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Information and Communication Technologies: Availability and Utilization in Human Capital Development in Computer Education in Secondary Schools in Enugu Educational Zone

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Abstract
The study adopted to assess the information communication utilization for human capital development in secondary Computer Education in Enugu Education zone of Enugu state. No sampling was conducted as the 105 teachers in the 29 secondary schools in the zone were used. The instrument for data collection was a structured questionnaire. Validation of the instrument was conducted and a reliability of the instrument was determined by the use of crombach's alpha with reliability co-efficient of 0.69 revealing high internal consistency. Data was analysed using mean statistics and percentage. The basic findings were that information and communication technology gadgets available were inadequate for human capital development in secondary school computer education and also the extent of utilization of ICT for human capital development was low. It recommended that school managements should partner with the private sector to provide adequate ICT gadgets for utilization in human capital development in secondary schools.
Keywords: Computer Education, ICT, Human Capital Development

1. Introduction

Information and communication technology (ICT) has occupied a central position in the contemporary world. Ability to work with information and communication technology (ICT) is recognised as one of the key components necessary for success in life and competition in the labour market (Levy and Murmane, 2001; Salganik, 2001; Eurydice, 2002) which every citizens should possess.

Concerning ICT two important roles are assigned to schools. The first is to fulfil the expectations of the society for demanding ICT skills and the second is to raise the quality of education in the schools with the support of ICT. Usage of ICT in schools is so devise that it is almost impossible to list all possible applications. But Iperen (2006) tried to enumerate some of the information and communication technologies available for school management to include- desktop, laptops, virtual library, scanners, printers, internet, school websites, e-mail servers, over head projectors, multimedia, examination scoring machines, school cyber café among others. Ugboja (2008) included radio, tape recorders, video tapes and recorders, television, telephone (cell phones) and calculators.

Information and communication technology is one of the world challenges considered in the target of the millennium development goals which are intended to seek the co-operation of private sector to make available the benefits of new technologies (MDG monitor, 2005). The initiative was geared towards globalization and has facilitated information transmission and made it possible for people and organizations to access education, employment, seek medical attention, remit money to any part of the world and so on without difficulty. Abubakar (2004) observed that ICT is challenging to teaching and learning in Nigeria, because it assist the government capacity building in achievement of Universal Basic Education goals of Education for All (EFA) by 2020.

Computer Education as one of the science subjects is important in the life of a student and effort should be made by teachers to ensure that students learn the necessary computer concepts. It is designed to empower the youth with the knowledge to solve personal and societal problems. It is aimed at inculcating scientific skills, attitude, competences, abilities and habits for societal and personal transformation. This is to the extent that before one undertakes any university education, the candidate must have a good knowledge of computer education. Therefore there is need for thorough study of Computer education at secondary school for human capital development of the country. This can be done through efficient use of ICT.

Recent review of ICT in science education shows that ICT can make science more interesting, authentic and relevant; allow more time for observation, discussion and analysis and increase opportunities for communication and collaboration (BECTA 2003). Osborn and Hennessy (2003) describes the benefits of using ICT in the computer education classroom to include the development of students critical thinking skills, ease of data collection and manipulation, increased access to knowledge in a virtual format and enhance motivation and engagement. A recent review from the United States research on technology use in schools, (Cisco system, 2006), shows that the use of technology results in a small but significant, improvement in students learning. There is

even some evidence that using ICT will reduce teacher's workload (Selwood and Pilkington, 2005).

Taylor (2003) recognized three roles of computers in a classroom as tutor, tool and tutee. Introduction of ICT in computers lessons can raise not only the level of knowledge but students' attitude towards computer as well (Kubiatke and Halakova, 2009). As computer teachers; we additionally have to distinguish between two groups of applications. In the first group are generic applications used in all subjects like word processing, searching for information, communication using emails and multimedia presentations. In this case if a computer teacher does not use ICT in a classroom, damage to the student is limited because they can achieve missing skills with their works in other subjects, or at home (Kuhlemeier and Hemker, 2007).

