Perception of Teachers Towards the Utilization of Information and Communication Technology (ICT) in Teaching Introductory Technology in Secondary School in Delta State in Nigeria

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Abstract

The advent of information and communication technology (ICT) worldwide in this new millennium has posed some challenges to different spheres of education and other human endeavour. It is therefore imperative to look at the adequacy and utilization of ICT equipment for teaching introductory technology subject in Delta State. Furthermore, the study was conducted to ascertain the adequacy and utilization of ICT equipment in urban and rural secondary school in Delta State of Nigeria. Two major research questions and two hypotheses guided the study. The target population for the study consisted of all the principals and introductory technology teachers teaching the introductory technology subject in Delta state secondary schools. 86 respondents completed the questionnaires used for data collection and analysis. The mean, standard deviation and the Z-test were the statistical tools used for data analysis. The hypotheses tested at 0.05 level of significance. The findings revealed that: (1) There is inadequate information and communication technology equipment in terms of number required for teaching introductory technology subject in the urban and rural secondary schools in Delta State.(2) The available ICT equipment for teaching the introductory technology subject are not utilized in the urban and rural secondary schools in Delta state. In these areas of the introductory technology subject: (a) Technical Drawing (b) Metal work (c) Woodwork (d) Electricity /Electronics (e) General Workshop ICT equipment were not used. The study also showed the significance difference in the mean responses of adequacy and use of ICT equipment in urban and rural secondary school students in Delta state. The researcher gave these recommendations and suggestions based on the findings of the study as follows: The government should provide infrastructure and training for the integration of information and communication technology in advancing knowledge and skills in introductory technology subject. This suggestion is to actualize the National Policy on Education (FRN, 2004).The computers and other equipment for the use of ICT for teaching introductory technology should be supplied by the government and so on.

Keywords*: Teachers, information, Communication, Technology, Nigeria*

Introduction

The present application of information and communication Technology (ICT) to all the activities of the world confirmed the fact that the use of ICT is becoming an indispensable tool for modern advancement in knowledge and skills. With the present day computerizations of activities in education, the focus is now on introduction of ICT in schools at all levels (Folayan and Ibrahim, 2000). The inclusion of ICT in our education and the National Policy on Education is highly necessary as we launch into the new millennium and targeting the millennium development goals. World Bank (2000) defined information technology as the integration of computer technology mainly in the form of internet and information management system. Cox (1999) pointed out that information and communication technology as well as all that is involved in gathering and

processing information using modern communication technologies such as computers and other related equipment so that the services generated can reach all that desired reasonable cost and in good time to the overall benefit of mankind.

The training of youth in the schools aimed at equipping them with useful skills and at improving the knowledge in their desired areas of study at the end of training. To facilitate effective training of the youth to acquire knowledge and skills, it is the desire of the government to integrate ICT in our education systems. FRN (2004) government stated that necessary infrastructure and training for the integration of ICT in advancing knowledge and skills in Nigeria should commence immediately in our institutions. The federal Government has set up a body known as National Information Technology Development Agency (NITDA) and the purpose according to (Enweremadu, 2001) of establishing this agency is to integrate internet into educational process, produce 500,000 professionals in the information technology network and employ the merging technology of satellite communication to provide access to the internet.

World Bank (2002) stated that when computer is properly integrated into a broader educational program would help to improve the academic training for science and technology education and holds out the opportunity to revolutionize pedagogical methods and expand access to quality of education. There is need to brace up to the new challenges and systems of education through the development and use of ICT in junior secondary school which is at the level of acquisition of knowledge and skills in education (Okoli, 2005). Introductory technology is one of the pre-vocational subjects in the junior secondary school curriculum in Nigeria that can provide the youth with such training.

Information And Communication Technology

The following issues represent challenges to improving information and communication services:

- High cost of private provision of power.
- Lack of local manufacture or maintenance of information and telecommunication equipment and the lack of local software development capacity.
- Absence of effective and efficient postal communication.
- Inadequate human capacity and indigenous technical know how.

Policy thrust: Under NEEDS the government is committed to the following policy thrusts;

- Develop and sustain a modern information and communication technology to support private sector-driven growth and economic development and to improve the quality of life and reduce the level of poverty significantly.
- Improve access to internet connectivity, and raise the level of computer usage and literacy.
- Facilitate the development of a national multimedia super corridor, including provision of appropriate incentives for private sector involvement.
- Aggressively promote information and communications technology as an instrument of mass education, growth, and development.

