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Assessment Of The Level Of Achievement Of Students In Computer Studies In Senior Secondary Schools In Bayelsa State, Nigeria

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ABSTRACT
The study assessed the level of achievement of students in homes with personal computers and those in homes without personal computers in computer studies in the cognitive and psychomotor domains among senior secondary schools in Bayelsa state. Two research questions and two hypotheses were formulated to guide the study. The study employed a descriptive, ex-post facto research design. The population was all the 12,441 students in public senior secondary school in their final year of study in Bayelsa state. The multistage sampling technique which involved a proportional stratified procedure and a simple random sampling technique were used to arrive at a sample of 380 students. The instrument for data collection was the West African Examination Certificate (WAEC) computer studies 2020 past question. The reliability of the instrument was established through the test re-test method. The results obtained from the test administered was scored and graded into five-point range of very low, low, average, good and excellent with a mean standard or range of 0-1, 1.1-2, 2.1-3, 3.1-4, 4.1-5 respectively. The study revealed a significant difference in the level of students' achievement in cognitive and psychomotor domain, between students with personal computer and those without personal computers. It recommended that government should ensure the provision of all necessary infrastructural facilities that will enhance the teaching of computer studies in public senior secondary schools in Bayelsa State.
Keywords: Assessment, Socio-economic status, Achievement, Computer studies, Cognitive domain, Psychomotor domain.

INTRODUCTION

Education is the bedrock for technological and economic development of any nation. The National Policy on Education (Federal Republic of Nigeria [FRN], 2014) viewed education as an instrument par excellence for effecting national development. The immense educational potential of information technology also implies that all students would need it to play central role in their future careers and have a great advantage in the labour market and to be able to search for valid information relating to their academic activities. The recent development in the Nigerian educational sector that demonstrate a certain level of information and communication technology (ICT) application in secondary schools, prompted the Federal Government of Nigeria in the National Policy on Education to recognize the prominent role of ICTs in the modern world. To this effect, computer studies was introduced into our educational system by the Federal Government (FRN, 2014). In the light of this, the policy states that 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, 2014). At the Junior Secondary School, Computer Studies has been made a pre-vocational elective while it is a vocational elective subject at the Senior Secondary School.

Computer Studies is the study of the theory, design, use and analysis of computer devices. This entails knowing the computer itself, its operation, what it can do, how it can do it and why it is doing it, these forms the basis of computer studies curriculum in senior secondary school (Oribhabor, 2020). The West African Examination Council Computer Studies syllabus is developed from the National curriculum for Senior Secondary School Computer Studies. The objectives of the syllabus are to test candidates' proficiency in both the cognitive and psychomotor aspects of learning in Computer Studies (WAEC Computer Studies Syllabus, Page 1, 2020).

The aspect of assessment of the student level of achievement in computer studies as indicated by the syllabus cut across the three domains of learning which are the cognitive, affective and the psychomotor domain. The cognitive domain basically deals with the acquisition of information and transforming it into knowledge after being subjected to reasoning. In other words, it is known as the thinking domain or the head in the taxonomy of education (Kasilingam, Ramalingam & Chinnavan, 2014). It focuses more on the intellectual ability than the other two domains. It comprises of knowledge, comprehension, application, analysis, synthesis and evaluation. Kasilingam et al (2014) further posited that the cognitive domain is the core of the learning domain. This assertion about the cognitive domain has led to more emphasis being laid on the cognitive aspect thereby neglecting other aspect of learning. The over concentration on the cognitive domain by classroom teachers who lack expertise in test construction can be seen in the mode of assessment among students in achievement in classroom instruction. Noor, Saim, Alias and Rosil (2020) attributed the over dependence of teacher's assessment of students achievement on cognitive domain as a result of lack of knowledge in test construction. Opong (2006) posited that teachers who are not experts in test construction find it difficult to withstand the rigor involved in constructing and validating achievement test that cut across all domains of learning, hence the emphasis on the cognitive aspect which is more easier to construct when compared to the psychomotor domain. Nworgu (2015) on his part asserts that most of the achievement tests constructed by the unskilled classroom teachers are narrow in scope. Instead of the teachers to consider all the aspects of learning, they narrow their assessment of student on the cognitive aspect. The teacher made test are expected to prepare the students for standardized achievement test in their Senior Secondary School Examination (SSCE). However, it has been observed that the teacher made test which are unreliable and invalid have failed to prepare students for the standardized achievement test such as the West African Examination Council or the National Examination Council (Osadebe, 2015).

