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A Review of English Language Proficiency and Academic Performance in Science Subjects among Senior Secondary School Students in Nigeria

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Abstract
English language proficiency and academic performance in science subjects among senior secondary school students in Nigeria was reviewed. The aim was to find out the relationship between students' performance in English in relation to their performance in sciences. Numerous peer-reviewed studies were examined and relevant information related to the topic were compiled. Most of the authors said designating a foreign language to teach sciences and mathematics, without providing the necessary support and opportunities to develop adequate language proficiency, has resulted in structural barriers that especially disadvantage and marginalize students from economically depressed groups; thus, sustaining what has been termed as 'linguistically structured inequalities.' Also, most of the authors observed that the performance of students in Mathematics' examination at Senior Secondary School Certificate Examination (SSCE) is poor but further stated that the performance in English is more impressive than that of Mathematics and this they linked to poor reading ability. It is then suggested that there is need to

improve the teaching of English language to improve performance in science subjects and Mathematics' education. This work showed that competency in English significantly determines performances in aptitude or academic tests.

Keywords: English Language, Proficiency, Performance, Science Subjects, Mathematics.

Introduction

English language as the official medium of classroom instruction in Nigerian secondary schools has tended to affect students' academic performances greatly because the language is foreign to the students. A student who has a problem with communication skill may likely not do well academically which is why the English language is very important in the Nigerian educational system (Aina *et al*., 2013). Since 1960, English has dominated all other languages in all sectors (Ogunmodimu, 2015), especially the education sector. The Nigerian education system is divided into primary, secondary, and tertiary education. The Federal Ministry of Education and Ministry of Education at States and Local Government level take responsibility for implementing government policy on education.

The role of English in the Nigerian education sector is outlined in the National Language Policy on Education (2004), which states that English is the only medium of instruction at all levels of education.

Despite the importance attached to the English Language, and efforts made by stakeholders in the educational sector to optimize the learning of the English Language as a school subject, students' achievement in the English Language appears not to commensurate to the investment made in it. There has been a fall in students' academic achievement in the English Language over the years as compared to other subjects in the school system (Attah and Ita, 2017). The multi-lingual and multi-cultural nature of Nigerian polity on the one hand and the absence of a national unifying indigenous language on the other have led to the adoption of English language as a medium of intra-national and inter-national communication (Fakeye and Ogunsiji, 2009). More importantly, the English language has become the pivot on which the educational wheel of Nigeria rotates. Language is the medium of instruction for all school subjects from the primary school level to the university, in addition to being a

compulsory school subject that must be passed at all levels of education in Nigeria (Ajufo, 2007). The poor performance of students in the English language at public examinations in recent times has been explained as a major cause of the decline in academic achievement and standard of education in Nigeria (Fakeye and Ogunsiji, 2009). Fakeye and Ogunsiji (2009) observed that having difficulties in grasping fully the contents and concepts of the various subjects of the curriculum taught in the target language (English language) seems to be one of the most serious problems that English proficient language students faced in their particular course of study. This is the same problem with Nigerian English proficiency language students whose performance in the various school subjects at public examinations is nothing to write home about. Language proficiency refers to the degree of competency in a certain language. English proficiency is a student's ability to use the English language to make and communicate meaning in spoken and written contexts while completing their programme of study.

The Objective of this Review

The objective of the review is to find out the performances of science students in English language in relation to their performances in science subjects.

English Language Proficiency of Senior Secondary School Students and their Performance in Biology

The importance of English language for enhancing educational attainment through improved communication ability can never be over emphasized. Students who have so much difficulties with their communication skill in English language may not function effectively, not only in English language but in their academic and this is no reason than the fact that English language in Nigeria today is the language of text-books and the language of instruction in schools. According to Aina *et al.* (2013), when Students' Proficiency in English Language is high, it will definitely affect and improve the academic performance of such students. Nevertheless, where the proficiency in English is lacking in any academic setting, it will definitely lower the academic performance of such students Biology is a science subject which aims at equipping students with appropriate scientific skills,