Targets and strategies. NEEDS sets the following targets:

- Increase telephone density to one telephone per 25 people.
- Make telecommunication accessible to a wider range of Nigerians, regardless of where they live.
- Develop a national communications and telecommunication backbone, including a national multimedia super corridor.

NEEDS adopts the following strategies:

- Use a combination of fiscal and financial incentives to encourage private sector investment in service provision in the industry.

- Enforce intellectual property rights, and promote entrepreneurship, training, and partnerships.
- Pursue a local content policy in the manufacture of electrical and electronic equipment and communications and telecommunications equipment, including handsets, accessories, and components.
- Facilitate access to special financial support through NEXIM, the Bank of industry, SMEIES, and other institutions, for private sector-driven wireless telephone and internet connectivity development in rural areas.
- Foster an enabling environment for developing software capacity.
- Provide incentives to develop industrial parks in information communications technology.

Introductory Technology Subject In Junior Secondary School

The subject normally starts in the first year of the junior secondary courses. The introductory technology subject, which comprises of areas like woodwork, metalwork, technical drawing, electricity/electronics and Auto-mechanics, is taught in the urban and rural secondary schools in Delta State. The federal ministry of education prepared the curriculum which a solely for the teaching of the subject. While the award of certificates at the junior secondary school level in Delta State is usually carried out by the Delta State Ministry of Education. The examination is usually taken at the end of the first three years of secondary education. For effective implementation of introductory technology government shall provide necessary infrastructure and training for the integration of ICT in the school system in recognition of the role of ICT in advancing knowledge and skills in the modern world (FRN, 2004).

Statement of the Problem

The introductory technology is practical and activity oriented subject. It is because of the practical oriented activities that the subject requires integration of ICT in the teaching of the subject. The introductory technology core curriculum introduced in 1985, is implemented in secondary schools across the country disregarding the use of ICT. Okebukola (1995) pointed out that computer studies and computer-based education are now planned to be key elements in the implementation of the National Policy on Education, which started in the year 1988. It was noticed that computer based ICT education were not be integrated into the implementation program of the secondary school in Nigeria. The success of the implementation of this curriculum will largely depend on different factors like the adequacy of equipment and effective utilization of ICT in the urban and rural secondary schools. Now there is no evidence relating to the adequacy ICT equipment and how effectively they are utilized in urban and rural secondary schools in Delta State for the successful implementation of the curriculum in this area of study.

White (1987) stated that in the past educational institutions, including secondary schools used computers only for administrative purpose such as pay roll, inventories, order forms, attendance records for the most part teachers and students were not involved. This was because computers were very largely and far too costly to be placed in schools but now microcomputers are becoming common in the classrooms. Hence, the need arises to look at teacher perception and views towards the utilization of ICT in teaching introductory technology in secondary school.

Hypotheses

Ho_1: There is no significant difference in the mean of urban and rural junior secondary school students with adequate information and communication technology equipment for teaching introductory subjects.

Ho_2: There is no significant difference in the utilization of urban and rural junior secondary information and communication technology equipment for teaching introductory subjects.

Research Questions

(1) How adequate are the ICT equipment and facilities for teaching introductory technology subject in urban and rural secondary schools in Delta State.
(2) How effective is ICT equipment utilized in teaching the introductory technology subject in urban and rural secondary schools in Delta State.

Purpose of the Study

The purpose of this study was to assess the adequacy and utilization of ICT equipment for teaching introductory technology in urban and rural secondary school in Delta state
Specifically, the study is to:
-Verify the adequacy in terms of number of available ICT equipment in urban and rural secondary school in Delta State.
-Ascertain whether the available ICT equipment are properly utilized in teaching the introductory technology subject in the urban and rural secondary schools in Delta State.

Population

The target population for this study consists of 120 introductory technology teachers and 115 school principals in Delta State who are currently teaching and working respectively in the secondary school. There are 115 secondary schools in Delta State that are currently offering introductory technology subject, according to ministry of education, examination and standard branch, Asaba Delta State.
Sample

The researcher seeks to obtain a proportional sample that represented the schools and the staff of the chosen school. The sample of the study was selected using the stratified random sample design for the school. The proportional procedure was carried out by dividing the schools into strata of urban and rural schools then random sampling was carried out on each urban and rural stratum to select the sample size of the schools.