The psychomotor domain focuses on performing tasks which involves motor activities from the lowest level to a specified level of accuracy. It is concerned with the learners' ability to acquire and apply the motor skills or manipulation of objects or activities (Kasilingam et al, 2014). The psychomotor domain comprises of perceptions, set, guided response, mechanism, complex overt response, adaptation and origination. Assessment of students' achievement in computer studies would not be comprehensive or complete if the teachers failed to assess or evaluate students' skills in psychomotor domain. However, due to lack of professional test construction in Secondary Schools, most of the classroom teachers only focuses on the cognitive aspect of students' achievement thereby neglecting one of the most important aspect of student's achievement in computer studies which is the psychomotor skills. As it has been observed, the over dependence on the cognitive aspect of assessment among students in computer studies could be attributed to some factors which includes but not limited to lack of computer hardware, lack of qualified teachers, inadequate electricity supply among others.

The importance of student's academic success in computer studies cannot be over emphasized. Students Computer skills would boost academic standing of seniors in secondary schools through use of internet to search for educational materials related to their academics and would help them greatly in their academic pursuit. Computer skills, no doubt, is the foundation of good academic excellence. Processed information would be relevant to students and would improve their overall academic performance. This is also applicable to Senior Secondary School Students in Bayelsa State, Nigeria.

The Federal Government, through the National Policy on Education (FRN, 2014) promised to provide the basic necessary infrastructure for effective implementation of Computer Studies/ICT in schools, however, in most of the schools, it has been observed that computer components and other

infrastructures are unavailable. Okwudishu (2005) showed that the unavailability of computer/ICT facilities in schools have impacted adversely on the teachers who teach computer studies within a classroom. In order to prepare students for computer education, there is need for computer/ICT facilities to be available in all the schools. In Bayelsa State, the Government have built computer/ICT resource centres in some of the secondary schools, however, the centres are yet to be equipped with the necessary Computer/ICT facilities for effective teaching/learning activities (Osadebe &Ojukonsin, 2018). The unavailability of computer accessories in most of the schools makes it difficult for students to gain practical knowledge on how to perform basic computer applications and have negatively affected their performance in Standardized Computer Studies achievement test (Nwokocha, Akanwa & Nwokocha, 2015).

To possess sophisticated computer skills technically involves mastery of the senior secondary education syllabus on computer studies. The syllabus of the WAEC is normally reviewed once in three years. The objectives of the syllabus are to test candidates' understanding, knowledge and acquisition of basic concepts of computer and its operations; manipulative, computational and problem-solving skills; application of software packages; operation of computer-related simple devices; on-line skills and their applications; safe attitudes and good practices on effective use of computer; potential for higher studies in Computer related areas. The objectives can only be achieved by students if the necessary Computer/ICT facilities are put in place and training of teachers for the proper implementation of ICT in the modern world is put into reality in accordance with the policy statement from the Federal Government (FRN, 2014). Students who have achieved high computer skills especially in psychomotor domain will find it easy to partake in any Computer Based Test than their counterpart with low computer achievement or skills. However, there are problems that hinder students from achieving the computer skills in senior secondary education in Bayelsa State.

A major hindrance in schools across the Federation is that most teachers after covering their content areas, scheme of work or syllabus, especially from the senior secondary level, usually resort to assess the students with unreliable and invalid tests (Osadebe, 2015). The unreliable test is often used to prepare the students for their Senior Secondary Certificate Examination (SSCE) which is conducted by the West African Examination Council (WAEC) or National Examination Council (NECO). Osadebe (2015) further posited that the poorly designed tests affect students' interest and achievement.

Another issue affecting the degree of achievement among students in computer studies especially in the psychomotor aspect among students in senior secondary schools is lack of computer and ICT facilities in schools for practicals. Most schools in Bayelsa State do not possess ICT facilities for use by educators and students in carrying out practical lessons to bring what has been taught in the cognitive aspect into the psychomotor aspect of learning (Osadebe & Ojukonsin, 2018). Few schools that have computer sets and internet facilities hardly make it accessible to students. The fact that students are only taught theory (cognitive aspect) of computer appreciation and not practical makes it difficult for them to comprehend what is being taught. Studies have shown that students achievement in computer studies between cognitive and psychomotor domains varies.

Noor, Saim, Alias and Rosli (2020) investigated students performance on cognitive, psychomotor and affective domains in the course outcome for embedded course and the purpose of the study was to assesses the performance of students in the domains of learning. The results of their study indicated that students performed better in the psychomotor and affective domain compared to the cognitive domain. Sonmez (2017) also conducted a study on the association of cognitive, affective, psychomotor and intuitive domains in education. The study's objective was to evaluate students' performance using the domains of learning and high levels of significance were found in the study and positive correlation among cognitive, psychomotor, affective and intuitive learning outcomes.

