

AVAILABILITY OF INFORMATION AND COMMUNICATION TECHNOLOGY FACILITIES FOR MATHEMATICS INSTRUCTION IN GOVERNMENT AND PRIVATE OWNED PRIMARY SCHOOLS

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Abstract

This study examined comparatively the availability of information and communication technology facilities for mathematics instruction in government and private owned primary schools. The study was a descriptive survey which covered all the primary schools in Onitsha north local government area. A total of four hundred (400) primary school teachers consisting of two hundred (200) teachers from government owned schools and two (200) teachers from private owned schools were used as the sample for the study. The instrument for the study was a researcher developed questionnaire and the data collected were analyzed using percentages and chi-square for the research question and hypothesis respectively. The findings of the study revealed that there is a significant difference in the availability of ICT tools between private owned and government owned primary schools, and this has implications for effective mathematics instruction. Based on these findings, it was recommended among other things that government should try and provide these ICT materials for use in mathematics teaching and learning.

Introduction

Mathematics has a vital role to play in achieving the highly desired technological / industrial development of the Nigerian society. It's relevance in an individual's daily dealings is so great that acquiring mathematical skills, ideas, processes, computational abilities, intuitive and deductive reasoning's etc are indispensable tools for a successful and meaningful human existence (Osafehinti, 1990). According to Ale (1994), mathematics has substantial use in all other human activities including school subjects such as technology, science, genetics etc.

However, despite the vital role that mathematics has to play in the society and its relevance in an individual's daily dealings, students' performance in the subject seems to be quite low as can be deduced from the results of senior secondary certificate May/June examinations (Ihezue, 1995). Students exhibit much hatred or dislike for mathematics. They play truancy towards mathematics lessons and when they are present in class, they pay little or no attention to the teacher. They devote greater time in studying other subjects than mathematics, despite the compulsory status ascribed to it in the national policy.

Several factors have been outlined as contributing to this low achievement of students in mathematics. Some of which include use of inappropriate teaching methods, poor students' background and lack of

mathematics laboratory etc. According to Obodo (1997) many of the teachers use inappropriate methods and no teaching aids in the classroom. They give little or no considerations to the psychology of the learner who may need concrete realities, thus the learners perceive mathematics as difficult, abstract and uninteresting.

This is mostly critical at the primary level where non-specialist mathematics teachers are made to teach mathematics. Moreover, mathematics is a highly structured subject with what is learnt at the higher level dependent on what is learnt at the primary and subsequently secondary level. Thus, the inability to adequately comprehend primary mathematics develops a poor background or foundations for the pupils in mathematics. This calls for more efforts on the part of primary mathematics teachers to adopt lively and inspiring methods which will help the pupils to relate mathematics instruction to real life situations. This can be achieved through the use of information and communication technology (ICT)

Information and Communication Technology (ICT)

In contemporary times, information and communication technology is seen as a driving force in global economic development. Information refers to a definite knowledge acquired or supplied about something or somebody or collected facts and data about a specific subject. Communication is the exchange of information, message, and ideas, by means of speaking, writing, or using a common system of signs or behavior. Thus, Obayi in Okoye, (2005) described information and communication as the use of electronic means to collect data, process, store, retrieve and make available different types of information to anybody seeking to get or use it anytime, anyhow and anywhere in the world, for the pursuance of national economic development and advancement. It is also seen as a convergence or combination of micro-electronics, computers (hardware's and software's) and telecommunication for the purpose of acquiring, processing, storing of huge amounts of information and the rapid dissemination of vocal, pictorial, textual and numeric information (Williams, 2005; Sanni; 2007, Nwachukwu, 2008;).

Several researchers, Okoye, (2005); Sanni (2007), Atagher (2008), have tried to outline some elements or tools of information and communication technology. They include:-

- a. The computer with its software's.
- b. Communication systems like mobile phones, telephones, telex facsimile, Internet, E-mail, Fax, Videotext, document delivery etc.
- c. Technologically oriented audio and audio-visual materials / microwave systems like radio programmes, recorded cassettes, tele-lectures, television programmes, video tapes, and sound motion pictures.
- d. Reprographic systems (micrographics, electronic copies, word processing etc.

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Nwachukwu in his own view outlined other ICT-oriented activities in the field of education to include :-

1. Broadcast materials or CD-ROM as sources of information
2. Micro-computers with its devices
3. Electronic toys
4. E-mail
5. Video conferencing
6. Internet-based research etc.