In this way 30 schools, 15 representing the urban and 15 representing the rural schools, was drawn proportionally from the population. In a like manner 60 introductory technology teachers 2 teachers from each of the 30 schools and 30 principals, one principal in each of the 30 schools was randomly selected. In all the researcher have 30 secondary schools and 90 staff were involved in the study.

Validation of the Instrument

The researcher subjected items of the instrument to face validity by giving the initial pool of the instrument to research professionals and five experts in the field of industrial technical education from the department of vocational teacher education, university of Nigeria, Nsukka and three experts from the department of Technical and Business Education, Delta State University, Abraka.

Method of Data Collection

Questionnaire was the major instrument of the study. The researcher personally administered the questionnaire to the respondents and also employed the assistance of experts in the field of industrial technical education especially introductory technology teachers to help administer the questionnaire in distance locations. Such teachers on behalf of the researcher distributed, collected and returned the completed questionnaire copies to the researcher. The reliability of instrument was established using a test retest reliability procedure. The Pearson's product-moment correlation coefficient was employed to correlate the scores. A coefficient of internal consistency (r=55) was computed and result confirmed the questionnaire items appropriate for the study.

Method of Data Analysis

The raw scores obtained from the responses in each questionnaire items was computed and tabulated into frequency table. In analyzing the data collected the researcher used the mean, standard deviation and Z-test statistic. The mean and standard deviation was used assess the adequacy and use of ICT equipment for teaching introductory technology in schools raised in the research questions. While the Z-test statistics was used to test the hypotheses formulated for the study.

Results

Research Question 1

How adequate are the ICT equipment and facilities for teaching introductory technology subject in urban and rural secondary schools in Delta State?.

Table 1. Mean responses of adequacy of ICT Equipment for teaching Introductory Technology subject in Urban and Rural Secondary Schools.

Ranking of items	Area of Introductory Technology	Urban Schools N=42		Rural Schools N=44		Grand Mean	Remarks
		XU	SDU	XR	SDR		
1	Woodwork	2.70	0.42	2.16	0.33	2.43	Inadequate
2	Technical Drawing	2.24	0.26	2.32	0.28	2.28	Inadequate
3	Metal Work	2.18	0.31	2.02	0.28	2.10	Inadequate
4	Electricity/ Electronics	1.98	0.12	1.81	0.22	1.89	Inadequate
5	General Workshop	1.88	0.08	1.61	0.17	1.75	Inadequate

Data presented in Table 1 shows that Woodwork received the mean score of 2.70 (urban) and 2.16 (rural). Technical Drawing received the mean of 2.24 (urban) and 2.32(rural). Metal Work received the mean (X=2.18) Urban and mean (X=2.02) Rural. Electricity/Electronics received the mean of (1.96) Urban and (1.81) rural. Then the general Workshop received the mean (X=1.88) urban and rural (1.61) rural. The ranking column showed the woodwork items as having the highest grand mean rating of (X=2.43) followed closely by Technical Drawing items with rating of (X=2.28) then followed by the metal workshop equipment with rating of (X=2.10) while Electricity Electronics

received the rating of (X= 1.89) and General workshop equipment received the lowest grand mean rating of (X=1.75), as shown on the Table 1, none of the items has upto a grand mean rating of X=3.50 adequacy. The remarks above are based on ranking of grand mean and cut-off point of 3.50 on a five-point scale.

Research Question 2

How effective are the available ICT equipment utilized in teaching the introductory technology subject in the urban and rural secondary schools in Delta State?.

Table 2. Mean responses of Extent of utilization of ICT Equipment for teaching Introductory Technology subject in Urban and Rural Secondary Schools.

Ranking of items	Area of Introductory Technology	Urban Schools N=42		Rural Schools N=44		Grand Mean	Remarks
		XU	SDU	XR	SDR		
1	Technical Drawing	2.65	0.25	2.57	0.31	2.61	Not Utilized
2	Woodwork	2.76	0.43	2.06	.28	2.41	Not Utilized
3	Electricity/ Electronics	2.25	0.21	1.94	0.71	2.10	Not Utilized
4	Metal Work	2.35	0.36	1.82	0.16	2.09	Not Utilized
5	General Workshop	2.25	0.32	1.66	0.14	1.96	Not Utilized

The data presented in table 2 shows that Technical Drawing attracted the mean of 2.65 (urban) and 2.57 (Rural). Woodwork equipment received the mean score of 2.76 (urban) and 2.06 (rural). Electricity/Electronics received (X=2.25) urban and (Xr= 1.94) rural. Metalwork equipment received 2.35 and 1.82 mean of urban and rural respectively. General workshop equipment received the mean of (Xu=2.25) in urban and the (Xr =1.66) in rural.

