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EMOTIONAL INTELLIGENCE AS A CORRELATE OF SENIOR SECONDARY SCHOOL STUDENTS' ACADEMIC ACHIEVEMENT IN BIOLOGY IN AWKA SOUTH EDUCATION ZONE

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Abstract

The study investigated emotional intelligence as a correlate of senior secondary school students' academic achievement in Biology in Awka South Education Zone. Three research questions were developed to guide the study. Three null hypotheses were formulated and tested at 0.05 level of significance. Correlational research design was used for the study. The population of the study comprised 1,956 students' of senior secondary school two (SSII) in Awka South Education Zone. Simple random sampling technique was used in selecting the sample for the study. The sample size for the study comprised 100 SSII Biology students'. The research instrument was Students' Grade Chart on Biology in Senior Secondary Schools (SGCBSSS) and adapted Emotional Intelligence Questionnaire (EIQ). The questionnaire was validated by two experts from the Department of Science Education and one specialist in Education Measurement and Evaluation, Faculty of Education, all in Nnamdi Azikwe University, Awka. The reliability of the instrument was carried out using test-retest method and calculated using Spearman's Correlational Coefficient and a value of 0.76 was obtained. The data collected were analysed using Linear Regression and Regression ANOVA for hypotheses. The findings of this study revealed that there was a low positive relationship between the students' emotional intelligence and their academic achievement in Biology. The findings of the study also revealed that there was no significant relationship between the male and female students' emotional intelligence and their academic achievement in Biology. Based on the findings, it was recommended, among others, that educational administrators should adopt policies and educational programmes that support social and educational learning. In addition, teachers should be able to recognise and understand their own

emotions as well as the emotions of their students in order to create conducive classroom learning experience.

Keywords: Emotional intelligence, academic achievement, Biology

Introduction

Education has been an instrument of transformation. It is a matchless asset of fundamental importance to man and his environment. According to Nwosu in Agbasi, (2023), education is a process by which an individual acquire many physical and social capabilities demanded by the society of their origin. There are several fields in education such as vocational education, physical health education, education management, economics education, business education, lingual education, adult education, early childhood education and science education.

Science education is a genuine tool for scientific, social and technological advancement which involves the systematic study of natural phenomena, application of critical thinking, exhibiting inquisitive attributes and practical demonstration of scientific skills. It is basically an ultimate branch of education concerned with scientific related fields of study. Science education is the scholarly and practical discipline concerned with the teaching and assessment of science content, science process as well as nature of science (Obialor, 2018). Science education encourages students to think about natural phenomena or phenomena with scientific methods such as scientists and prepares the students to become citizens who are responsible for the phenomena around them, for example, global warming (Sahlan in Agbasi, 2023). The Federal Government of Nigeria (FRN, 2014) recognized the teaching of science as vital in the secondary school curriculum due to the impact of learned scientists or science educators on the development of a nation's scientific growth, scientific innovation and explaining the scientific phenomena. This recognition made the Federal Government of Nigeria to integrate Biology as one of the science subjects to be taught in senior secondary schools in Nigeria.

Biology as one of the major science subjects taught in secondary and tertiary level of education is basically concerned with the biotic and abiotic components in the natural world. Obialor, Ezeobi and Ezenwabuchili (2020) defined biology as a science subject which describes how living organisms carry out their life activities and how they interact with their environment. Onu, Anyaegbunamatterm and Uzoigwe (2020) view biology as a natural science which studies the existence (evolution, morphology and physiology) of living things as well as their interactions with the non-living components of the earth. Biology exposes man on how to maintain good health through clean water, clean air, good hygiene and sanitation, balanced diet, vaccination against infectious diseases, exercise and adequate rest (Obialor, 2016). The inclusion of Biology by the Federal Government of Nigeria into the curriculum as a science related subject in Nigerian senior secondary schools offers the students' the opportunity to gain knowledge and skills related to the natural world. The knowledge and skills acquired from learning Biology can contribute to academic success by enhancing their critical thinking, problem-solving abilities, and overall scientific literacy.

