

Undergraduate Students' Perception on the Methods of Teaching Computer Programming in the South-South, Nigerian Federal Universities

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Abstract

The study investigated the undergraduate students' perception on the methods of teaching computer programming. The study became necessary due to poor performance of students in the course. Descriptive survey design was adopted. Three research questions and two null hypotheses guided the study. Proportionate stratified random sampling technique was used to draw the sample size of 1000 students from three out of the five federal universities in south –south geopolitical zone of Nigeria. A questionnaire titled Lecturers Teaching Method Questionnaire (LTMQ) was developed by the researchers for data collection. The developed instrument was validated by three experts; two have taught computer programming for at least five years and one educational methodology expert. The data were analyzed using percentage, mean, standard deviation and t-test. The findings revealed that lecturers employed lecture method during instruction mostly and never used guided discovery and practical methods; gender had no influence on the perception of undergraduates on the methods used by their lecturers and the factors affecting their choice of teaching methods. Based on the findings, recommendations were made which include that the university management should monitor the methods of teaching employed by their lecturers even when the lecturers are not from Faculty of Education.

Keywords: University students, teaching methods, Computer Programming, Nigeria

Introduction

The advent of computer has contributed much in the human activities more especially in the teaching and learning. Umendu (2005) described computer as a powerful device which has the capability of accepting data as (input) in a prescribed form, apply a series of arithmetic and logical operation on the data (processing) and produce the result of these operations as information (output). The output is produced in specific format to the users at a very fast speed under the control of some logical sequence of instruction called “program”. In the same vein, Osita (2014) defined computer as an electronic device which is capable of receiving input, storing it for a desired period of time, manipulating it according to a given set of instructions and producing output.

Basically, a computer performs four functions: input, process, output and storage. Input refers to raw data that are entered into a computer from the input device such as the keyboard, joystick and mouse. Data can be in the form of letters, numbers, images, etc. Process is the act of performing operations on data according to the given instruction and it is totally an internal process of the computer system. Output is the processed data given by the computer as information; it can be called result while storage is the ability of the computer to save input data or generated results

in a storage device for future use. In view of that, Ugwu (2006) suggested that computer can be used for a lot of things which includes; data processing, medical diagnosis, and communication among others. In addition, computers have been an upward trend in terms of usage. As far back as 1946, the use of the computer by the government is increasingly high. The computer was used for military purposes like decrypting enemy message or calculating trajectories of ballistic missiles. Using computers was very complicated then. Only those things which were impossible to be done with a time were given to computer. Later, the real use of computer evolved when Herman Hollerith invented punch cards and the computers were used for census purposes. Computers were still too big to be used for other things. It was only after the innovation of microprocessor that computer could get smaller; still they were complicated to be used and laid the foundation for windows.

Now computer is used everywhere, business today rely on computer technology to assist them in almost every area of corporate life. Computers have invaded the grocery store, fast food restaurants, small and big enterprises alike. They process data, store information, workout complex mathematical problems, track inventory and even control temperature and highlighting in office building. Reliance on the high-speed digital computer is so complete that world of commerce would break up to a sudden stop if computers were removed. Pujari (2015) highlighted the importance of computer in the society as to: help in information delivery, improves human health, promotes methods of planning how to plant and harvest crops, means of communication, and fast bank transaction. The more we learn about the importance of computers, the more computer literate we become and the more chances we will have of advancement in mostly any field. This is why it has become necessary to include computer appreciation as one of the requirement in the minimum standard for universities, polytechnics and colleges of education.

Every computer system makes use of a programming language. Programming language is a formal constructed language designed to communicate instructions to a machine, particularly a computer. It can be used to create programs to control the behavior of a machine or to express algorithms. Programming language can also be seen as a computer language engineered to create a standard form of commands (Giraldo, 2016). Programming deals with the design, implementation, analysis, characterization, classification of programming languages and their individual features. The following are examples of programming languages: ANSI, Q BASIC, FORTRAN, C, C++, C#, COBOL, PASCAL, JAVA, Artificial intelligence.