The ranking column showed that the Technical Drawing equipment items as having the highest grand mean rating of (X=2.61) followed closely by woodwork equipment items with rating of (X=2.41) then followed by the Electricity/Electronics equipment items with rating of (X=2.10) while metal work equipment items received the rating of (X=2.09), as clearly shown on the Table 2, none of the equipment items has upto a grand mean rating of X=3.50 on the rating scale. The remarks above are based on ranking of grand mean and cut-off point of 3.50 on a five-point scale.

Table 3 Summary of Z-test Analysis on Adequacy of ICT equipment for teaching Introductory Technology Subject

Location	Mean X	SD	df	Z-test	Z-critical	Remarks
Urban	2.19	0.32	84	3.24	1.98	Reject Ho_1
Rural	1.98	0.28				

Table 3, the figures represent mean and standard deviation of the mean responses of teachers obtained from the junior secondary schools. The calculated values fall in the rejection region.

Formulated hypothesis, which states that there is no significant difference in the mean responses on the information and communication technology equipment for teaching urban and rural students in Delta State was rejected, because the calculated- value falls on the rejected region. Z-calculated = 3.24 which is greater than Z-critical = 1.96 at 0.05 level of significance with the degree of freedom df=84. The statement implies that there is a significant difference in the mean responses of the urban and rural teachers on the adequacy of information and communication technology. The null hypothesis rejected and its alternative was accepted.

Table 4 Summary of Z-test Analysis on the Utilization of ICT equipment for teaching Introductory Technology Subject

Location	Mean X	SD	df	Z-test	Z-critical	Remarks
Urban	2.45	0.24	84	6.82	1.98	Reject Ho_2.
Rural	2.01	0.35				

Table 4 represents the figures showing the mean and standard deviation of the mean responses on the utilization of information and communication technology by teachers of junior secondary schools. The calculated values fall in the rejection region. The null hypothesis is therefore rejected on the bases of the Z-calculated = 6.82 which is greater than the Z-critical = 1.98 at 0.05 level of significance with the degree of freedom of 84. The alternative hypothesis was then accepted which states that there is a significant difference in the responses of urban and rural teachers on the utilization of information and communication technology (ICT) for teaching introductory technology in junior secondary school in Delta State.

Discussion of the Findings

The findings of this study were discussed in line with research questions and hypotheses formulated. The findings of the first question revealed that there is inadequate ICT equipment in terms of number required for teaching the subjects in the urban and rural secondary school in Delta State. In an effort to answer in details the research question one, the principals and introductory technology teachers were asked questions on the issues of adequacy of the ICT equipment and their responses tended more to uniformity. The teachers accepted that their schools were not supplied computers by the government.

Achuonye (2002) emphasized that ICT should be part and parcel of the teacher training programme so that the graduating teachers will in turn integrate them in their daily teaching process. It can be seen therefore that research question one which seek to ascertain whether ICT equipment in terms of number required for teaching the introductory technology subject in urban and rural secondary school has a negative responses against the adequate ICT equipment.

The findings of the research question two on how effective are the available ICT equipment for introductory technology subject are utilized in teaching the subject in urban and rural secondary schools in Delta state. The respondents pointed out that electricity light from the Power Holding Company (PHCN) of Nigeria is not always available or supplied to the urban and rural areas where it is needed for the teaching of introductory technology subject. The perception of teachers towards the utilization of ICT in teaching introductory technology subject was not encouraging, and the results shows that the teachers disagreed, most of the items were not utilized because they agreed

that ICT is too cumbersome and the situation lead to the student graduates acquisition of theoretical knowledge in different areas of introductory technology subject.

Elliot (1998) stated that other part of information and communication technology is telecommunications. The technology used to bring about the communication of voice and data signals over some geographic distance. The term information technology (IT) assumes not only the presence of computing technology but also the organization of information systems into networks, through the application of telecommunication technology. Abindube (1999) pointed out that the use of computer requires acquisition of practical skills, which must be properly communicated to learners, and most of the teachers lack these skills and this leads to their low interest in computer utilization.