attitudes, competences and ability to apply scientific knowledge to every challenge of life. Biology is a natural science that deals with the living world (Ojufo, 2007). Yilshik *et al*. (2020) posited that the subject Biology excites intellectual curiosity, increases awareness of fragile ecosystem and stimulates critical thinking. Aina *et al*. (2013) stated in his findings that there is a strong correlation between English Language proficiency and students' academic performance in science course especially Biology. Also, according to Joyce (2022), the higher the English language proficiency levels of the students are the higher their achievement level in science. The study further concludes that students' English language proficiency could be a predictor in the students' academic performance in Science, Mathematics and English since the medium of instruction used in the teaching of the said subjects is English. The English language is the world's current lingua franca. It is the language of communication around the globe which is extensively spoken and written language (Joshi, 2013). Bibi *et al*. (2021) further describes the significance of English skills students doing engineering courses may face difficulty to make their career global if they fail to communicate efficiently in English. The main reason behind this value given to the English language is that English enjoys the status of the present world lingua franca for international trade & exchange, air travel, and technology. According to Joyce (2022), the importance of the English language for enhancing educational attainment through improved use of rules and conventions which are used to explore and communicate meaning can never be overemphasized. Students who hardly comprehend the English language may not perform well not only in English subjects but also in other subjects taught in English such as Science e.g. Biology. Laura (2018) said English language learner students often struggle to correctly and consistently apply cognitive strategies to aid and assist their comprehension and understanding of text throughout their reading. Not only would English language learner students benefit from strategic instruction in metacognitive literacy strategies, but they also require literacy instruction that strategically maximizes their first language literacy proficiencies to benefit from the transference of existing literacy skills and conceptual knowledge.

According to Jack (2018), the English language has a complex status in today's world. For some people, it is acquired as a first language. For some, it may be learned at school, and be essential for academic and professional success. For others, it may represent a subject that they are required to study in school, but for which they have no immediate need. And English means different things to people in different parts of the world. For some, it may arouse positive feelings – as the language of pop culture, the media and social networking. For others, it may have associations with colonialism, elitism or social and economic inequality. English today has a unique status, as a consequence of the role it plays around the world and its function as an 'international' or 'world language'. It has been described as the world's lingua franca. Although some 380 million people are said to speak it as a first language in countries like Australia, Canada, the United States and Great Britain, a further 600 million people use it, alongside other languages, as a 'second language' – in countries like Nigeria, India and the Philippines. And another one billion people are said to be studying it, at any one time, as a 'foreign language', in countries like China, South Korea, France, Germany, Russia and Spain. English is learned for many different reasons. It may be an essential tool for education and business for some learners; it may be the language of travel and related activities of sightseeing for others; and it may be needed for social survival and employment for new immigrants in English-speaking countries. For some, it may be a popular language for the media, entertainment, the internet and other forms of electronic communication. For many, however, it may merely be a language that they are obliged to study, but which they may never really have any obvious need for. Despite the emphasis on learning English in many parts of the world, it is worth remembering that many people can survive perfectly well in their own countries without ever having to use English (Jack, 2018), and that fluency in English does not necessarily offer learners any social or economic advantage.

English Language Proficiency of Senior Secondary School Students and their Performance in Chemistry

The Nigerian education sector has faced several challenges that have affected students' performance in science subjects. One of these challenges has been the continual weak performance of students in WASSCE. Unsatisfactory WASSCE results have been a source of great concern to stakeholders in the education sector for over a decade (Olayide, 2012). According to Chinda and Pepple (2021), Within the framework of science education, Chemistry has been recognized as an essential school subject and its significance in the scientific and technological growth of any country has remained extensively reported. The significance of the acknowledgement given to Chemistry in the advancement of the individual and the country is that it is made a core subject among the natural science and other science-related courses in the Nigerian education system. Its inclusion as a core subject in science in secondary schools calls for the necessity to teach it efficiently. Nbina (2013) said despite the relative importance of chemistry, it is very disappointing to note that the performance in the subject at both internal and external examinations has remained constantly poor and the trend of students 'performance has been on the decline. Some of the variables that may be responsible for these may be curriculum related variables and instructional materials related variables and improper presentation of the subject. This is because real science teaching can lead to the achievement of scientific and technological prominence. Wiki (2012) said that English proficiency is a student's ability to use English to make and communicate meaning verbally and in writing during the course of learning. Proficiency in English can be defined as English language learners' communication, information, ideas and concepts necessary for academic success whose first language is a language other than English and who is unable to perform ordinary classroom works in English. According to Edwin (2015), Language proficiency is the ability of an individual to speak or perform in an acquired language. Lack of English proficiency is commonly regarded by policy makers and educators as the major cause of language minority students' academic failure in English only programs. Thus, it is assumed that students require bilingual

