

## EMOTIONAL INTELLIGENCE AND INTELLIGENCE AS PREDICTORS OF ACADEMIC ACHIEVEMENT AMONG BIOLOGY EDUCATION STUDENTS IN NORTH-CENTRAL UNIVERSITIES, NIGERIA

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### Abstract

*the study investigated emotional intelligence and Intelligence as predictors to academic achievement in biology among biology education undergraduate students in north-central universities, Nigeria. The study has three (3) objectives and three hypotheses. The study employed correlational research design. The population for the study comprised of three hundred and twenty-seven (327) 200level B. SC (Ed) Biology students of Federal Universities in North-Central Zone, Nigeria. Simple random sampling technique (draw from the hat method) was used in selecting the sample schools in north-central, Nigeria with intact groups. Two research instruments were used to generate the data: Trait Emotional Intelligence Questionnaire (TEIQ) with a reliability coefficient of 0.86 and Raven Progressive Matrice Test (RPMT) with a reliability coefficient of 0.88 were used to establish the level of emotional intelligence and Intelligence of the subjects. While, the subject's GPA was used as measure of their academic achievement. The data collected was analyzed using regression analysis to test the null hypotheses. From the analysis, the results revealed that there was a positive correlation between emotional intelligence, Intelligence, and academic achievement. The result also shows that the two independent variables that are emotional intelligence and Intelligence are good predictors of academic achievement with different level of impact. It was recommended that Students of all levels should be exposed to emotional intelligence, and Intelligence skills in re-addressing students with academic problem.*

**Keywords:** Emotional Intelligence, Intelligence, and Academic Achievement

### Introduction

Education is used as an instrument to modify human behavior and produce functional individuals that would contribute towards the development of the larger society economically, socially, and security wise. Students in higher educational institutions are viewed as leaders of tomorrow. They have academic success as their major goal. For this goal to be achieved, it requires dedication, sacrifices, self-discipline, motivation and cordial relationship between students and lecturers. Students at this level are saddled with a lot of responsibilities and challenges (Salami, 2016) which may sometimes result in stress. He further stressed that they need good mental health to be able to succeed in their academic pursuit. As academic demands increase and new social relations are established science students specifically biology students become uncertain of their abilities to meet these demands and as a result of this, they become discouraged in their study and try to abandon their academic activities.

Biology students are expected to be exposed to techniques and learning principles that could enable them develop the required skills and competence to perform professionally. However, some institutions have failed in this perspective. Dangana, Usman, Lawal and Mari (2021) reported that currently biology education as a model has failed to focus on developing graduates for successful career worldwide. Whereas, biology education should enable students to possess the necessary skills for the teaching profession. Success in biology education need to develop emotional intelligence, intellectual skills such as problem solving

and critical thinking skills. Intellectual skills include the ability to relate concepts learned to new situations, the ability to think for oneself, to critically assess new information and situations, and to apply knowledge from one subject context or problem to another. At the university, there are many factors which affect the poor achievement in biology such may include, lack of venue, highly congested classrooms because of high population of students, lack of manpower to teach the various courses in science and biology in particular, student variables like emotional-intelligence, reasoning-ability, working memory-capacity, self-efficacy and intelligence, among others that affect learning (Fayombo, 2012). The emphasis of the present research is to determine whether emotional intelligence and intelligence are predictors of students' academic achievement since there are scanty researches on these variables.

Emotional intelligence and intelligence are important resources for enhancing students' learning, success and quality in education. The term Emotional-Intelligence (EI) is defined as the subject of social intelligence that involves the ability to monitor one's own and other's feelings and emotions, discriminate among them and use the information to guide one's thinking and actions (Salovey & Mayer, 1990). It can also be referred to as the ability to regulate our own and others' feelings and emotions in pleasant and unpleasant moments. Simply put, emotional intelligence is a learned ability to identify, understand, experience and express human emotions in healthy and productive ways. Emotional experience and expression are unique to individual as no one thinks, expresses learner feelings, and acts in the same way in the learning environment. Elias, (2014) however, stated that emotional-intelligence is a necessary component of any educational community, and defined emotional-intelligence has been a set of skills necessary for effective social interaction and classroom success such skills include: (a) emotional recognition and regulation (b) self-control (c) goal setting (d) social responsibility (e) empathy (f) problem solving (g) conflict resolution and (h) skills needed for leadership and effective group participation.