The hypothesis tested revealed that there is a significant difference in the mean responses of the urban and rural introductory technology teachers on the adequacy of information and communication technology equipment for teaching the subject. To actually make the picture clear and to address the issues, one may want to side and support the idea stated in the work that the urban schools with cyber café facilities in town has inadequate equipment than the rural schools counterpart with inadequate ICT equipment.

As rightly pointed out by the introductory technology teachers showed that effective implementation of introductory technology subject can also be made or achieved by urban and rural students taught with adequate ICT equipment when made available. In addition, the government on the other hand is putting up workshops and installing the (ICT) equipment in various part of the country and institutions for the purpose of adequately equipping them with necessary equipment and introductory technology materials and facilities (Olorunselu,1999).

The second hypothesis findings revealed that there is a significant difference in the mean responses on the utilization of information and communication technology equipment for the teaching of introductory technology subjects in urban and rural area in Delta state. There is a significant difference in the mean responses of urban and rural teachers on the use of ICT equipment for teaching introductory technology subject in JSS in Delta State. Ezekwe (1990) made his contribution towards the promotion of science (ICT) equipment utilization and technology management of materials in Nigeria. He stated that it is through the utilization of ICT and science materials that meaningful achievement can be attained in introductory technology subject. Agunbiade (2000) stated that practical aspect of technical skills forming has been generally ascribed to the global shortage of competent technologist in different areas. The failure of the strategies of (ICT) adopted in Nigeria to alleviate the problem is blamed on lack of equipment, computer facilities and time constraint.

Another possible reason of the discrepancy in the responses of the urban and rural introductory technology teachers is that the urban students are exposed to private cyber café existing in towns. The respondents agreed that the (ICT) equipment were used by students in urban and they are exposed to the use of computers in the cyber café in town than their rural school counterpart. This might account for the discrepancy between the responses of the urban and rural teachers on the utilization of ICT equipment. In this way the hypothesis ($H0_2$) testing and seeking to know whether there is a significant difference in the mean responses of urban and rural school teachers on the utilization for teaching introductory technology subject yielded alternative results to the stated hypothesis. In this regard, the findings revealed that there is a significant difference in the utilization of ICT equipment in urban and rural areas secondary school for teaching introductory technology subject.

Conclusion

It was the purpose of this study to find out whether there is adequate ICT equipment for teaching introductory technology and to ascertain how effective are the ICT equipment utilized in teaching the introductory technology subject in the urban and rural secondary schools in Delta State. It was as well as the purpose of this study that the findings of the research shall be used to suggest the possible solution to the Delta State government where the (ICT) equipment are not available, inadequate and where available they are not properly and effectively utilized in teaching introductory technology in Delta State. The government from review of literature on the use of ICT for teaching introductory technology subject places high premium on this issues of the use of ICT on teaching introductory technology subject.

Among the major short falls observed from the investigation of the schools. It was discovered that there are schools where the ICT equipment are not existing at all and the teachers are not even literate in the field of ICT as a result the ICT equipment are not utilized in teaching the students the subject in such schools. It is therefore hoped that other researchers, the government in the state as well as educational body and planners in their efforts to find out the necessary implementation problems of ICT equipment utilization for the teaching of introductory technology programme as well as to resolve such problems. The government should show enough interest and ways of providing a lasting solution to the inadequate, lack of ICT equipment for teaching introductory technology subject enumerated as the findings and utilize the findings on ICT for the growth, progress of ICT and utilization for teaching introductory technology subject.

Recommendation and Suggestions

(1) The industries, non-governmental agencies and private enterprises should provide ICT, equipment, workshops, generators, steady power supply of Electricity light for effective teaching and learning in secondary school in Nigeria.
(2) Companies, government and other international organization should provide fund and take the responsibility of the provision of the ICT equipment and computer system programme to improve the poor state of instruction in secondary school.
(3) The government should post minimum of three trained ICT experts and technical teachers to the secondary schools to enable them make effective use of the available ICT equipment and seek the advice from qualified teachers for effective implementation of the subjects.
(4) Supervisors and inspectors from ministry of education should be sent to the JSS to ascertain the degree of utilization of the ICT equipment and ICT programs and ICT provided by the government and other private organization.
(5) Computers, equipment, tools gadgets provided by the government should be installed in different JSS to enable the teachers use ICT for teaching during the practical class. The rehabilitation of the Secondary schools buildings and provision of ICT, equipment and facilities should be carried out to improve the learning standard.

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