In the second group are applications adapted or developed to be used in computer teaching (McFarlene and Sakellariou, 2002), like virtual discussions (O'Bryne, \potry and Carnegie, 2008), simulations (Ramasundaram, Grunwald, Mangeot, Lamarford and Bliss 2005), and virtual laboratory (Jenkins 2004), and real laboratory exercises with data acquisition system (Sorgo, Hajdinjak and Briski, 2008). Asiabka (2008) opined that human capital development is about investing on people, using variety of means including education, training, coaching, mentoring and internship. This can be facilitated with the application of ICT gadgets. Ihenunekwu (2003) contented that human resources development refers to conscious effort to develop necessary human capacity both intellectual and physical to ensure requisite results and success on a continuing basis. He stressed that the concept of human capital refers to the abilities and skills of human resources of a country. On the other hand human capital formation refers to the process of acquiring and increasing the number of persons who have skills, education and experience, which are critical for the scientific and technological development of a country. Therefore ICT gadgets should be employed in schools to facilitate these when they are effectively used. It makes the study of computer to be hands-on and enables students to recreate real or imagined events that have occurred in the process. The basic plan for the utilization of educational media demands that the teacher should prepare himself, the environment, the students and evaluate the media for utilization. After planning, the teacher should apply these principles of utilization which includes selection of the media, determining the learner's readiness, control utilization, encourage the action of students' participation and evaluate their performance and follow up.

It is worthy to note that if ICT gadgets are utilized in teaching and learning computers in schools, it will facilitate the students' information access on any field of their interest in science globally. This will enable them to acquire the required attitude, habit and interest for scientific and technological development. Therefore the question is, what are the ICT gadgets available for teaching computer in school and to what extent are they being used in the teaching and learning process?

1.1. Purpose of the study

The purpose of this study is to access the availability and utilization of Information and Communication Technology (ICT) in human development in senior secondary school computer education in Enugu Education zone and to find out the problem confronting the use of ICT in human capital development.

1.2. Research Questions

The following research questions guided the study:

- What are the information and communication technology gadgets available for human capital development in secondary school for computer Education teachers?
- To what extent are ICT utilized for human capital development by secondary school computer Education teachers?
- What are the problems of ICT utilization for human capital development in secondary schools?

2. Theoretical literature

Various theories have been used to explain the utilization of information and communication technology in human capital development. The most acceptable is TPACK of Mishra and Koehler (2008). The theory states that effective teaching and learning is only possible when the teacher is proficient in the use of technology, skilled in pedagogy and has a sound knowledge of subject content. TPACK is an acronym for technology, pedagogy and content

- ***Technology (T):*** encompasses ICT technologies such as computer software and hardware, internet and related technologies that could be used in teaching and learning
- ***Pedagogy (P):*** this describes the collected practices, processes, strategies, procedures and methods of teaching and learning. It also includes knowledge about the aims of instruction, assessment and student learning.
- ***Content (C):*** is the subject matter that is to be learned, for example, architecture of a computer system.

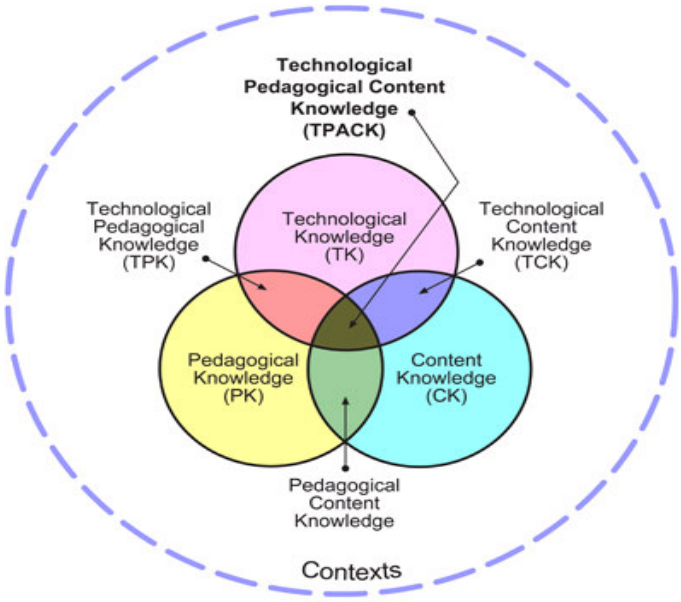

Figure 1: Technological Pedagogical and Content Knowledge Framework (TPACK) (Mishra and Koehler, 2008)

