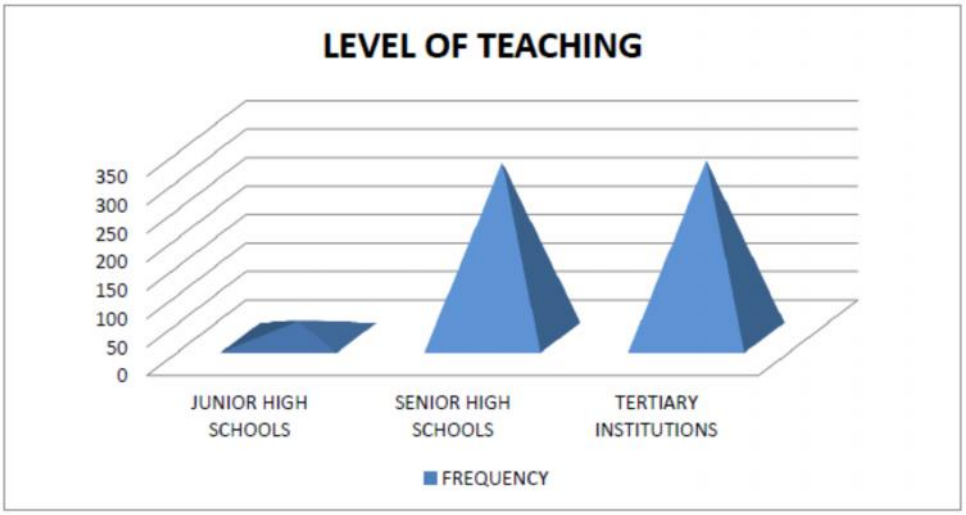

Figure 3 shows the levels of teaching of respondents

The data in table 3 figure 3, shows that 30(4.62%) of the respondents teach at the junior High school level , 308 (47.38%) teaches at the Senior High School whiles majority lecture at the tertiary level with a frequency of 312 and 48.0

Table 4: Educational Qualifications of Respondents

Educational Qualifications	Frequency	Percentage
Teachers Certificate A	144	22.15
Bachelor's Degree	478	73.54
Master's Degree	23	3.54
PhD upwards	5	0.77

The data in table 4 shows that only a small number of the respondents 5(0.77%) possessed PhD and above and all of them were lecturers at the tertiary level, 144 (22.15%) has teachers certificate A and all of them were also teaching in the Junior High schools, majority of the respondents possess a bachelor degree and also teaches at the Senior High School. Those with master's degree were 23(3.54%) and they teach in either Senior High or tertiary institution.

Table 5: Availability of ICT resources

S/N	ICT Resources	Available %	Very Readily Available%	Readily Available%	Not Available%
1	Telephones (Land lines, mobile phones and intercoms	1	95	4	-
2	Desktop PC	11	55	24	10
3	Laptop PC	20	30	20	30
4	Photocopier	25	7	10	58
5	Internet (e- mail)	15	70	20	5
6	Teaching notes on CD	5	5	10	80
7	Scanner	2	3	5	90
8	Tele-fax	2	2	1	95
9	Students Records on CD	15	10	5	75
10	Online Access to Research works.	15	70	20	5
11	Education Journals on CD	5	6	5	84
12	E-learning facility	4	1	10	85
13	Online Teaching Tutorials	2	5	3	90
14	Ipad/Tablet	5	45	10	40

Table 5 shows the availability of ICT resources, in the following categories. Telephones, (landlines, mobile and Intercoms) 100% rate of availability. It shows the highest rate of availability. This study concluded that every teacher/lecturer had access and used telephones both for teaching and private matters. Next on the list of ranking is internet (email) and Online Access to research works. It can be concluded that all those with internet access can also access the online research works with 95%. Other ICT resources with high availability ranking are; Desktop PC 80%, laptop PC with 70% available, the Ipad/Tablet with 60% available and with 40% not available. Whereas, the following ICT resources indicated high rate of non-availability; Tele-fax, teaching notes on CD, Scanner, Online Teaching Tutorials, E-learning facility, Students Records on CD, and Photocopier.