The ability to control the emotions has become important for the students not to get carried away by the flow of negative and evil elements. When a person becomes stressed he/she may tend to be over-emotional and allow emotions to influence decisions and relationships towards his study and study partners, so having a high emotional intelligence make the person cope with stress in a healthy way and keep emotions in check. Various investigators such as Rode, Mooney, Arthaud (2007) have engaged in researches that examined and apply emotional intelligence constructs within academic, medical, and other learning settings and they reported that, students with emotional intelligence skills prove a high intellectual ability and therefore do better academically than students with low or no emotional intelligence skills. Likewise, Singh et al. (2009) reported a significant positive relationship between emotional intelligence and GPA that students with high emotional intelligence did well in almost all of their causes compared to students with low emotional intelligence skills.

Human intelligence according to Kanazawa, (2014) accounts for man's most unique capacity for rational thinking and action. For the purpose of this investigation, intelligence is adequately defined as the general mental ability to quickly learn, solve novel problems, educe relationships, quickly process information accurately, think rationally, act purposefully, and most effectively adapt to one's environment as measured by Culture Fair Intelligence Test that has been validated and standardized for use in Nigeria (Kpolovie, 2015). Intelligence is acquired both by nature and at least 50 percent heritable in line with evolution theories that heritability and gene expression of organisms change overtime (Langer, 2014)

Goleman (2013) argued that academic intelligence itself is not sufficient to anticipate a person's success, and their IQ stands secondary even in the job performance. Deshpande (2014) found that the students from the high achieving schools were higher in intelligence

and other variables explained much of the variance between the high and low achieving schools. In another study, (Watkins, Lei, & Canivez, 2017) stated there has been considerable debate regarding the causal precedence of intelligence and academic achievement. Some researchers view intelligence and achievement as identical constructs. Although the past studies examined the students' academic performance (AP) either by considering IQ or EI discretely. Producing a competent graduate with a fair learning outcome being one of the main purposes of any Higher Educational Institutions (HEIs), most of those institutions thrive to produce students with good academic achievement and Grade Point Average (GPA). Although scoring a high GPA these days fetches a good opportunity for any university student either for future employment or to pursue further higher education, the study by Hassan and Al-Razgan (2016) stated that even the Saudi students with high GPAs fail to get admission in university level due to poor score in entrance test. Hence, the present study did not focus much on current graduates' GPAs except to understand if their cumulative GPA supports students' performance in EI- and IQ-based test. Deshpande (2014) found that the students from the high achieving schools were higher in intelligence and other variables explained much of the variance between the high and low achieving schools. In another study, (Watkins, Lei, & Canivez, 2007) stated there has been considerable debate regarding the causal precedence of intelligence and academic achievement. Some researchers view intelligence and achievement as identical constructs.

Others believe that the relationship between intelligence and achievement is reciprocal. In Nigeria, education is considered the most important instrument for change and national development. Students proceed to the university to acquire knowledge and skills to make them relevant in the workplace. Thus, it is paramount for universities to effectively capture these functions. In Nigeria, there is a fundamental challenge of disconnect between the university system and the corporate world. This can be attributed to the relative gap that exists in the curricular of several universities, particularly in terms of teaching core competencies such as emotional intelligence. However, of all the problems facing Nigeria's education system, none is more agonizing and persistent as the poor academic achievement of students, especially of universities. And this has resulted in frustration, high dropout rates and inability to graduate with a good result. In spite of numerous efforts made by researchers, educators and policy makers to tackle this problem, academic achievement of students does not seem to have improved. The persistent poor achievement of students in university has called for divergent investigations into the factors responsible for the problems. Many researchers have reported that the emotional intelligence and intelligence of the biology students have great effect on their achievement. Also, very scanty literature is available on the relationship between university biology students' emotional intelligence, intelligence and their academic achievement in Nigeria. Therefore, the main purpose of this study is to find out: the relationship between emotional intelligence, intelligence and academic achievement of biology education university students and of which between emotional intelligence and intelligence is a predictor of academic achievement in north-central universities, Nigeria.