Computer Programming is often shorten to programming. It is a comprehensive process that leads from an original formulation of a computing problem to executable programs. Farlex (2012) said that computer programming is a process of creating a sequence of instructions to enable the computer to do something. Osita (2014) supported the assertion by defining computer program as a set of instruction given to the computer to perform a given task. It involves activities such as analysis, understanding generically solving such problems resulting in an algorithm, verification of requirements of the algorithm including its correctness and its resource consumption, implementation (coding) of the algorithm in a target programming language, testing, debugging and maintaining the source code, implementation of the build system and management of derived artifacts such as machine code of computer programme. Mifflin (2011) opined that computer programming could be referred to as (i) an artificial language used to write instructions that can be translated into machine language and then executed by a computer, and a simple language system designed to facilitate the writing of computer programs either high level language, low level or machine code. It is necessary to note that the purpose of programming is to find a sequence of instructions that will automate performing specific task or solve a given problem. The process

of programming requires expertise which should be gotten through proper teaching and training. This informed the present study.

Teaching is perceived in different ways. It is more than training students so that they can stand on their own feet in society. Teaching is to practice as practice aids memory, strong intent and competence (Ngwoke, 1995). According to Okeke (2008), teaching is an abstract art that calls for imparting knowledge or instruction to learners in order to do something. Okeke further added that teaching is also seen as the act or profession of a person who teaches. A teacher must enter the mind of his / her student with the intent to engage. A teacher must engage ones student in the process of absorbing, understanding, applying and then retaining new knowledge. It is said that it takes the average human 21 days to create a new, repetitive behavior and it takes 30 days to make the habit part of one's life (Unachukwu & Ebenebe, 2009). Teaching calls for giving instructions, guidance and direction to the learner. It includes all the activities of providing education to others (Okeke, 2008). The person who provides education is called a teacher. A teacher is a person that has acquired special skills required for effective imparting of knowledge and skills to a group of learners, pupils or students (Offorma in Owodunni & Hassan, 2013). Adesina & Fagbemiye in Okekeokosisi & Anekwe (2015) added that a teacher is and will continue to be both the major indicator as well as the major determinant of quality instruction. Ifelunni (2014) highlighted the roles of a teacher which when applied by teachers would enhance quality instructional delivery. The roles are: facilitator of learning, a motivator, a guidance, counselor, a role model that inspire the students. The teacher uses different methods in doing his best to make students understand. His duty is to encourage students to learn the subject. The teacher equally takes cognizance of the three domains, learners' age and stages of development (Okigbo & Okekeokosisi, 2014). Nwankwo (2014), teaching means interaction of teacher and students. Both teacher and students participate for their mutual benefits and have their own objectives and target to achieve. In teaching, three main aspects come in our front; first is the teacher, second is the students and third is education. Nwafor (2007) described a teacher as the organizer of necessary learning experiences (the implementer of curriculum), students are the centre of curriculum delivery and education is what to be taught to learners (students).

According to Henderson (2004) Computer science teaching / learning is a relatively new phenomenon in Nigeria, but the use of computers is reflected in many areas of human endeavors. Henderson further said that computer programming is useful in medicine, domestic activities, engineering, architecture, education, arts and humanities. It is imperative to note that computer science is one of the subjects that will help to attain the aim of Nigerian Tertiary Education, which among others include, preparing students with the knowledge and skills for self-reliance and the world of work, promoting national and international understanding and interaction (Nigeria Education Research and Development Council, [NERDC], 2015). The NERDC also emphasizes the need to include information technology in the general study courses for students so as to expose them to all round improvement in university education. However, certain factors contributed to the problems encountered in the teaching of computer in schools. Sometimes the lecturers may not know the right approach to use for a particular topic and the technique used may not really appeal to the interest of the learners (students). Some of the students may get confused at the end of such lesson. Okekeokosisi & Okeke (2015) suggested that any teaching method to be used by lecturers should win learners (university undergraduate) attention and interest. Learners (university undergraduates) performance perhaps will depend on the method of teaching used in instruction. This will make lecturers (teachers) to strive for effectiveness by applying appropriate teaching method. This is in line with the views of Igboanugo (2013), Amaefule (1999) and Conway (1997)

that lecture method (conventional method) of teaching is not effective since learners are not actively involved.