The socio-economic status of parents contributes to the variations observed in computer studies among undergraduate students as observed by Fust-Bowe (2005). Most students with parents of high socio-economic status often possess their own laptops and with this, understanding of computers technology is enhanced unlike the students from homes of low economic status. They may not be exposed to this form of knowledge prior to their admission into the university. So, there exists difference at the entry point; while some students already have a pre-knowledge of the computers,

others may be touching computers for the first time at university. The same applies to students facing computer based assessment. Oladunjoye and Benwari (2014) observed in their study that the socio-economic status of students affects their exposure to computer resources.

Statement of the Problem

Students' level of achievement in the cognitive and psychomotor domains in computer studies may vary. While some students may achieve high in both cognitive and psychomotor domains, others may likely achieve in only one aspect of the domain of learning. This could be attributed to a lot of challenges or problems which include but not limited to, lack of computer hardware and software, lack of qualified or trained teachers, lack of electricity, expensive nature of computer accessories especially for students with low socio-economic background., lack of internet in rural areas amongst others (Osadebe & Ojukonsin, 2018). It is against the backdrop of the perceived challenges in computer studies in secondary education highlighted above that the problem of the current research centres on the degree achievement of students at senior secondary schools in computer studies in cognitive and psychomotor domain in Bayelsa State.

Research Questions

The following research questions were answered:

1. What is the cognitive achievement level of students who have personal computers at home and students without personal computers at home in computer studies in Senior Secondary Schools in Bayelsa State?
2. What is the psychomotor achievement level of students with personal computers at home and students without personal computers at home in computer studies in Senior Secondary Schools in Bayelsa State?

Hypotheses:

The following null hypotheses were formulated and tested at 0.05 level of significance

Ho$_1$: There is no significant difference in the cognitive achievement level in computer studies between students with personal computers at home and students without personal computers at home in senior secondary schools in Bayelsa State?

Ho$_2$: There is no significant difference in the psychomotor achievement level in computers studies between students with personal computer at home and students without personal computers at home in senior secondary schools in Bayelsa State?

RESEARCH METHODS

The *Ex-Post-Facto* research design of a descriptive study was employed in the study. The population of the study comprised of all the 12,441 final year students in 205 senior secondary schools in Bayelsa State.The sampling technique used in the study was the multistage sampling procedure involving the use of a proportionate stratified sampling technique and a simple random sampling procedure. In the first stage, the proportionate stratified technique which involve the application of an appropriate percentage in the procedure in the selection of proportionate number of participants from each stratum (Senatorial District) was used. This resulted to Bayelsa Central with 51% student, Bayelsa East with 20% student, and Bayelsa West with 29% student thus making a total sample of 100%. In the second stage, 380 participants from 30 schools through simple random sampling technique was employed resulting to a sample size of Bayelsa Central with 194 students in 14 (46%) schools, Bayelsa east having 76 students in 9 (31%) schools and Bayelsa west having 110 students in 7 (23%) schools totalling to 380 students in 30 schools.

The researcher adopted the WAEC computer studies 2020 past question as the instrument. The Objective multiple based choice questions served as the cognitive instrument and the practical questions served as the psychomotor instrument. The instrument consisted of three sections – A, B and C. Section A sought information on the respondents Socio-demographic variables which includes Location, Gender, Socio-economic Status, section B consists of 50 objective multiple-choice questions (50 marks) while section C consist of 3 practical questions (50 marks).

The research instrument was a standardized achievement examination constructed by the West African Examination Council which has undergone all the processes involved in the development of an achievement test, hence it was deemed valid. The reliability was established using the test re-test method. The instrument was administered to fifty (50) students who were not part of the sample for

the study. After an interval of two weeks, the same instrument was re-administered to the same respondents and scores were recorded. The two sets of scores were analysed using the Pearson Product Moment Correlation Coefficient statistics and it was established at 0.98 and 0.91 for both cognitive and psychomotor domains of learning respectively which shows that the items in the instruments were reliable.

Scores of participants was converted into five-point standard or range as follows:

35-50 = Excellent = 5 points
30-34 = Good = 4 points
25-29 = average = 3 points
20-24 = low = 2 points
0-19 = very low = 1 point

Thus, a response mean of 2.10 to 3.00 was taken as average achievement level in computer studies. That is, mean of 3.10 and above was regarded as above average and taken as acceptance of high level of achievement in computer studies, a mean of 1.10 to 2.00 was considered as low level of achievement of students in computer studies and a mean score of 1.00 and below was interpreted to be very low level of achievement of students in computer studies. However, students whose scores falls into the range of low and very low are said to be below average achievers in computer studies.