### **Objectives of the Study**

The general objective of this study is to determine the relationship among emotional intelligence, intelligence and academic achievement and between emotional intelligence and intelligence which is a better predictor of academic achievement in biology among undergraduate education students in North-Central Universities, Nigeria.

### **Research Questions**

- (i) What is the relationship between emotional intelligence and academic achievement in biology among undergraduate biology education students in North-Central universities, Nigeria?

- (ii) What is the relationship between intelligence and academic achievement in biology among undergraduate biology education students in North-Central universities, Nigeria?
- (iii) Which between emotional intelligence and intelligence predict academic achievement in biology among undergraduate biology education students in North-Central Universities, Nigeria?

### **Null Hypotheses**

- Ho<sub>1</sub>:** there is no significant relationship between emotional intelligence and academic achievement in biology among undergraduate biology education students in North-Central universities, Nigeria.
- Ho<sub>2</sub>:** there is no significant relationship between intelligence and academic achievement in biology among undergraduate biology education students in North-Central universities, Nigeria.
- Ho<sub>3</sub>:** There is no significant difference in emotional intelligence and intelligence as predictors to academic achievement in biology among undergraduate biology education students in North-Central universities, Nigeria.

### **Methodology**

The study employed correlational research design. It is correlational because attempt was made to establish the type of relationship that exists among the variables and forecast which of them is more reliable predictor of achievement. In this design, the instruments used for data collection were Trait Emotional Intelligence Questionnaire (TEIQ) and Raven's Progressive Matrices Test (RPMT). The two instruments were validated by three professors; two were from department of Psychology, and one from science education department, Ahmadu Bello University, Zaria. The instrument TEIQ has the reliability coefficient of 0.86 and RPMT has the reliability coefficient of 0.88. The reliability was determined after pilot testing using split half. The population for the study comprised of all the 200 levels B.Sc (Ed) biology students of the federal Universities in North-Central, Nigeria. The universities are located in Abuja, Benue, Kwara, Niger, Plateau, Nasarawa and Kogi states. Each of the states has only one federal university with population of 359 students. Simple random sampling technique (draw from the hat) was used in selecting the universities. Five federal universities within North-Central Nigeria were selected with intact class sample size of 327. Since the research is correlation in nature, the population is manageable.

The data for the study was collected by administering the four instruments and the data were analyzed using SPSS 20.0V. The research questions were answered using Correlation analysis of Pearson Product Moment Correlation Coefficient and multiple regression analysis. The results of the analysis are presented below:

**Research Question One:** What is the relationship between emotional intelligence and academic achievement in biology among undergraduate education students in North-Central Universities, Nigeria?

The data collected to answer research question one, was analyzed using Mean, Standard Deviation and Pearson Product-Moment Correlation Coefficient Statistic (PPMCC) as shown in Table 1.

**Table 1: Pearson Product-Moment Correlation Coefficient (PPMCC) Statistics on Relationship between Emotional Intelligence and Academic Achievement in Biology among Undergraduate Biology Education Students in North-Central Universities, Nigeria**

Variable	N	Mean	STD	r-value	p-value	Decision
Academic Achievement	328	2.39	0.75	0.48	.000	Sig.
Emotional Intelligence	328	103.39	23.71			

Significant at  $P < .005$

Table 1 revealed that there was a moderate positive correlation ( $r=0.48$ ) between emotional intelligence and academic achievement of biology students. This is so because the  $r$ -value is not carrying negative sign and it is more than 0.29 according to Cohen, (1988) who stated that  $r$ -value from 0.10 to 0.29 for low correlation, 0.30 to 0.49 for moderate correlation and 0.50 to 1 for high correlation. The table revealed the PPMCC of emotional intelligence as  $r = 0.48$  while that of academic achievement is .000 at  $P < .005$ . The null hypothesis which states that there is no significant relationship between emotional intelligence and academic achievement was there for rejected.