Gender is another issue of interest in students' performance in the teaching / learning process. The concept of gender, according to Okeke (2007), Eniayeju in Onyeneho, Iheikena & Onyeme (2015) refers to as the biological differences between man and woman. The gender has his or her socially or culturally constructed characteristics and roles which are asserted to it in any society. Gender roles are created by a society and are learned from one generation to the next as part of a society's culture. In the context of teaching-learning, it implies roles that are related to male and female issues. In this study, it concerns male and female performance. Okafor in Okekeokosisi & Okeke (2015) advised that gender discriminations should not affect teaching-learning of students for their actual performance. Yet research findings revealed that some methods of teaching appeal to males more than females.

Finally, the enhancement of teacher effectiveness in the teaching of computer programming lead the researchers to find out the male and female students' perception on the teaching of computer programming using varied methods of teaching by their lecturers in the South-South Nigerian Federal Universities.

Statement of the Problem

The Nigerian educational programme lays emphasis on science and technology, and computer science is required to be in fore front for this dream to materialize. Computer programming is one of the courses in Computer Science programmes housed in Computer Science Department (Faculty of Physical Sciences) and spread to Computer and Electronics Department (Faculty of Engineering), Vocational Education and Science Education Department (Faculty of Education), yet students find it difficult to understand this all important course. Therefore, computer science teaching and learning calls for all stakeholders in educational sector to show concern for the methods of teaching computer programming. For the teaching-learning of computer programming in higher institution to be effective, the lecturers are required to consider the most effective methods of teaching these students, so as to improve on their performance. Hence, the problem of this study is 'what is the undergraduate students' perception on the methods of teaching computer programming in the South- South Nigerian Federal Universities?

Purpose of the Study

The aim of the study was to determine the Undergraduate students' perception of the methods of teaching computer programming in the South-south, Nigerian federal universities. Specifically, the study sought to find out:

1. The perceptions of the university undergraduates on teaching methods employed by their lecturers in teaching computer programming.
2. The mean perception of male and female university undergraduates on the teaching methods employed by their lecturers.
3. The factors influencing the choice of method of teaching computer programming in the universities

Research Questions

1. What are the teaching methods employed by lecturers in the teaching of computer programming as perceived by undergraduate students?

2. What are the mean perceptions of male and female university undergraduates on the teaching methods employed by their lecturers in teaching computer programming?
3. What are the possible factors influencing the lecturers' choice of method of teaching computer programming as perceived by undergraduate students?

Hypotheses

1. There is no significant difference between the mean ratings of male and female undergraduates on their perception of methods employed by their lecturers in teaching computer programming ($P < 0.05$).
2. There is no significant difference between the mean ratings of male and female undergraduates on the factors influencing their lecturer's choice of method of teaching computer programming in the university ($P < 0.05$).

