

Study behaviour and students' achievement in selected science subjects amongst secondary school in Anambra State, Nigeria

JohnBosco O.C. Okekeokosisi, School of Secondary Education (Science), Federal College of , Education (Technical), Asaba, Delta State, Nigeria, gentlejack10@yahoo.com

Nkechi T. Nchikwo, Department of Computer and Robotics Education, Nwafor Orizu College of Education Nsugbe, Anambra State, Nigeria, Nkechi.nchikwo@nocen.edu.ng

Chioma S. Mbaegbu, Department of Science Education, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria.

Abstract

The need to improve the performance of students in selected science subjects necessitated this study. Study behaviour are learning tendencies that influence performance either positively or negatively. The study investigated the study behaviour of secondary school students in relation to their achievement in selected science subjects (biology, chemistry and computer studies). The study adopted correlational descriptive research design. The population comprised of all science students in senior secondary schools in Anambra State. Purposive sampling technique was used to select senior secondary two (SS2) students because they have been exposed to selected science subjects and they are not examination class. Simple random sampling balloting without replacement was used to select one hundred and eighty (180) science students in senior secondary two (SS2) schools drawn from two educational zones were biology, chemistry and computer studies are offered in external examination in the state. The population also constituted the sample. Two instruments were used for data collection- a study behaviour inventory and the second was the test scores of students in the respective science subjects from their second term examination results. Mean and standard deviation were used for analysis. The results revealed that students have good study behaviour with reference to all the study behavior examined. It was recommended amongst others that teachers should adopt teaching strategies that will promote students' meaningful learning of science subjects.

Keywords: Study behavior, Achievement, Science subjects

Introduction

The word "science" is derived from the latin word, "scientia" which means "Knowledge". Science is seen as a process of thinking, a means of acquiring new knowledge and a means of understanding the natural world. Okigbo and Okekeokosisi (2014) defined science as activities culminating into a testable and verifiable body of knowledge. Science according to Nwala (1997) is seen in three main ways as; a body of knowledge, a method for acquiring knowledge or studying and understanding the world and as institution. Bradford & Hamer (2022) summarized the definition of science as the systematic and logical approach to discovering how things in the universe work. It is also the body of knowledge accumulated through the discoveries about all the things in the universe. This x-rays science as a systematic investigation of nature and its environment.

Science as a body of knowledge comprises of chemistry, biology, physics, mathematics, agriculture, microbiology, pharmacy and medicine. They are subjects taught in schools. These subjects are interrelated to each other. Science subjects undergo basic steps for knowledge acquisition. Such steps are observation, problem definition, hypothesis formulation, experimentation, conclusion and theory formulation. The various basic steps mentioned are utilized by experts to engage in the study and for the development of human knowledge.

Nigeria as a developing country adopted education as an instrument par excellence for effective socio-economic and technological development. One subject in science education that doubles in occupying central position for scientific and technological enhancement is computer studies. Computer studies is a subject taught in both primary schools, junior secondary as basic science and technology. It is as well taught in senior secondary and tertiary institutions of learning. The subject is therefore of great value and highly an indispensable tool in all human endeavours. This is why Wright (2019) stated that technology has struggled to find position into the

classroom in all sorts of ways, from projectors and televisions to computer laboratory and student laptops. Along with improving the way students are taught, it is also virtually important that students learn to use computers to improve their own work and prepare for careers in a world where computers have become as common as the pencil and paper. Computer studies has been defined in diverse manners. Onah (2018) described computer studies as a subject organized to enable people understand the function, uses and limitations of computer and to provide an opportunity for the study of the modern methods of information processing. It is a science of using electronic devices to develop applications that help to solve diverse human problems in every field of experiences be it in banking, transport, building, agriculture, education and communication system. It is an aspect of vocational, science and technology education which gears towards introducing individuals to the global world (Okekeokosisi & Okigbo, 2019). It is of great value and indispensable in all aspects of human endeavours. Hence, computer studies is very important for logical, critical thinking and sound reasoning, life-long learning and for self-reliance.