Academic achievement of students in an educational institution is one of the avenues of measuring the provision of qualitative education in educational institutions. According to Al-doulat (2018), students' academic achievement is the knowledge gained by students' during a stipulated learning period for a given group of educational subjects studied in a semester, session or academic year. However, the underperformance of Biology students' in West African Senior School Certificate Examination in Nigeria has become a worrisome situation that calls for urgent attention. Chief examiners' report on West African Senior School Certificate Examination in Obialor (2022) showed that the performance of Biology students' in 2019 fell below expectation. The report classified candidates' weaknesses under poor spelling of some technical terms , poor performance in questions that require application of knowledge, inability to answer questions that require corresponding answers correctly, inability to relate and state observable structures of organism and their functions, not giving title to drawings among others. Assessing a group of students' academic achievement is a key indicator of whether learning has occurred and if instructional delivery has been effective in meeting educational objectives. Studies (Al. Duolat, 2018; Aloysius, 2016 and Agbasi 2023) have shown in recent times that one of the most important factors for determining students' academic success or failure in educational institutions is emotional intelligence.

Emotional intelligence of a person is exhibited in the daily human relationships as it exerts great influence on the ability of humans to form relationships in different areas of life. Emotional intelligence refers to the ability to manage and portray one's emotion in a coordinated manner that results in progressive growth in the field of academics and in the society (Amalu, 2018). Emotional intelligence encompasses two sub-types of personal intelligence as described by Gardner in Prabha (2015) which are intrapersonal intelligence (the ability to access one's own feeling) and interpersonal intelligence (the ability to read the moods, intentions, and desires of others). The intrapersonal emotional intelligence helps the students' to control and identify the emotions they feel at that point in time in response to environmental demands and external pressure while the interpersonal emotional intelligence helps the students' to identify and relate with peers, teachers and other members of the society at large (Prabha, 2015). According to Mayer and Salovey in Amalu (2018), emotional intelligence consists of five basic qualities such as self- awareness, self-regulation, self-motivation, empathy and social skills. Self awareness is the ability to monitor one's emotional state and to currently identify and name one's emotion (Amalu, 2018). Self-motivation is the passion to work for internal reasons that go beyond money and status. Empathy has to do with the ability to understand the emotional make-up of the people (Prabha, 2015). It is a skill in treating people according to their emotional reaction while social skill is the proficiency in managing relationship and building networks and an ability to find common ground and build rapport (Mestre and Barchard, 2014). According to Goleman (2008) , emotional intelligence can predict academic achievement better than traditional measures of intelligence and may improve students' academic achievement scores and school performance. Preti (2013) studied the factors that affect the development of emotional intelligence and the role these factors play in the academic achievement of students and reported that emotional intelligence and academic achievement are correlated with the teaching practice that promote emotional and social skills among students. Unfortunately, Azuka (2012) submitted that much attention has not been given to determine the influence of emotional intelligence in the school system and in the teaching of science biology inclusive. However, gender may exist as a factor in the relationship between students' emotional intelligence and their academic achievement in biology and other science subjects.

Gender refers to the social construct that identifies one as being male or female. According to Singh in Obialor (2016), gender refers to a socio-cultural construct that connotes the characteristics, differentiated roles and responsibilities of male and female in a particular society.

Senior secondary school students consist of male and female students. The requirements and academic pressure peculiar to senior secondary science school male and female students' demand that they must have some level of emotional intelligence to see through their academic endeavours. Without regards for a specific gender, students' with high emotional intelligence may likely adopt to positive self-reflection, better interpersonal and time-management skills in dealing with life challenges while students' with low emotional intelligence may likely engage in self damaging behaviors that might affect their academic success and relationship with others within and outside the school environment. However, several studies such as Orabi (2007), Gazvinic (2001) have reported that gender is an issue in students' academic achievement as female students' out-performed their male counterparts. On the other hand, Wagu (2014) in a study conducted among the students' of secondary schools in Kenya showed that male students' performed higher than females in academics. Eisenberg, Spinrad and Smith (2004) opined that boys usually show less self -control and could be more aggressive in action whereas females can control their emotions. Manish and Nehajul (2017) investigated emotional intelligence and stream as predictors of academic performance among students of Aligarh Muslim University India and reported that emotional intelligence significantly predicted academic performance while gender did not influence the prediction of students' academic performance by emotional intelligence. However, study carried out by Okwo (2014) revealed that gender influences predictive power of emotional intelligence on junior secondary students' academic achievement. From the above reports, it can be observed that sufficient study has not been conducted on the variable emotional intelligence as regards gender and that there is also no conclusive report on the influence of gender on students' emotional intelligence and their academic achievement. This study, therefore, sought to investigate emotional intelligence as a correlate of senior secondary school students' academic achievement in Biology in Awka South Education Zone.