Method

The study adopted a descriptive survey research design. The population consisted of all university undergraduate students in South – South Nigerian Federal Universities offering computer programming courses. The sample comprised 1000 university undergraduate students (350 males and 650 females). Proportionately stratified random sampling technique was used to sample three out of five Nigerian federal universities out of the 5 Nigerian federal universities in south – south geopolitical zone. In each of the three Nigerian federal universities, 10% of the population of undergraduate students offering computer programming courses housed in Computer Science Department (Faculty of Physical Sciences), Computer and Electronic Department (Faculty of Engineering), Vocational and Science Education (Faculty of Education) were used for the study. Thus, a sample of 1000 university undergraduate students was drawn and used for the study. Researchers made 21- item structured questionnaire titled Lecturers Teaching Method Questionnaire (LTMQ) was used for data collection. The instrument consisted of three clusters which dealt respectively on method of teaching adopted by lecturers, gender perception on the teaching methods employed by lecturers, possible factors influencing lecturers' choice of method. The instrument was structured on a four point rating scale of Strongly agree (SA) – 4points, Agree (AG) – 3points, Disagree (DI) – 2points, Strongly Disagree (SD) – 1point. The instrument was validated by three experts; two have taught computer programming for at least five years and one educational methodology expert. The instrument was trial-tested on computer science undergraduates that did not form part of the sample. It had appropriate psychometric qualities. The questionnaire was administered to the respondents by the researchers with the help of two research assistants. The copies of questionnaire were retrieved on the spot, thus ensuring 100% return. Research question one was answered using percentage while research questions two and three were answered using mean and standard deviation. The cut-off mark for decision making on the research questions was 2.50. This implies that an item with a mean rating of 2.50 and above shows that the item was agreed upon by the respondents, otherwise the item stood disagreed. The two null hypotheses were tested at 0.05 level of significance using t-test statistics. The decision was not if the t-calculated is less than the t-table value, the hypotheses is accepted, otherwise it is rejected.

Results

The results of the study were presented according to the Research questions and Hypotheses as shown in Tables 1 to 5.

Research Question 1: In the opinion of university undergraduates, what are the teaching methods employed by lecturers in the teaching of computer programming?

Table 1: Percentage responses of university undergraduates on methods employed by Lecturers in teaching computer programming.

S/N	Methods of Teaching	Yes	No
1	Demonstration	72 (7.2%)	928(92.8%)
2	Discussion	361(36.1%)	639 (63.9%)
3	Learning by Inquiry	27 (2.7%)	973 (97.3%)
4	Lecture	100 (100%)	0 (0%)
5	Guided discovery	0 (0%)	1000(100%)
6	Practical	0 (0%)	1000(100%)
7	Project	270 (27%)	730(73%)
Total	7	1730(24.7%)	5, 270(75.3%)

Table 1 reveals that all the university undergraduates perceive that their lecturers teach them with lecture method (100%) and never teach them with guided discovery and practical method (0%).

Research Question 2: What are the mean perceptions of male and female university undergraduates on the teaching methods employed by their lecturers in teaching computer programming?

Table 2: Mean and Standard Deviation on the Students' Perception on the Teaching Methods Employed by their Lecturers in Teaching Computer Programming

S/N	Methods	Gender	\bar{X}	SD	Decision
1	Demonstration	Male	1.53	0.11	Disagree
		Female	1.05	0.09	Disagree
		Total	1.29	.010	Disagree
2	Discussion	Male	2.03	0.08	Disagree
		Female	2.85	0.09	Agree
		Total	2.44	0.09	Disagree
3	Learning by inquiry	Male	1.20	0.09	Disagree
		Female	1.02	0.10	Disagree
		Total	1.11	0.10	Disagree
4	Lecture	Male	4.00	0.00	Agree
		Female	4.00	0.00	Agree
		Total	4.00	0.00	Disagree
5	Guided discovery	Male	1.93	0.06	Disagree
		Female	1.86	0.07	Disagree
		Total	1.90	0.07	Disagree
6	Practical	Male	1.00	0.00	Disagree
		Female	1.00	0.00	Disagree
		Total	1.00	0.00	Disagree
7	Project	Male	2.52	0.14	Agree
		Female	1.64	0.16	Disagree
		Total	2.08	0.15	Disagree
	Total	Male	1.93	0.06	Disagree
		Female	1.86	0.07	Disagree
		Total	1.90	0.07	Disagree

From Table 2, both male and female university undergraduates said that they were taught with lecture method which is in item 4. They jointly disagreed with items 1, 5 and 6 as teaching methods not employed by their lecturers during instructional delivery. This can be attested from their various mean scores.