The uses of these tools in teaching and learning have several benefits. It creates easy access to information learning opportunities and resources for both learners and teachers, makes learning more flexible, interesting and reduces student's perception of mathematics as an abstract subject. It leads to economical delivery of instruction, enables new instructional models, promotes teacher productivity and helps to expand learning time beyond school period (Okoye, 2005, Sanni, 2007). The use of the internet provides for both teachers and pupils, global access to all kinds of information generation and sharing. Radio and cassette players, educational television, video cassettes and VCD's can be used to teach and reinforce mathematical concepts, skills and processes especially at the primary school level.

According to Trucano (2005), there is widespread belief that ICTS can and will empower teachers and learners, transforming teaching and learning processes from being highly teacher-dominated to student centered. This transformation results in increased learning gains for students, creating opportunities for learners to develop their creativity, problem-solving abilities, informational reasoning skills, communication skills and other higher-order skills. The extent then to which these ICT tools are available in primary schools in Onitsha North Local Government Area of Anambra State constitutes a major problem of this study.

It is an established fact that the educational systems have become a joint venture between private proprietors and the government particularly at the primary and pre-primary level. Each of these sectors strive towards excellence and the attainment of the desired objectives. However, Akpakwu (1995) stated that government had been known not to be able to manage anything as effectively and as profitably as private enterprises, since what belongs to all is often seen as belonging to none and as a result deserves no special attention. This study therefore intends to also find out how true this assertion is with regards to the availability of ICT materials in government owned schools as compared with private owned primary schools.

Research Questions

The research question below guided this study.

1. To what extent are ICT tools available for teachers use in primary schools in Onitsha L.G.A.

Hypothesis

This hypothesis will be tested in this study.

1. There is no significant difference in the availability of ICT tools in private owned primary schools and government owned primary schools.

Method

The study was a descriptive survey since no variables were manipulated. The population consisted of all the primary school teachers in both private and public primary schools in Onitsha North L.G.A. Four hundred of these teachers (400), two hundred from private and two hundred from public primary schools were sampled and used for the study.

The major instrument used for the study was a researcher developed questionnaire which consisted of two sections. The first elicited information on personal data and the second on the availability and usage of information and communication technology facilities. This instrument was validated by two lecturers in the school of education Nwafor Orizu College of education Nsugbe. In analyzing the data collected, frequency counts and percentages were used in answering the research question. While Chi-square was used in testing the hypotheses at 0.05 level of significance.

Results and Discussion

Table 1: Frequency Counts and Percentages of Teacher's Response on ICT Facilities Available in their Schools

| | Facilities | Private Schools | | Government Schools | | | |
|---|--|------------------------|-------------|---------------------------|-------------|--------------|-------------|
| | | Freq. | Per. | Freq. | Per. | Total | Per. |
| 1 | Computers and their software devices | | | | | | |
| 2 | Communication systems | 196 | 98 | 42 | 21 | 238 | 59.5 |
| a | Land / mobile phones | 120 | 60 | 34 | 17 | 154 | 38.5 |
| b | Internet facilities | 54 | 27 | 0 | 0 | 54 | 13.5 |
| c | E-mails | 32 | 16 | 0 | 0 | 32 | 8 |
| d | Fax machine | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total | 206 | | | | | |
| 3 | Technologically oriented audio, visual and audio-visual materials. | | | | | | |
| a | Radio programmes, recorded cassettes / CDs | 136 | 68 | 22 | 11 | 158 | 39.5 |
| b | Television programs | 180 | 90 | 12 | 6 | 192 | 48 |
| c | Video tapes / VCDs | 122 | 61 | 0 | 0 | 122 | 30.5 |
| d | Sound motion pictures / | 32 | 16 | 0 | 0 | 32 | 8 |

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| | | | | | | | |
|---|---------------------------|------------|----|-----------|---|-----|----|
| | projectors. | | | | | | |
| | Total | 470 | | 34 | | | |
| 4 | Electronic toys | 24 | 12 | 0 | 0 | 24 | 6 |
| 5 | Reprographic systems like | | | | | | |
| a | Micrographics | 0 | 0 | 0 | 0 | 0 | 0 |
| b | Electronic copiers | 120 | 60 | 0 | 0 | 120 | 30 |
| | Total | 120 | | 0 | | | |

Table 1 reveals that the extent of availability of ICT materials in primary schools in Onitsha north local government area is quite low. This is because from the response of the teachers on the available ICT materials as shown in the table, only computers and their software devices had a percentage above average (59.5%). The other ICT materials were below average in terms of availability. This is quite unfortunate in view of the several benefits accruable from the usage of ICT materials in teaching and learning as pointed out by Okoye (2005), Trucano (2005) and Sanni (2007).