Purpose of the Study

The purpose of this study was to examine emotional intelligence as a correlate of senior secondary school students' academic achievement in Biology in Awka South Education Zone. Specifically, the study determined:

1. The relationship between senior secondary school students' emotional intelligence and their academic achievement in Biology.
2. The relationship between male students' emotional intelligence and their academic achievement in senior secondary school Biology.
3. The relationship between female students' emotional intelligence and their academic achievement in senior secondary school Biology.

Research Questions

The following research questions guided the study:

1. What is the relationship between senior secondary school students' emotional intelligence and their academic achievement in Biology?
2. What is the relationship between male students' emotional intelligence and their academic achievement in senior secondary school Biology?
3. What is the relationship between female students' emotional intelligence and their academic achievement in senior secondary school Biology?

Hypotheses

The following null (Ho) hypotheses were tested at 0.05 level of significance :

1. There is no significant relationship between senior secondary school students' emotional intelligence and their academic achievement in Biology.
2. There is no significant relationship between male students' emotional intelligence and their academic achievement in senior secondary school Biology.
3. There is no significant relationship between female students' emotional intelligence and their academic achievement in senior secondary school Biology.

Methodology

Correlational research design was adopted for this study. This is a type of non-experimental research method in which the researcher will measure the variables, understand and assess the statistical relationship between these variables with no influence from any extraneous variables. According to Norman (2013), correlational study represents a general approach to research that focuses on assessing co-variation among naturally occurring variables. It would indicate the magnitude and direction of the relationship between the variables studied. The study was carried out in Awka South Education Zone of Anambra State. The population of this study comprised 1,956 students from senior secondary schools two (II) in Awka South Education Zone. A sample of one hundred (100) senior secondary school II students' was selected randomly from twenty (20) schools out of the sixty-two (62) government owned secondary schools in Awka South Local Government Area using simple random sampling technique. Emotional Intelligence Questionnaire (EIQ) and Students' Grade Chart on Biology in Senior Secondary Schools (SGCBSSS) were used for data collection. Emotional Intelligence Questionnaire (EIQ) was adapted from Njoku, (2021). The instrument was made up of two sections, A and B. Section A was used to obtain bio-data of the respondents while section B was drafted to elicit information from the respondents on the emotional intelligence of senior secondary school students'. In addition, section B contains 25 items. The original instrument constructed and used by Njoku had 4 response options of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). EIQ was adapted to five scale response option of Very Often (VO), Often (O), Sometimes (S), Rarely (R) and Never (N). The reason for this adaptation is to adjust the items in the questionnaire to fit in the current research topic. Additionally, the adjustment was made to enable the students' have response options that best appeal to their emotions. Weights of 5, 4, 3, 2 and 1 were assigned to these options respectively. The questionnaire was validated by two experts in Science Education Department, Nnamdi Azikiwe University, Awka and one specialist in Education Measurement and Evaluation, Faculty of Education, Nnamdi Azikiwe University, Awka. Test-retest method was used to establish the reliability of the instrument (questionnaire). The first and second scores obtained were calculated using Spearman's Correlational Coefficient and a value of 0.76 was obtained. Hence, the instrument was considered highly reliable for the study. Data were collected through administration of Emotional Intelligence Questionnaire (EIQ) in each of the sampled schools. Before the administration, the researchers consulted the principals whose schools were sampled for the study to seek permission in order to administer the instruments to the student with

the assistance of the Biology teachers. The Senior Secondary two (SS II) students' who were used for the exercise were told to write their names correctly on the instrument given to them in order to enable the researcher match EIQ and Student Grade Scores Chart on Biology in Senior Secondary Schools (SGSCBSSS). There was strict supervision during the administration of the instrument. At the end of the exercise, all the data were collected for analysis in the study. The data collected were analysed using Linear Regression. Specifically, the research questions were answered using Correlation coefficient (r) and Coefficient of determination (r^2), while the hypotheses were tested using Regression ANOVA at 0.05 level of significance. The interpretation according to Nworgu, (2015) who provided a three-way guide for interpreting correlation coefficient values when a large number of paired scores have been correlated. They are as follows: r = ± 0.30 and below, low relationship: r = ± 0.30 to below ± 0.80, moderate relationship; and r = ± 0.0 and above, high relationship. The response alternatives were assigned values accordingly in the following ways:

Very Often (VO) – 5 points

Often (O) – 4 points

Sometimes (S) – 3 points 2

Rarely (R) – 2 points

Never (N) – 1 point

Hence, mean rating = $\frac{4+5+3+2+1}{5} = \frac{15}{5} = 3.0$

= Weighted Mean = $\overline{X}$

The weighted mean of 3.0 stands as a critical value upon which the response was determined. Any item with mean value 3.0 and above was interpreted as 'Very Often' while below 3.0 was interpreted as 'Never'.