Research Question 3: What are possible factors influencing the lecturers' choice of method of teaching computer programming in the university?

Table 3: Mean and Standard Deviation of Respondents on Possible Factors Influencing the Lecturers Choice of Method of Teaching Computer Programming in the University

S/No	Items	\bar{X}_1 of male	\bar{X}_2 of female	SD ₁ of male	SD ₂ of female	Decision
15	Age of the University Undergraduate	3.34	3.30	0.10	0.11	Agree/Agree
16	Development level of the University Undergraduate	3.18	3.15	0.101	0.12	Agree/Agree
17	What the University Undergraduates already know	2.90	2.85	0.10	1.12	Agree/Agree
18	What the students need to know to succeed with the Lesson	2.00	2.10	0.10	1.15	Disagree/Disagree
19	The subject matter content	2.96	2.90	0.10	0.12	Agree/Agree
20	The objective of the lesson	4.00	4.00	0.00	0.00	Agree/Agree
21	Instructional material	2.10	2.20	0.30	0.26	Disagree/Disagree
Total		20.48	20.5	0.80	2.88	
Cluster\bar{X}		2.93	2.93	0.11	0.41	Agree/Agree

In the Table 3, the respondents agreed on items 1-3, 5 and 6 as possible factors influencing the lecturers' choice of method of teaching computer programming in the universities. They equally disagreed with items 4 and 7 as not the possible factors influencing the lecturers' choice of method of teaching computer programming in the universities. However, since the majority of the values were greater than the cut-off mark of 2.50, therefore, items that ranged from the cut-off mark and above were agreed as indicated in the decision column. From the cluster \bar{X} for males (2.93) and females (2.93) which are greater than the cut-off mark (2.50), it implies that the items ranging from the cut-off mark and above were agreed as possible factors influencing the lecturers' choice of method of teaching computer programming in the universities.

HO₁: There is no significant difference between the mean ratings of male and female undergraduates on their perception of teaching methods employed by their lecturers in teaching computer programming.

Table 4: The t-test of the mean ratings of male and female undergraduates on the teaching methods employed by computer science lecturers

Gender	\bar{X}	SD	N	df	t-cal	t-crit	Decision
Male	1.93	0.06	350	998	0.07	1.960	Not rejected
Female	1.86	0.07	650				

The t-cal is 0.07 at 998 degree of freedom while the t-crit is 1.960. The null hypothesis of no significant difference between the mean ratings of male and female undergraduates on their perception of teaching methods employed by computer science lecturer was rejected

HO₂: There is no significant difference between the mean ratings of male and female undergraduates on the factors influencing their lecturers' choice of method.

Table 5: The t-test of the undergraduate responses on the influencing factors on lecturers' choice of method

Gender	\bar{X}	SD	N	df	t-cal	t-crit	Decision
Male	2.93	0.11	350	998	0.00	1.960	Not rejected
Female	2.93	0.41	650				

The level of significance used for the hypothesis 2 is 0.05 as seen in Table 5. The t-cal is 0.003 at 998 degree of freedom. The t- crit is 1.960. The null hypothesis of no significant difference between the mean ratings of male and female undergraduates on the factors influencing lecturers' choice of method was not rejected.