Despite the relevance of ICT facilities in transforming teaching and learning from being highly teacher dominated to student centred, not much thought have be given by the government, school administrators and other stakeholders to the provision of these facilities especially for the teaching of such subject like mathematics which is considered by many pupils as abstract. This prevailing situation may therefore be one of the reasons why teachers have continued to adopt what Obodo (1997) referred to as inappropriate methods. Thus, making the hope of achieving increased learning gains for students a mirage.

Hypothesis 1

There is no significant difference in the availability of ICT tools in private owned primary schools and government owned primary schools in Onitsha North Local Government Area.

In testing this hypothesis, the chi-square statistic was determined using SPSS evaluation format. The result is presented below.

Table 2: School Type * Type of Facility Cross Tabulation.

| | | Comp and software devices | Communi cation system | Techn-oriented audio, visual and audio – visual materials | Electronic toys | Reprog raphic systems | Total |
|-------------|----|---------------------------|-----------------------|---|-----------------|-----------------------|-------|
| School type | I | 196 | 206 | 470 | 24 | 120 | 1016 |
| | II | 42 | 34 | 34 | 0 | 0 | 110 |
| Total | | 238 | 240 | 504 | 24 | 120 | 1126 |

School type I = Private owned, Type II = Government owned

Table 3: Chi-square tests

| | Value | df | Asymp.Sig (2-sided) |
|------------------------------|--------------|-----------|----------------------------|
| Pearson chi-square | 42.838 | 4 | .000 |
| Likelihood ratio | 53.954 | 4 | .000 |
| Linear-by-linear association | 40.808 | 1 | .000 |
| N of valid cases | 1126 | | |
| | | | |

Table 2 reveals that private owned primary schools had more of the ICT facilities examined in the order technologically oriented audio, visual and audio-visual materials, communication systems, computers and their software devices, reprographic systems and electronic toys, while government owned primary schools had very few computers, land/mobile phones and radio / televisions. This situation is further confirmed by table 3 where the calculated chi-square probability level is .000. Since this probability level is less than the 0.05 level of significance, the null hypothesis is rejected and we therefore conclude that there is significant difference in the availability of ICT tools between private owned primary schools and government owned primary schools in favour of the former. This indicates that there is gross neglect by the government and other stakeholders in the education industry, towards the provision of needed ICT facilities in public primary schools. Thus agreeing with Akpakwu (1995) who stated that government is often known not to manage their establishments as effectively and as profitably as private enterprises since such establishments are seen as belonging to none and as a result deserves no special attention. Private enterprises on the other hand strive towards excellence and are quite willing to go to any length to achieve same. This situation is not limited to primary schools alone as Akudolu (1998) equally discovered that ICT facilities are not available for teachers use in secondary schools. Thus Efedo and Usifo (2008) observed that many public schools in Nigeria at all levels do not have the required or suitable educational media and facilities with which creative ingenuity of learners could be enhanced.

Implications of the Study on Mathematics Learning

The poor availability of information and communication facilities in primary schools has implications for the learning of mathematics. Mathematics teaching continues to be conventional, thus creating and maintaining the impression in the mind of the pupils that mathematics is too abstract and difficult to learn. The disparity between government and private owned primary schools in the availability of ICT facilities implies that there will be greater ease in the teaching and learning of mathematics for both teachers and pupils in private owned primary schools. Teachers in private primary schools are also offered greater opportunities for improvement in their techniques of research for more effectiveness.

Conclusion

The desire to increase students' achievement in mathematics and stem the tide of mass failure in the subject is worthwhile. This is because mathematics is vital for more technological development. Such dreams could be achieved by laying a good foundation for the pupils at the primary level of education through creative exposure of the pupils to mathematical skills, facts and processes.

This demands the use of information, and communication technology facilities. However from the findings of this study, it is discovered that these facilities are lacking especially in government owned primary schools which accommodates greater majority of the masses. Therefore concerted efforts should be made by the government to ensure that these facilities are provided for greater effectiveness in mathematics teaching and learning.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. The government should make efforts to provide these ICT facilities in public schools for use in mathematics instruction as well as other subjects.
2. The school authorities should join forces with the PTA to provide some of these facilities within their reach.
3. There should be an effective monitoring system to ensure that the ICT facilities already provided in both public and private schools are properly maintained, and utilized for making mathematics learning more creative.
4. Teachers should be sensitized on the need to use these facilities in mathematics teaching and learning.

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