The importance of computer studies to human life has been emphasized in the National Policy on Education. The Federal Republic of Nigeria (FRN, 2013) included computer studies as one of the vocational, science and technological education (VSTE) subject in secondary schools. The FRN emphasized the aims of computer studies to include life-long learning, entrepreneurship development and job creation. Accordingly, computer studies as one of the core subjects offered at the senior secondary school prepares students for meaningful living in the society as well as for further education. Thus, the teaching of computer studies should gear towards inculcating in the students those manipulative and experimental skills necessary to make students be competent and confident for life-long learning, self-reliance and for technological advancement of our country Nigeria.

Biology is one of the science subjects offered in senior secondary schools. The subject is important to humanity and its environment (Federal Republic of Nigeria (FRN, 2013). It is the science of life that deals with living matter, structure, function and behaviours of organism. It is concerned with evolution, distribution and taxonomy of life (Bilesanmi-Awoderu, Afuwape & Jolaosho, 2017a). Biology is the corner stone in every nation's technology and industrial development (Bilesanmi-Awoderu, Afuwape & Jolaosho, 2017b). Hence, its curriculum is planned such that the teacher is compelled to use activity oriented, learner-centered approach to meet the needs of the learners. Effective teaching and learning of biology cannot be achieved without good study behavior, positive and meaningful interaction between the learners, teacher, learning materials and the learning environment (Nzewi & Nwosu in Adebajo & Omoniyi, 2018). While Biology has been seen as important to science of life chemistry is that science that explains ones everyday life and happenings. Thus, the researchers motivate to embark on this study.

Chemistry is a science subject that studies the structure, composition, interaction, transformation and energy consequences of changes in matter. Chemistry as a science subject has immeasurable intrinsic and utility values in all aspects of human activities. Achimugu (2018) defined chemistry as a powerful tool for converting natural resources such as agricultural based materials into products of industrial and economic importance. Achimugu further pointed out that through application of chemistry, we increase agricultural production, improve the health of our people, develop new sources of energy and utilize petrol and natural gas. Chemistry is concerned with identifying common materials around us and then turning them around into more useful products hence, plays important role in influencing the rate of economic and technological development.

In spite of the roles of biology, chemistry and computer studies in national development, evidence in literature and that of available Chief Examiners' Report of WASSCE May / June 2019-2022 revealed that candidates performed woefully in the following topics of the respective subjects. In Biology, candidates could not explain components of the nervous system, could not differentiate between structural features and physiological features. Technical terms and scientific words were wrongly spelt. In addition, many candidates failed to adhere to the guidelines regarding biological drawings. Candidates could not adequately explain food preservation facilities such as silos and refrigerators. In chemistry, candidates were unable to distinguish between dehydrating agent and drying agent, the use of kinetic theory of matter to explain how solids change when heated, elemental analysis of organic compounds, the formation of the dipolar ion (Zwitterion) by amino acids under acidic and alkaline conditions, inability to state the correct observation of simple experiment (eg. Precipitates were incorrectly described and inferences stated did not correspond to observations recorded), inability to outline how recrystallization is carried out in the laboratory. Most candidates were unable to define atomic radius, identify specific tests for various organic compounds, differentiate between ions and atoms while in computer studies, most candidates – performed slightly average and showed weaknesses as having little understanding of the content of the subject matter, specifically in logic operations, basic programming, inability to differentiate between types and examples of computer virus, unable to answer questions involving number bases and writing basic instructions, unable to draw logic gates, difficulty in discussing the history of computer and lack knowledge

on the function of registers. Other weaknesses include poor handwriting, spelling mistakes and poor knowledge of computer keywords.

The summary of Chief Examiners' Report of WASSCE May / June 2019-2022, shows that greater percentage of students performed slightly average in the above stated selected science subjects in the WASSC examination. The subjects are not the same in form but are related in substance. These subjects promote human and societal development. Thus, the need to find out students study behavior in correlation of their achievement in these selected science subjects.