Results

Research Question One: What is the relationship between senior secondary school students' emotional intelligence and their academic achievement in Biology?

Table 1: Regression analysis of the relationship between senior secondary school students' emotional intelligence and academic achievement in Biology

Model	r	r^2	Adjusted r^2	Std. Error of the Estimate	Decision
1	.228[a]	.052	.042	13.97052	Low positive relationship

a. Predictors: (Constant), QEI

The result in Table 1 shows that the correlation coefficient between senior secondary school students' emotional intelligence and their academic achievement in Biology in Awka South Education Zone is .228. This indicates that there exists a low positive relationship between senior secondary school students' emotional intelligence and their academic achievement in Biology in Awka South Education Zone. Moreover, the data in the table also revealed that the coefficient of determination (r^2) associated with the correlation coefficient of .228 is .052. The coefficient of determination (r^2) indicates that 5.2% variation in senior secondary school students' academic achievement in Biology can be attributed to their emotional intelligence.

Hypothesis One: There is no significant relationship between senior secondary school students' emotional intelligence and their academic achievement in Biology.

Table 2: ANOVA Regression analysis of the relationship between senior secondary school students' emotional intelligence and their academic achievement in Biology in Awka South Education Zone

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1046.120	1	1046.120	5.360	.023[b]
	Residual	19127.190	98	195.175		
	Total	20173.310	99			

a. Dependent Variable: SA2AB

b. Predictors: (Constant), QEI

The result in Table 2 shows that at 5.360 F-value the probability value of .023 was obtained which is less than the 0.05 level of significance. Therefore, the null hypothesis was rejected. Hence,

there is a significant relationship (P<0.05) between senior secondary school students' emotional intelligence and their academic achievement in Biology in Awka South Education. This implies that secondary school students' emotional intelligence made a significant contribution to their academic achievement in Biology.

Research Question Two: What is the relationship between male students' emotional intelligence and their academic achievement in senior secondary school Biology?

Table 3: Regression analysis of the relationship between male students' emotional intelligence and their academic achievement in senior secondary school Biology in Awka South Education Zone

Gender	r	r^2	Adjusted r^2	Std. Error of the Estimate	Decision
Male	.265[a]	.070	.050	15.23626	Low positive relationship

a. Predictors: (Constant), QEI

The result in Table 3 indicates that the correlation coefficient between male students' emotional intelligence and their academic achievement in senior secondary school Biology in Awka South Education Zone is .265. This indicates that there exists a low positive relationship between emotional intelligence and academic achievement of male senior secondary school Biology students' in Awka South Education Zone. The data in the table also revealed that the coefficient of determination (r^2) associated with the correlation coefficient of .265 is .070. The coefficient of determination (r^2) indicates that 7.0% variation in male secondary school students' academic achievement in biology can be attributed to their emotional intelligence.

Hypothesis Two: There is no significant relationship between male students' emotional intelligence and their academic achievement in senior secondary school Biology.

Table 4: ANOVA Regression analysis between male students' emotional intelligence and their academic achievement in senior secondary school Biology' in Awka South Education Zone

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	808.392	1	808.392	3.482	.068[c]
	Residual	10678.608	46	232.144		
	Total	11487.000	47			

a. Dependent Variable: SBBA

b. Selecting only cases for w2hich Gender=Male

c. Predictors: (Constant), QEI

The result in Table 4 reveals that at 3.482 F-value the probability value of .068 was obtained which is greater than the 0.05 level of significance. Therefore, the null hypothesis was not rejected. Hence, there is no significant relationship (P>0.05) between emotional intelligence and academic achievement of male senior secondary school Biology students' in Awka South Education Zone. This implies that emotional intelligence has no significant contribution to the academic achievement of male senior secondary school students' in Biology.

Research Question Three: What is the relationship between female students' emotional intelligence and their academic achievement in senior secondary school students' Biology in Awka South Education Zone?