PRESENTATION AND ANALYSIS OF RESULTS

Research Question 1: *What is the cognitive achievement level of students with personal computers at home and students without personal computers at home in computer studies in Senior Secondary Institutions in Bayelsa State?*

Table 1: Mean rating of cognitive achievement level of students with personal computers at home and students without personal computers at home in computer studies in Senior Secondary Institutions in Bayelsa State

Socioeconomic background	Frequency (N)	Percentage (%)	Mean ($\bar{x}$)	Std. Deviation	Level of achievement	Remark
Students with computer	81	21.3	3.96	0.86	Good	Above average
Students without computer	299	78.7	3.08	0.88	Good	above average
Total	**380**	**100**				

Table 1 shows the mean rating of cognitive level of achievement of students with personal computers at home and students without personal computers at home in computer studies in Senior Secondary Schools in Bayelsa State**.** The result shows that high socio-economic status background students with personal computers at home and low socio-economic status background students without personal computers at home are good with a mean rating of 3.96 and 3.08 respectively. This indicates that both students from high socio-economic background that have computers at home and students from low socio-economic background without personal computer at home are above average in computer studies in the cognitive domain.

Research Question 2: *What is the psychomotor achievement level of students with personal computers and students without personal computers in computer studies in Senior Secondary Schools in Bayelsa State?*

Table 2: Mean rating of psychomotor achievement level of students with personal computers and students without personal computer in computer studies in Senior Secondary Schools in Bayelsa State

Socioeconomic background	Frequency (N)	Percentage (%)	Mean ($\bar{x}$)	Std. Deviation	Level of achievement	Remark
Students with computer	81	21.3	2.27	1.28	Average	Average
Students without computer	299	78.7	1.29	0.63	Low	below average
Total	**380**	**100**				

Table 2 shows the mean rating of psychomotor achievement level of students with personal computers and students without personal computers in computer studies in senior secondary schools in Bayelsa state. The result shows that the mean of students with personal computers and students without personal computers was 2.27 and 1.29 respectively. This indicates that students with personal computers psychomotor achievement level in computer studies were average and students without personal computer psychomotor achievement level in computer studies in senior secondary schools in Bayelsa state were below average.

Hypothesis 1

There is no significant difference in the cognitive achievement level in computer studies between students with personal computers and students without personal computers in senior secondary schools in Bayelsa State?

Table 3: Analysis of independent sample t-test on the cognitive achievement level in computer studies between students with personal computers and students without personal computers in senior secondary schools in Bayelsa Stat

Variables	**N**	$(\bar{x})$	**Std. Deviation**	**Df**	**t-cal**	**Sig. (2 tailed)**	**Decision**
Students with computer	81	3.96	0.86				
				378	8.137	0.000	significant
Students without computer	299	3.08	0.88				

Table 3, showed the independent sample t-value of 8.14 and a p-value of 0.001. Testing the hypothesis at an alpha level of 0.05, the p-value of 0.001 was less than the alpha level of 0.05. Therefore, the null hypothesis was rejected. This implies that there is a significant difference in the cognitive level of achievement in computer studies between students with personal computers from high socio-economic background and students without personal computers from low socio-economic background in senior secondary schools in Bayelsa State.

Hypothesis 2

There is no significant difference in the psychomotor achievement level in computer studies between students with personal computers and students without personal computers in senior secondary schools in Bayelsa State?

Table 4: Analysis of independent sample t-test on the psychomotor achievement level in computer studies between students with personal computer and students without personal computer in senior secondary schools in Bayelsa State

Variables	**N**	$(\bar{x})$	**Std. Deviation**	**Df**	**t-cal**	**Sig. (2 tailed)**	**Decision**
Students with computer	81	2.27	1.29				
				378	6.658	0.000	significant
Students without computer	299	1.29	0.63				

Table 4, showed the independent sample t-value of 6.66 and a p-value of 0.001. Testing the hypothesis at an 0.05 alpha level, the p-value of 0.001 was less than the 0.05 alpha level. Therefore, the null hypothesis was found to be false. This implies significant difference in the psychomotor achievement level in computer studies between students with personal computers from high socioeconomic status and students without personal computers from low socioeconomic status in senior secondary institutions in Bayelsa State.