Table 6 Areas of ICT Use

S/N	Areas of Teaching	Yes%	No%
1	Recording students Marks	555(85.38)	95(14.62)
2	Giving Lectures/Lessons teaching	460(70.77)	190(29.23)
3	Administration	550(84.62)	100(15.38)
4	Counseling	374(57.54)	276(42.46)
5	Presentation Making	620(95.38)	30(4.62)
6	Supervision	600(92.31)	50(7.69)
7	Others	624(96.0)	26(4.0)

Table 7: Extent of ICT use

S/N	ICT Resources	LOW USAGE %	HIGLY USAGE %
1	Telephones (Land lines, mobile phones and intercoms	2	98
2	Desktop PC	20	80
3	Laptop PC	35	65
4	Photocopier	34	66
5	Internet (e- mail)	4	96
6	Teaching notes on CD	80	20
7	Scanner	85	15
8	Tele-fax	98	2
9	Students Records on CD	22	78
10	Online Access to Research works.	30	70
11	Education Journals on CD	45	55
12	E-learning facility	90	10
13	Online Teaching Tutorials	99	1
14	Ipad/Tablet	55	45

Table 7 provides information on the extent of ICT use in the teaching service. The result shows that the following ICT resources were highly used; telephones (mobiles, land line and intercoms) photocopier, Desktop PC, the Internet and laptop (PC), Students records on CD, Online Access to research works. Telephones with 98% crowned the list followed by internet with 96%.Whereas the following were lowly used; lpad/Tablet, Education Journals on CD, Tele-fax, Scanner, Teaching notes on CD. Tele-fax was ranked the least lowly used ICT resource with 1%.

Table 8: Perceived Productivity of Teachers

S/N	Perceived Productivity of Teachers	YES %	NO %
1	It leads to faster and speedier recording of student's marks.	89	11
2	It leads to faster preparation of teaching notes.	92	8
3	It makes teaching interesting.	90	10
4	It makes communication between colleagues easy.	88	12
5	It makes researching easy.	83	17
6	It makes lesson delivery simple.	77	23
7	It reduces cost of distance learning.	78	22
8	It makes tracking of students performance easy	67	33
9	It makes retrieving of information easier.	95	5

Table 8 shows the perceived productivity of teachers using ICT resources from the list of items. From the list of items, respondents were asked to say "Yes" or "No". The result showed that 89% agreed that the use of ICT resource leads to "faster and speedier recording of student's marks'. 92% also supported the argument that 'It leads to faster preparation of teaching notes, 95% also agreed that "it makes retrieving of information easier. Generally, almost t all the respondents agreed to a higher percentage to all the listed perceived productivity of teachers with the "Yes" higher than the "No".

Table 9: Problems Connected with ICT usage.

S/N	Problems with ICT usage	YES %	NO%
1	Inadequate funding	89	11
2	Poor Internet connectivity	98	2
3	Poor maintenance culture	85	15
4	Hardware/software problem	80	20
5	Poor knowledge of computer usage	97	3
6	Unstable government policies	89	11
7	Lack stable power supply	99	1

Table 9 shows the problems associated with ICT use. Majority of 99% of the respondents indicated 'Yes' for Lack stable power supply as the major problem hindering ICT use, while fewer respondents 1% indicated 'No'. The respondents agreed with other problems by indicating 'Yes' but with high rating 'No'.

CONCLUSION AND RECOMMENDATIONS

The significance of ICT implementation and use in the various schools and Institutions for active, efficient and good teaching practice, in Kumasi Metropolis of Ghana need not to be over-emphasized. The teaching profession in Ghana is a challenging one and quick access to and retrieval of appropriate teaching methods and notes by teachers, lectures, researchers etc. in the emerging digital era requires effective implementation and use of ICT in Schools/Institutions. The findings of this study have discovered that Schools/Institutions in Kumasi Metropolis are currently making head ways towards participating in the global acceptance and use of ICT. The paper recommends effective human capacity building and user education programs for sustainable use of ICT in Kumasi Metropolis Schools. Besides, Stake holders, and NGOs in Kumasi Metropolis should increase their level of funding towards enhanced participation in the ICT incorporation. The Government should provide enabling environment such as efficient and stable power supply in addition to relevant ICT policies to include lower tariff on all imported ICT equipment, accessories to boost ICT implementation and use in Ghana.

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