Table 5: Regression analysis of the relationship between emotional female students' intelligence and their academic achievement in senior secondary school Biology students' in Awka South Education Zone

Gender	r	r^2	Adjusted r^2	Std. Error of the Estimate	Decision
Female	.232[a]	.054	.035	11.43893	Low positive relationship

a. Predictors: (Constant), QEI

The result in Table 5 indicates that the correlation coefficient between female students' emotional intelligence and their academic achievement in senior secondary school Biology' in Awka South Education Zone is .232. This indicates that there exists a low positive relationship between emotional intelligence and academic achievement of female senior secondary school

students' in Awka South Education Zone. The data in the table also revealed that the coefficient of determination (r^2) associated with the correlation coefficient of .232 is .054. The coefficient of determination (r^2) indicates that 5.4% variation in female secondary school students' academic achievement in Biology can be accounted for by their emotional intelligence.

Hypothesis Three: There is no significant relationship between female students' emotional intelligence and their academic achievement in senior secondary school Biology in Awka South Education Zone

Table 6: ANOVA Regression analysis between female students' emotional intelligence and their academic achievement in senior secondary school Biology in Awka South Education Zone

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	372.9287	1	372.987	2.851	.098[c]
	Residual	6542.455	50	130.849		
2	Total	6915.442	51			

a. Dependent Variable: SAAB

b. Selecting only cases for which Gender=Female

c. Predictors: (Constant), QEI

The result in Table 4 reveals that at 2.851 F-value the probability value of .098 was obtained which is greater than the 0.05 level of significance. Therefore, the null hypothesis was not rejected. Hence, there is no significant relationship (P>0.05) between female students' emotional intelligence and their academic achievement in senior secondary school Biology in Awka South Education Zone. This implies that emotional intelligence has no significant contribution to the academic achievement of female senior secondary school students' in Biology.

Discussion of Findings

The findings of the study showed that there was a low positive relationship between senior secondary school students' emotional intelligence and their academic achievement in Biology in Awka South Education Zone. The findings further revealed that there was a significant relationship

between senior secondary school students' emotional intelligence and their academic achievement in Biology in Awka South Education. This implies that an increase in students'emotional intelligence led to a significant increase in their academic achievement in Biology. This is in line with the finding of Ismail (2019) who argued that emotional intelligence has a positive relationship and effect on students' academic achievement levels. The author further suggested that the higher the score reported in students' academic achievement, the higher their level in emotional intelligence. The finding of Ismail study also revealed that there was a significant relationship between emotional intelligence with regards to students' academic achievement in Biology.

The findings of the study also showed that there was a low positive relationship between male students' emotional intelligence and their academic achievement in Biology. The same is applicable to female students. Further analysis revealed that there was no significant relationship between the emotional intelligence and academic achievement of male and female students' in senior secondary school Biology in Awka South Education Zone respectively. This implies that an increase in male and female students' emotional intelligence did not lead to a significant increase in their academic achievement in Biology. This finding is supported by the findings of Manish and Nehajul (2017), whose study revealed that gender did not influence the prediction of students' academic performance by emotional intelligence. Additionally, the finding of this study is in disagreement with the findings of Okwo (2014), which revealed that gender influenced predictive power of emotional intelligence on senior secondary school (JSS) students' academic achievement in Biology.

Conclusion

From the above discussions, it was concluded that there was a low positive relationship between senior secondary school students'emotional intelligence and their academic achievement in Biology. The study also revealed that there was no significant relationship between the male and female biology students'emotional intelligence and their academic achievement respectively.

This implies that emotional intelligence has no significant contribution to the academic achievement of senior secondary Biology students irrespective of their gender.

Recommendations

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

1. Educational administrators should create policies and educational programmes such as peer mentoring and conflict resolution training that support social and educational learning.
2. Educational administrators are to encourage collaboration between schools, researchers and policy makers to further study the role of emotional intelligence in educational outcomes.
3. Teachers should be able to recognise and understand their own emotions as well as the emotions of their students' to create conducive classroom learning experiences.
4. Teachers are to foster an inclusive learning environment that supports the development of emotional intelligence.
5. Teachers are to encourage the use of positive and constructive feedbacks to promote educational growth.
6. Parents are to encourage their children to participate in activities such as team sports, creative arts or community services that promote emotional intelligence.

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