DISCUSSION OF FINDINGS

Research question 1 and 2 (table 1 and table 2) findings showed the achievement level in cognitive and psychomotor domains in computer studies between students with personal computers at home and students without personal computers at home. The results in research question seven (table 1) indicated that the grand mean was 3.96 and 3.03 respectively for students with personal computers and student without personal computers in the cognitive domain in computer studies. This revealed that student's with personal computers cognitive achievement level in computer studies is higher than

student's without personal computers cognitive achievement level in computer studies in senior secondary institutions in Bayelsa state. Also, the results in research question eight (table 2) on the psychomotor achievement level in computer studies between students with personal computers and students without personal computers in senior secondary institutions in Bayelsa state indicated that the grand mean is 2.27 and 1.29 respectively. This revealed that students with personal computers psychomotor achievement level in computer studies is higher than students without personal computers psychomotor achievement level in computer studies in senior secondary institutions in Bayelsa state.

Findings in hypothesis 1 and 2 (table 3 and table 4) further showed that there was a significant distinction in the achievement level between students with their personal computers and those without personal computers. The results are in in agreement with the result of Jackson and Schmitt (2001) who disclosed that students with personal computers from higher socioeconomic background produced better results in computer studies than their ccounterparts without personal computers from lower socioeconomic background. The findings also complies with that of Oladunjoye and Benwari (2014) who observed that students with personal computers at home from high socioeconomic standing are more exposed to computer skills than student without personal computers at home from low socio-economic background. Students with personal computers at home are in no doubt exposed to the system often even if they are not exposed to it in school, especially in computer software packages which they have not been exposed to in school.

CONCLUSION

The study revealed that there was a significant achievement level in computer studies in Bayelsa state between students with personal computers and those without personal computers. The study therefore concludes that to improve student's achievement level in computer studies, government should make provision of sufficient computer facilities among senior secondary institutions that will enhance the effective computer sstudies teaching and learning in all senior secondary institutions in Bayelsa State.

RECOMMENDATIONS

Considering the study's findings, it is thereby recommended that, the state government in collaboration with other stakeholders such as multinational oil companies, should ensure adequate provision of computer sets and other infrastructural facilities that will enhance the teaching/learning of computer studies in senior secondary schools in Bayelsa state.

REFERENCES

Federal Republic of Nigeria (2014). National policy on education (6_{th} edition) NERDC Press, Lagos.

Furst-Bowe, J. (2005). An analysis of Required Computer Competencies for University Students. *Journal of Research on Computing in Education*, 28, (2) 175-89.

Kasinlingam, G., Ramalingam, M. and Chinnavan, E. (2014). Assessment of Learning Domains to Improve Students Learning in Higher Education. *Journal of Young Pharmacists*, 6(4), 27-33

Nkwocha, P. C. Akanwa, U. N. & Nkwocha, N. C. (2015) Challenges encountered using cbt by 2015 utme candidates in Owerri zone one, Nigeria. Test validity implications. JOSR Journal of research & method in education (JOSR-JRME) 5 (1) 28- 35.

Noor, N.M., Sam, N.M, Alias, R. and Rosil, S.T. (2020) cognitive Domain of Performance for Non-Laboratory Embedded Course. *International Journal of Learning, Teaching and Educational Research*. Vol 9 (4).

Nworgu, B.G. (2015). *Educational Research: Basic issues and methodology*. Nsukka: University Trust Publishers.

Okwudishu, C. H. (2005). Awareness and use of information and communication technology (ICT) among village secondary school teachers in Aniocha South Local Government Area of Delta State. Unpublished B.Sc (LIS) Project Delta State University.

Oladunjoye, P. & Benwari, N.N. (2014). Computer Literacy among Undergraduate Students in Nigeria Universities. *British Journal of Education*. 2(2): 1-8.

Opong, K.N. (2006). *Construction and Validation of Economics Achievement Test*. Unpublished M.Ed. Dissertation; Delta State University, Abraka, Nigeria

Oribhabor, C.B. (2020). Investigating the Influence of Computer Anxiety on the Academic Performance of Junior Secondary School Students in Computer Studies in Nigeria. *International Journal of Computing Sciences Research*. Department of Guidance and Counseling, Faculty of Arts and Education, University of Africa. 4(4):370-382

Osadebe, P.U. & Ojukonsin, T.B. (2018). Assessment of Computer Studies Teachers' Constraints in the use of Information and Communication Technology. *International Journal of Advance Research*. 6(7):246-277

Osadebe, P.U. (2015). Construction of Valid and Reliable Test for Assessment of Students. *Journal of Education and Practice*. 6(1)

Sonmez, V. (2017). Association of Cognitive, affective, Psychomotor and Intuitive Domains in education, Sommez Model., University Journal of Educational Research, 5(3), 347-356