instruction only until they have become proficient in English. Logically, after students have become "proficient in English", any difficulties they might encounter in an English only program cannot be attributed to lack of English proficiency. Laura (2018) explained that Cognitive academic language proficiency also can address the benefits of language specific skill transfer across languages. If a learner has attained a high level of cognitive academic language proficiency in their dominant language, but possesses low language proficiency in English, it is possible that the language-specific skill or concept can still transfer, thereby enabling the learner to understand and interact within a familiar academic concept in a language reduced environment.

This is also known as the interdependence hypothesis. It is important to note that this transferability of language-specific skills across languages is reliant upon additional factors including student motivation, affective or emotional state, and level of prior experience with the content and learning setting (Cummins, 1980). This means that students with adequate development of their dominant language can effectively and strategically apply that knowledge to enable them to decipher the same concept framed within the new or target language. Edwin (2015) said English language proficiency is presumed to be one important contributor to the unexplained variance of the differences in academic achievement between Hispanic English language learners and native English language speaking students. According to Cummins, high order English language proficiency or cognitive academic language proficiency enables the student to learn in a context, which relies heavily on oral explanation of abstract or decontextualized ideas. This is often the context in which high school science is taught, with unfamiliar events or topics being described to students with little or no opportunity to negotiate shared meaning. It has been stated, that students who have not yet developed higher order English language proficiency or cognitive academic language proficiency will be at a disadvantage in such settings. According to Olanipekun *et al*. (2014), good language proficiency in English language may be a positive predictive validity variable on the performance of students on intelligence test. This and asserted when it was discovered that the measurements of intelligence tend to reflect the learner's

mastery of language and in this sense English language. It was on this note that while lamenting on the poor performance of students in West African Examination Council (WAEC) said that the matter is serious because of the influence English has on all the other subjects of the curriculum which invariably pointed at the notion that students' success in English language could influence the overall performance of students in other disciplines. Nevertheless, where the proficiency in English is lacking in any academic setting, it could lower the academic performance of such students. Yet, students' academic performance in English language or General English as the case may be is worrisome and awfully poor further revealed that lack of proficiency in English language is one of the factors contributing to poor performance in Mathematics. In his research, he observed that the performance of students in Mathematics' examination at Senior Secondary School Certificate Examination (SSCE) is poor and this he linked to poor reading ability (Olanipekun *et al*., 2014).

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English Language Proficiency of Senior Secondary School Students and their Performance in Mathematics

The educational system adopted by Nigeria is the 6:3:3:4 system of education where the child spends 6 years in primary school, 3 years respectively in junior and senior secondary school and 4 years in the university as the case may be. At every