Study behaviour can be referred to as the tendency of a student to learn in a systematic and efficient way. It is the organization, control of the strategies for learning, devotion of time and attention to acquire information or knowledge either through books, media and the like (Magdalena, 2015). However, knowledge can be acquired or configured either by cognitive, affective or psychomotor depending on the learners' ability (Negovan, 2010). To study is hard hence, study behaviour is stated to include finding quiet location to study, taking breaks, setting goals and taking practice tests (Coursera, 2023). It can be seen as all necessary learning strategies - methods to efficiently manage learning. It is an approach through which the learner has for learning materials, his environment and management of time to determine his academic success or achievement. Furthermore, the present society is a competitive society where the principle of struggle and survival of the fittest exists. Pen has become mightier than sword. Study behaviour is therefore a process from which an individual gets proper input to feed his hunger and to quench his thirst for knowledge. Adewuyi and Akinade (2010) affirmed that study behaviour is of great importance in actualizing the potentialities of the individual which can be influenced by situation or circumstances. Proper study behaviour enables an individual to reap a good harvest in future. Thus, good study behaviour promotes learner to develop himself, think about himself, his environment and how his mind learns for better achievement.

Good study behaviour leads to high academic achievement while bad study behaviour leads to poor academic achievement, as there is direct relationship between good study behaviour and academic achievement (Satapathy & Singhal, 2000). Good study behaviour can be defined as personal strategy or strategies which a learner applies for acquiring knowledge, skills, ideas and competencies (Jemide, 2001). According to Mendezebal (2013) good study behaviour is the pattern of habit or behaviour adopted by students in the pursuit of their studies that serve as the vehicle of learning. It is the degree to which the students engage in regular acts of studying that are characterized by studying routines such as review of material, frequency of studying session occurring in an environment that is conducive to studying. Azikwe in Akporehwe and Billy (2018) summarized good study behaviour as the adopted way and manner by which a student plans his/her private readings after classroom learning so as to attain mastery of the subjects. According to them, mastery of the subject leads to higher achievement. This portrays the role good study behaviour plays in students' academic achievement. Ramamurti in Kumar, Ahsan and Negi (2017) emphasized that despite possessing good intelligence and personality, the absence of good study behaviour hampers academic achievement. Thus, Drew (2023) summarized study behaviour as the consistent practice and approach to *study* on a regular basis, to enhance academic performance. Therefore, good study behaviour plays important role in developing learning, shaping individual learners towards proper thinking method leading to creating new ideas for societal development.

Statement of the Problem

Science as the bedrock of other subjects is relevant to other fields of study and to humanity. The advancement of science ushers in development to the world. The knowledge of the concept promotes career development in the field of science, vocational, engineering and technology. Thus, the selected subjects require to be taught by competent teachers who can guide students towards achieving the desired educational goal. Fortunately, an attempt to address this unsatisfactory situation, experts in the field of education have come up with so many factors that could predict students' performance such as: assignment and homework, time allocation, note taking, study periods procedure, concentration, written work, reading speed, test examination anxiety management and consultations. In view of the aforementioned suspected factors that could predict students' performance, students' academic achievement is still attributed to study behavior. Hence, it is this gap in knowledge that this study seeks to fill.

Purpose of the Study

1. The study seeks to determine the study habits of Senior Secondary Two (SS2) science students
2. The study seeks to access the extent to which study behaviour influenced students' achievement in science subjects

Research Questions

Three research questions were raised for investigation as followed;

1. What are the study behaviour of senior secondary two (SS2) students in science subjects?
2. What are the mean achievements of the students in Biology, Chemistry and Computer studies?
3. What is the relationship between the study behaviour of the students and the achievement in Biology, Chemistry and Computer studies?

Method

Two research methods were adopted in this study. The first was the survey designed where opinion on the type of study behaviour adopted was sought from respondents. The second was the ex-post-facto research design where previous test scores of students in science subjects were obtained. The population comprised of one hundred and eighty (180) senior secondary two (SS2) science students drawn from two educational zones where computer studies is offered in external examination in the state.

The population also served as the sample size. Two instruments were employed in this study in order to address the research questions. The first was a study behavior inventory. The inventory consisted of (8) sections A-H on different aspects of study behaviour in form of statements followed by three (3) options which had been selected based on two inventories presented by Bakare (1972) and Wren in Nwala (2021). The students were expected to choose the option which best described their study behaviour. Test scores in biology, chemistry and computer studies from their second term examination results were obtained from their respective form teachers. The inventory was validated by two experts in Educational Psychology and Measurement and Evaluation. A reliability index of 0.73 was obtained using PPMC after the inventory was tested on a group comparable to the sample under investigation.