Mishra and Koehlar (2008) noted that for effective teaching and learning, the teacher must master his learning content, must master strategies, procedures, and methodology for delivering of instruction and lastly the teacher must be vast in using technological tools to change and improve his learning outputs. TPACK offers a new perspective and options in ICT integration in teaching and learning. The Theory presents a holistic outlook of ICT integration in Human Capital Development in Computer Education in Secondary Schools. The theory therefore recognizes the complex interrelationship among the different elements, which are contextually bound in a successful integration of ICTs in education. These core elements, which constitute the different components of the theory, are: technological knowledge, pedagogical skills/knowledge and the content knowledge (Mishra and Koehler, 2008).

In this study, TPACK theory is very relevant to the usage of information and communication technology in the classroom. The teacher must be vast in knowledge and usage of technology to be able to adopt these tools in the classroom. TPACK theory emphasizes ICT literacy as a key component in integrating ICT in the classroom. TPACK theory provides a framework upon which the effects of ICT can be tested.

3. Methodology

The study was carried out using survey design in Enugu Education zone of Enugu State Nigeria to access the Information and Communication Technology availability and utilization for human capital development in senior secondary school computer. The population consisted of all the computer teachers in 29 secondary schools in the zone with a population of 105 computer teachers. There was no sampling since the population was manageable. The instrument was a questionnaire with option of available and not available for research question 1, Strongly Agreed (SA), Agreed (A), Disagreed (DA) and Strongly Disagreed (SD) for research question 3. Research question 2 contains Very High Extent (VHE), High Extent (HE), Low Extent (LE), and Very Low Extent (VLE).

Before the administration of the instrument, it was validated and reliability was carried out using crombach alpha because of its polychotomous nature, with a reliable index of 0.69 revealing high degree of internal consistency of the items. The instruments were administered with the help of research assistants. The data collected were analysed using mean for research question 2 and 3 and percentage for research question 1. Any item above 50% is available but below it is not available. The decision rule for research question 2 and 3 was that any item with a mean of 2.50 and above was rated agreed while mean score below 2.50 was rated disagreed.

4. Result

The results of the study are presented in tables below according to research questions.

Research Question 1

What are the information and communication technology gadgets available for human capital development in secondary school for computer Education teachers?

Table 1: Mean response of Computer Education teachers on the availability of ICT gadgets for human capital development.

N-105

S/N	Item Description	Available	%	Not Available	%	Decision
1	Radio Set and Tape Recorder	45	43	60	57	NA
2	Television sets	30	29	75	71	NA
3	Video Recorder and video tapes	40	38	65	62	NA
4	Strides and filmstrips	20	19	85	81	NA
5	PowerPoint and computers	15	14	90	86	NA
6	Overhead Projectors	15	14	90	86	NA
7	Calculators and cell phones	80	76	25	24	AV
8	Internet service and connectivity	35	33	70	67	NA

NA- Not Available; AV- Available

In table 1, it was shown that ICT were not available for human capital development in teaching computer in secondary schools. The only item that is available was cell phone and calculator with 76%, all others were not available.

Research Question 2

To what extent are ICT facilities utilized for human capital development by secondary schools computer Education teachers?

Table 2: Mean response of secondary schools computer education teachers in the utilization of ICT facilities for human capital development.