Discussion

The analysis of the teaching methods employed by lecturers in the teaching of computer programming shown in Table 1 indicated that lecture method is predominantly used. This can be attested by its percentage "Yes" of 100%. By implication, the method was not effective. This is in line with the findings of the study carried out by Igboanugo (2013) that peer-teaching is significantly more efficacious than the conventional teaching method (lecture method) in teaching difficult chemistry concepts. Students' achievement and interest are boosted when taught difficult chemistry concepts using the peer-teaching which is learner-centered and more active than the conventional teaching method. Students can learn difficult chemistry concepts when they are actively involved (Conway, 1997). The conventional teaching encourages rote learning which is not suitable for learning the abstract difficult chemistry concepts (Amaefule, 1999). In addition, the result of the research carried out by Okekeokosisi (2013) pointed out that learners taught with constructivist instructional model perform high and retain higher than those taught with lecture method.

The analysis on the students' perception on their lecturers' choice of method as presented in Table 2 pointed out that the male and female students had the same total mean (2.08) respectively in the gender perception test on computer science lecturers' choice of method. This implies that all the items were accepted as university undergraduate perception on the teaching methods employed by their computer science lecturer. Anyiam and Onwe in Okekeokosisi and Okeke (2015) suggested that the teacher should ensure that any teaching method to be used be such that it can win the attention and interest of pupils. This is because attention and interest are indispensable as far as effective teaching is concerned. It is also with the suggestion made by Ngwoke (1995) that practice aids memory and leads to strong intent and achieve competence. In addition, when students are actively involved in teaching-learning process, more energy is liberated towards such and it finally leads to high achievement and interest in the subject matter content. Adesina & Fagbemiye in Okekeokosisi & Anekwe (2015) defined who a teacher is. "A teacher is and will continue to be both the major indicator as well as the major determinant of quality instruction". The assertion was supported by Ifelunni (2014) as he went further to define who a teacher is and his functions. A teacher is one who has acquired the requisite content and pedagogical skills needed to facilitate learning. The functions of a teacher as listed by Ifelunni

(2014) include; a facilitator of learning, a motivator, a guidance, counselor, a role model that inspire the students.

Table 3 analysis on the possible factors influencing lecturers' choice of method showed that the items ranging from the cut-off mark and above were accepted as factors influencing lecturers' choice of method. The factors influencing lecturers choice of method should be avoided during instructional process. University undergraduates are the centre of curriculum implementation while lecturers are the curriculum implementers. They have to be considered. Okigbo & Okekeokosisi (2014) suggested that during instructional delivery, the teacher is expected to take cognizance of the learner's age and stages of development. Besides, the learners' pervious experiences are to be considered for effective learning. This can lead to process new experiences.

The analysis of the hypotheses in Tables 4 and 5 respectively imply that there is no significant difference between the mean ratings of male and female undergraduates on their (Table 4). There is no significant difference between the mean ratings of male and female undergraduates on lecturers' choice of method of teaching computer programming (table 5). This supported the assertion early made by Okafor in Okekeokosisi & Okeke (2015) that gender discrimination should not affect teaching –learning of students for their actual performance.

Conclusion

The findings of this study reveals that one way to effectively delivery of a computer programming courses and achievement of stated objectives is to allow the use of practical exercises. University undergraduates will also practicalize what they have been lectured, thus moving them, creating excitement in university undergraduates, improving their attitude and positive performance towards computer programming courses. This will in effect enhance the production of quality graduates (programmers) and future Nigerian lecturers who also are oriented towards values necessary for self-reliance.

Educational Implications

Lecture method (conventional method) of teaching that is constantly use by lecturers are acquiring inferior results when compared with the modern and revolutionary teaching methods that are available for use during instructional delivery. Greater university undergraduate interaction is encouraged, the boundaries of authority are being broken down and a focus on enjoyment over grades is emphasized. Lecturers are encouraged to use appropriate teaching methods that are making impact.

Recommendations

For lecturers to experience high performance of university undergraduates in computer programming courses, the following are recommended;

- Authorities in the universities should monitor the methods of teaching employed by their lecturers
- Lecturers in the universities should attend seminars and conferences that deal with higher education pedagogical or didactical skills.

References

Amaefule, A.A. (1999). The Comparative effects of two teaching methods on students achievement in chemistry. *Journal of Gombe Technical Education*. 2(1);59-66.