Data Collection

The study behaviour inventory was administered to the students in government owned schools from the sample schools. Sections A-G of the inventory contained 5 items each while section H contained only three items. All the items contained three categories of responses namely: almost never, sometimes and almost always with a weight value of (1) through (3) depending on how the response was favorable or unfavorable statements.

Scoring

For positively structured items, the marks were assigned as follows always never-1, sometimes 2, and almost always-3. For negative structured items the marks were reversed as follows almost never-3, sometimes-2, almost always-1. The maximum score on the 42 items on the inventory was 129 while the minimum was 43. Mean scores of students obtained from both the inventory and test scores were computed to answer the research questions.

Results

Research Question 1: What is the mean scores of the study behaviour of the students?

Table 1: Summary of mean scores of the study behavior of students

S/N	STUDY BEHAVIOUR	\bar{X}	SD
1	Assignment and homework	79.33	12.69
2	Time allocation	72.64	14.02
3	Note Taking	63.66	12.41
4	Study periods procedure	73.17	13.45
5	Concentration	68.40	12.92
6	Written work	70.30	12.29
7	Reading speed	66.68	37.84
8	Test examination anxiety management	72.36	13.57
9	Consultations	68.73	16.83
Mean of means		70.52	

From Table 1, it portrays that students have good study behavior with reference to all the study behavior examined, with mean higher than 60.

Research Question 2: What are the mean achievements of students in biology, chemistry and computer studies?

S/N	Selected Science subjects	\bar{X}	SD
1	Biology	53.31	21.05
2	Chemistry	46.19	15.55
3	Computer studies	48.14	14.75
Mean of means		49.21	

Table 2 revealed the achievement level of the students in the three subjects. Among the three subjects, biology had the highest mean value of 53.31 which was slightly above 50 while others had not up to average 50.

Research Question 3: What is the relationship between the study behaviour of students and their achievements in biology, chemistry and computer studies?

S/N	Science subjects	Mean of means
1	Study behavior	70.52
2	Selected Science subjects	49.21

In Table 3, it showed that the mean of means of the students' study behavior was 70.52 which was above the acceptable value of 60%. It x-rayed good study behavior of students generally. For the achievements of students in biology, chemistry and computer studies, its mean of means showed 49.21 which was below acceptable value of 50%. This summed the achievement of students to be generally below average.

Discussion - Conclusion

The findings of the study revealed that the study behaviour of the students were generally good. This can be viewed from the scores obtained in each study behavior inventory. Result in Table 1 supports the findings of Sunday and Akporehwe (2022) that good study behavior promotes academic performance while bad study behavior contributes to poor performance of students in examinations. Since the study habits of the students were assessed to be generally good, it was expected that the achievement of the students in the science subjects such as biology, chemistry and computer studies would be high, but that was not the case, as the students' mean achievements were below the accepted value of 50, as the mean of means was 49.21. This explained the fact that, it is not just one variable that determines students' achievement. Their low achievements could be as a result of the teachers' factor such as teaching strategy adopted by the teachers. In sufficient or in adequate number of qualified and well trained science teachers, teachers' attitude and unavailability of instructional materials, in sufficient number of qualified laboratory staff and well equipped laboratories for biology, chemistry and computer studies. Atsuwe and Moses (2017) added that academic achievement of a student is also dependent on the efforts they put into study even though it is not the singular variable that exerts influence on academic performance. This is however at variance with Mendezabal (2013) findings that students with less favourable study behaviour have low performance and vice versa. The assertions of Obomanu and Akporehwe (2012) corroborates the findings of this study that students' performance in the sciences is low. This indicates that the teaching and learning of science has a complex relationship of so many variables for the process to be successful. Therefore all hands must be on deck, from the government to the teachers, students, parents, administrators and all stakeholders, to bring about effective teaching and learning of science.

The findings of this study have shown that the students study behaviour of the sampled schools were generally good. That is they have good study behaviour ranging from assignment and homework, time allocation for study, note taking, study period's procedure, concentration, written work, reading speed, test/examination, anxiety management and consultation. But it was found out that the achievements of students in the science subjects of biology, chemistry and computer studies were low. This brings to mind that there are so many variables that make science teaching and learning to be successful, that will lead to the students' achieving high in both internal and external examinations. Therefore, such variables like well-equipped separate laboratories for biology, chemistry and computer studies, qualified and well trained science laboratory personnel, good instructional materials and facilities and well trained qualified science teachers. This should be made possible for an effective teaching and learning for science.