N-105

S/N	Item Description	VGE	GE	LE	NE		Remark
1	Plan and organize computer lessons with radio houses during school period.	40	36	50	58	1.75	Low extent
2	Plan and show various computer working processes and other concepts in TV Programs	100	60	70	25	2.45	Low extent
3	Record practical and theory lessons in tape recorder and video tapes	40	36	50	58	1.75	Low extent
4	Use power point to teach and show certain computer concepts and principles	32	45	70	47	1.85	Low extent
5	Overhead projectors and films are used to demonstrate computer activities	40	45	60	50	1.47	Low extent
6	Internet connections for teaching computer concepts	20	30	60	60	1.62	Low extent
7	Calculators and cell phones are used in teaching and learning	280	60	20	5	3.48	High Extent
	Grand Mean					**2.05**	**Low extent**

Table 2 indicated a low extent in the utilization of information technology for human capital development in teaching and learning computer in secondary schools with a grand mean of 2.05. The only point of high extent of utilization is the use of calculators and cell phones in learning. Others have below 2.05 which indicated low extent.

Research Question 3

What are the problems of ICT utilization in human capital development in teaching secondary school computer?

Table 3
Mean response of computer education teachers on the problems of ICT utilization in human capital development. N-105

S/N	Item Description	SA	A	D	SD		Remark
1	Most computer teachers lack basic knowledge and skill in utilization of ICT facilities in teaching.	240	90	20	15	3.47	Agreed
2	The government did not provide adequate ICT facilities to be used in schools for human capital development	200	60	60	5	3.09	Agreed
3	Schools lack technical staffs for maintenance and installation of ICT facilities	160	45	80	10	2.81	Agreed
4	Most schools are not internet ready and therefore lack connectivity	200	15	40	10	3.09	Agreed
5	The supply of electric power is irregular and inadequate for ICT facilities (if available)	136	138	42	14	3.14	Agreed
6	Schools lack funds to provide the needed ICT services for human capital development.	128	123	52	6	2.94	Agreed
7	The curriculum planners have not produced enabling policy for integration of media houses in teaching computer contents during school hours	212	96	24	8	3.23	Agreed
	Grand Mean					**3.11**	**Agreed**

Table 3 revealed that there were ICT utilization problems for human capital development in teaching computer education in secondary schools with a grand mean of 3.11.

5. Discussion

Findings from the study indicated that ICT were not available in most of our secondary schools in Enugu Education zone. The table showed higher percentage of most ICT materials not available apart from cell phones and calculators. This agrees with Ugboaja (2010) who found out that ICT gadgets were not available and were not utilized in secondary school Agricultural Science.

The study indicated that due to the absence of ICT gadgets, the computer teachers do not make use of them in teaching and learning process. This may be attributed to teachers' lack of knowledge in the use of ICT in teaching. This agrees with Pelgrum (2001) and Binlingam (2009) who independently found out that the most factors in the implementation of computers in teaching and learning is whether a teacher can or cannot arrange appropriate teaching opportunities for using ICT in classroom or laboratory. According to Sorgo, Verckovnik and Kocijancic (2010), teachers make their decisions about use of ICT applications on individual basis and use of one application does not mean that some other applications will be used.

Data in table three showed that there are many problems confronting the utilization of ICT facilities in computer teaching and learning in secondary schools. This is in agreement with Uburu (2005) and Ugboaja (2010) who independently found out that the use of ICT in the country is facing so many problems; the findings of this study may be as a result of the fact that government had not paid sufficient attention to the issues concerning ICT provision and training of teachers in its use in schools.

6. Conclusion

Information and communication technology is among the innovations in education and since Nigeria had recognised the seriousness of ICT in human capital and technological development, all hands must be on deck to ensure the provision and training of teachers for utilization of ICT facilities. This will enable them to teach effectively.

With this background knowledge, it can be concluded that the number of demonstration and demonstrations using ICT gadgets will increase over time with installation of additional computers in the schools. But it will increase significantly when the teacher undergo training in the use of computer to enable them use it to prepare materials for instruction.

7. Recommendation

Based on the findings the following steps are suggested:-

- Government should take a positive step in the provision of ICT gadgets to all schools.
- Teachers should be trained on the utilization of ICT facilities to ensure effective teaching and learning.
- Curriculum planners should revise the curriculum to ensure proper integration of ICT in the computer Education curriculum.
- Donor agencies, philanthropists, Board of governors and PTA should put in their best in the provision of ICT facilities.

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