- Anyiam, J. & Onwe, S. (2001). *Prince and Practice of Education*. Enugu: Global Rays Academic Publisher.
- Conway, J. (1997). Educational technology education effect on model of instruction, copland. Retrieved from <http://copland.ude.edu/conway/eds.66.htm>
- Farlex, C.C. (2012). *Computer Programming*. US: Princeton University, Farlex Inc.
- Giraldo, J.P. (2016). Copy of Copy of Programming. Retrieved from <https://prezicom/.../copy-of->
- Henderson, H. (2004). *Career Opportunities in Computer and Cuberspace*. New York. Checkmark books.
- Ifelunni, C.S.I. (2014). Teacher education today for Nigeria tomorrow. *Matriculation Lectures*. Federal College of Education (Tech) Asaba, Delta State.
- Igboanugo, B.I.K. (2013). Effects of peer-teaching on students' achievement and interest in senior secondary school difficult chemistry concepts. *International Journal of Educational Research*, 12(2), 61-71.
- Mifflin, H. (2011). *American Heritage Dictionary of the English Language*. (fifth Edition) USA: Harcourt Publishing Company. Retrieved from [www. The freedictionary.com/programming...](http://www.thefreedictionary.com/programming...)
- Ngwoke, D.U. (1995). *Developmental Psychology and Educational Theories, Issues and Trends*. Enugu: Magnet Business Enterprises.
- Nigeria Education Research and Development Council, NERDC (2015). *National Policy on Education*. Lagos: NERDC Press.
- Nwafor, O. (2007). *Educational Innovation: Process and Products*. Enugu: Magnet Business Enterprises.
- Nwankwo, I, N. (2014). *Learner- Centred Classroom and Instructional Management*. Awka: Love-Isaac Consultancy Services.
- Okeke, C. (2008). Effect of Simulation-Game in Students Performance in Christian Religious Studies. *A Masters Thesis*, Imo State University, Owerri.
- Okekeokosisi, O.C & Okeke, C.N.A. (2015). The Effect of constructivist teaching approach on students' academic achievement, gender and interest in junior secondary schools Agricultural Science subject. *Contemporary Journal of Empirical Research*. 1(1); 105-125.
- Okekeokosisi, O.C. & Anekwe, M.C. (2015). Extent of the use of computers in teaching Science, Technology and Mathematics (STEM) as perceived by STEM teachers in Anambra State. *Journal of Empirical Research in Science and Technology Education (JERSTE)*. 4(1); 89-99.
- Okigbo, E.C. & Okekeokosisi, O.C. (2014). Effectiveness of constructivist instructional model in enhancing secondary school students' achievement in computer science. *International Journal of Education, Science and Public Policy in Africa (IJESPPA)*. 3(1), 1-9.
- Onyeneho, C., Iheikhena, I.C. and Onyeme, E. (2015). Gender Issues in mathematics education and human capital development. *Research and Development Journal (REDEJ)*. 4(1), 19-26.
- Osita, E. (2014). *Principles of C++ Programming*. Awka: De-Emeralds printing and Publishing.
- Owodunni, A.S. and Hassan, A.M. (2015). Competencies needed by vocational and technical teachers towards the development of entrepreneurial skills in students. *International Journal of Educational Research*. 12(2), 296-311.
- Pujari, S. (2015). Computers: Essay on the importance of Computer in the Modern Society. Retrieved from www.yourarticlelibrary.com/.../computer....

- Ugwu, B. (2006). *Computer the Easy Way for Beginners*. Umunze: Annyco Publishers.
- Umendu, E.C (2005). *Know Your Computer at a Glance*. Umunze: Annyco Publishers
- Unachukwu, G.C. and Ebenebe, R.C. (2009). *Developmental Psychology and Education*. (2nd Edition.). Enugu: Agatha Series Publishers Limited.