Recommendations

The following recommendations were made based on the findings:

1. Parents should encourage their children to study at home
2. Study room should be provided for day students at their respective homes
3. Teachers should also encourage the students to study in school
4. Teachers should use appropriate teaching strategy to ensure effective teaching and learning
5. Instructional materials should be provided in schools
6. Good and well equipped laboratories should be provided for biology, chemistry and computer studies.

References

- Adewuyi, T.D.O. & Akinade, E.A. (2010). Perception and attitudes of Nigerian women towards menopause. *Procedia social and Behavioral Science*, 5; 1777-1782.
- Akporehwe, N.J. & Billy, J.M. (2018). Study habits and students' achievement in science amongst secondary school in Bayelsa State, South-South Nigeria. *International Journal of Education and Evaluation*, 4(6);70-76.
- Atsuwe, B.A. & Moses, N.I.(2017). Influence of study habits on the academic performance of physics students in Federal university of agriculture Makurdi, Nigeria. *International Journal of Educational Studies*, 4(2);25-35.
- Bakare, C.G.U. (1972). *Study habits inventory manual. Psycho educational Research Production*. Ibadan: Johnm of printers.
- Bradford, A., & Hamer, A. (2022). Science and the scientific method: Definitions and examples. Retrieved on 15th December, 2023 from <https://www.livescience.com/20896-science-scientific-method.html>
- Chief Examiners Report (2019-2022). *West African senior secondary certificate examination*. Awka, Anambra State
- Coursera, G. (2023). Good study habits to development. Retrieved on 10th April, 2023 from <https://www.coursera.org>
- Drew, C. (2023). 27 Good Study Habits of Straight-A Students. Retrieved on 15th December, 2023 from <https://helpfulprofessor.com/good-study-habits/>
- Federal Republic of Nigeria (2013). *National Policy of Education*. 6th Ed. Yaba: NERDC Press.
- Jemide, W.I. (2001). *Attitudes to student educational advancement*. Ibadan: Dolan publishers.
- Kumar, A., Ahsan, M. & Negi, R. (2017). A study of relationship between study habits, intelligence and testing anxiety among senior secondary school students. *International Educational Journal*, 3; 163-168.
- Magdalena, S.M. (2015). The relationship of learning styles, learning behavior and learning outcomes at the Romanian students. *Procedia Social and Behavioural Science*, 1667-1672.
- Mendezabel, M.J.N. (2013). Study habits and attitudes: The road to academic success. Retrieved on 8th April, 2023 from [www.open science repository](http://www.open-science-repository.org).
- Negovan, V. (2010). *Psihologia invajarii. Forme, Strategii si stil*, ed. All.a, Bucuresti: Editura Universitera.
- Nwala, T.U. (1997). *History and philosophy of science*. Nsuka: Niger Books and Publishing co.Ltd.
- Nwala, L. (2021). Study habits and academic achievement of integrated science students in Rivers State, Nigeria. *GSI*, 9, Issue 8; 1991-2014.
- Obomanu, B.J. & Akporehwe, J.N. (2012). The effect of home related science activities on student performance in basic science. *World Journal of Education*, 2(1); 131-136.
- Okigbo, E.C. & Okekeokosisi, O.C. (2014). *Nature and history of science*. Awka: Fides communications.
- Okekeokosisi, O.C. & Okigbo, E. C. (2019). Effect of think-pair-share instructional strategy and gender on secondary school students' achievement in computer studies. *SEJRS*, 1(1);37-44.
- Onah, N.J. (2018). Difficulties in teaching computer studies in Enugu East Local Government area of Enugu State. Retrieved on 8th April, 2023 from <http://eprints.gouni.edu.ng>
- Satapathy, S. & Singhal, S. (2000). Mental health of visually and hearing impaired adolescents. *Journal of Personality and Clinical studies*, 16(2); 119-127.
- Sunday, E.I. & Akporehwe, N.J. (2022). Study habits and academic performance of science education undergraduates in River State University, Nigeria. *Journal of Education, Society and Behavioural Science*, 35 (1); 1-10.