stage of the child's education, emphasis is laid on numeracy and English language which is seen as a basis for cognition and a determinant/predictor of student's academic achievement (Magaji and Umar, 2015). In our match towards scientific and technological advancement, we need nothing short of good performance in Mathematics at all levels of schooling. Unfortunately, performance of students in Mathematics at the end of secondary education has not improved in the past decade as revealed by Tella (2007) The argument has been that Mathematics boosts students' arithmetical reasoning and English language for effective communication. These two subject areas are core and a sin-quo-non for understanding all subjects taking by the student including Financial Accounting. Numerical ability is associated with intellectual capacity of the individual, hence the emphasis on a credit pass in Mathematics and English language, which serves as pre-requisite or a precondition for admission into Nigerian universities. According to Atanda (2011), at the secondary level of education, there are compulsory subjects that students must offer because of their status in the curriculum, not minding whether such students are in science, commercial, arts or social science class. These are Mathematics, English Language, Biology, Economics and one of Nigerian languages. Out of these subjects, Mathematics and English Language are very essential for students to gain admission into institutions of higher learning. According to the study carried out by Henry *et al*. (2024) to examined how well English proficiency predicted mathematics scores and how well gender, SES, and grade level moderated the influence English proficiency on mathematics scores. Multiple regression analyses provided strong evidence of English proficiency as a strong predictor of performers in mathematics scores. Accordingly, students' access to higher levels of disciplinary literacy in mathematics can be constrained by their level of foreign language proficiency, which may very well restrict their access to dominant discourses and employment opportunities in a highly technological global economy. According to Younes *et al*. (2023), designating a foreign language to teach science and mathematics, without providing the necessary supports and opportunities to develop adequate language proficiency, has resulted in structural barriers that especially

disadvantage and marginalize students from economically depressed groups; thus, sustaining what has been termed as 'linguistically structured inequalities.

English Language Proficiency of Senior Secondary School Students and their Performance in Physics

Physics is a course that student usually performed poorly in all level of education in Nigeria. Aina and Olanipekun (2014) observed that Physics is a science subject in which students usually perform poorly at the senior school certificate examination. Kola (2007) worried about the alarming rate of students' failure in physics and called for an investigation into its causes. Many scholars have worked on the causes of poor performance in physics coming out with different results; however not many have been said about the influence English language has on academic performance of physics students. Moor *et al*. (2012) observed that girls scored low in Advance Placement (AP) examination than boys in calculus and chemistry examinations. Wanbugu *et al.* (2013) posited that there is gender differences in student performance in physics favouring male students in Kenya schools. Aina (2013) submitted that male students performed better than female among college of education students in Nigeria. In the opinion of Aiyelabegan (2003) poor performance in Physics may be due to a number of fundamental reasons, which could be due to shortage of science teachers in quality and quantity, inadequate laboratory equipment and facilities, poor motivated teaching strategies and shortage of suitable Physics textbooks and other factors. It was also observed that lack of interest in physics by students due to preconceived idea that physics is a difficult subject has affected the enrolment and performance of students in physics.

Aiyelabegan (2003) observed that attitude, approach of students and teachers to Physics, inadequacy of practical equipment, unconducive environment and lack of qualified teachers to teach practical works as factors affecting student performance in Physics. Apata (2007) confirmed that students taught by qualified and experienced teachers performed better than students taught by unqualified and inexperienced teachers in his study on the influence of teachers' academic

qualification and experience on students' performance in senior secondary school physics. Ogunbiyi (1986) investigated that many secondary school students are not familiar with some of the laboratory apparatus and are not able tell when such apparatus should be used and the experiment, we use them for.

According to Aina (2013), the importance of English language for enhancing educational attainment through improved communication ability can never be over emphasized. Students who have so much difficulties with their communication skill in English language may not function effectively, not only in English language but in their academic and this is no reason than the fact that English language in Nigeria today is the language of text-books and the language of instruction in schools. When students' proficiency in English Language is high, it will definitely affect and improve the academic performance of such students. Nevertheless, where the proficiency in English is lacking in any academic setting, it will definitely lower the academic performance of such students. vehemently, revealed that lack of proficiency in English language is one of the factors contributing to poor performance in Mathematics. In his research, he observed that the performance of students in Mathematics' examination at Senior Secondary School Certificate Examination (SSCE) is poor but further stated that the performance in English is more than that of Mathematics and this he linked to poor reading ability. He then suggests that there is need to improve the teaching of English language to improve Mathematics' education. His work proved that competency in English significantly determines performances in intelligence or academic tests.

Conclusion

Based on the review, it was concluded and observed that the performance of students in Mathematics' examination at Senior Secondary School Certificate Examination (SSCE) is poor but their performance in English is more impressive than that of Mathematics. It is then suggested that there is need to improve the teaching of English language to improve performance in science subjects and Mathematics' education. This work showed that competency in English significantly determines performances in aptitude or academic tests.

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