**Research Question Two:** What is the relationship between intelligence and academic achievement in biology among undergraduate education students in North-Central Universities, Nigeria?

The data collected to answer research question two, was analysed using Mean, Standard Deviation and Pearson Product-Moment Correlation Coefficient Statistic (PPMCC) as shown in Table 2.

**Table 2: Pearson Product-Moment Correlation Coefficient (PPMCC) Statistics on Relationship between Intelligence and Academic Achievement in Biology among Undergraduate Biology Education Students in North-Central Universities, Nigeria**

Variable	N	Mean	STD	r-value	p-value	Decision
Academic Achievement	328	2.39	0.75	0.71	.000	Sig.
Intelligence	328	110.76	13.43			

Significant at  $P < .005$

Table 2 shows high positive correlation ( $r= 0.71$ ) between intelligence and academic achievement in biology among undergraduate education students in North-Central Universities, Nigeria. The table revealed high relationship since the  $r$ -value is greater than 0.50. Likewise, the table revealed the PPMCC of emotional intelligence as  $r = 0.71$  while that of academic achievement is .000 at  $P < .005$ . The null hypothesis which states that there is no significant relationship between intelligence and academic achievement was there for rejected.

**Research Question Three:** Which between emotional intelligence and intelligence predict academic achievement in biology among undergraduate biology education students in North-Central universities, Nigeria?



The data collected to answer research question three, was analyzed using multiple regression analysis as shown in Table 3

**Table 3: Multiple Regression Analysis on Effect of Emotional Intelligence and Intelligence as Predictors of Academic Achievement in Biology among Undergraduate Biology Education Students in North-Central Universities, Nigeria**

Variable	N	R	R <sup>2</sup>	R <sup>2</sup> Adjusted	Coefficient Beta	F-cal	Sig.
Emotional Intelligence	327	0.48	.592	.589	.112	234.648	.000
Intelligence	327	0.71	.592	.589	.485		

Significant at  $P < .005$

From table 3 the R square shows how much of the variance in the dependent variable (academic achievement) is explained by the model. The R square value is .592 which is expressed in percentage, which means that the model (which includes emotional intelligence and intelligence) explains 59.2 per cent of the variance in academic achievement, which is arrived at by multiplying R square by 100. While in the standardized coefficient (Beta) column, the independent variable with larger Beta value predicts better academic achievement. Therefore, coefficient beta value revealed that both emotional intelligence and intelligence has Beta = .112 and .485 respectively. This means that intelligence with Beta value of .485 predict academic achievement of students better than memory capacity with Beta value of .112.

The two independent variables; emotional intelligence and intelligence make a significant unique contribution to the prediction of dependent variable (academic achievement) at significance of .000 at  $P < .005$ . Therefore, the null hypothesis which stated that emotional intelligence and intelligence have no significant effects on academic achievement of biology undergraduate students in north-central universities, Nigeria was rejected. Significant relationship exists as intelligence predicts academic achievement of biology students better than emotional intelligence.

### Discussion of the Findings

Result in table 1 shows that there was a moderately positive relationship between emotional intelligence and academic achievement of biology undergraduate students in north-central zone, Nigeria. The positive relationship shows that emotional intelligence is a predictor to academic achievement of biology students. The finding of this study is in agreement with that of Rozell et al. (2012); David et al. (2015); Singh et al. (2019) who reported a positive significant relationship between emotional intelligence and GPA that students with high emotional intelligence did well in almost all of their courses compared to students with low emotional intelligence skills. The finding of this study is in disagreement with that of Johnson (2018) who reported no significant correlation between emotional intelligence and academic performance on the basis of the GPA. Table 2 revealed that intelligence has a high positive relationship with academic achievement of biology students. Therefore, the finding of this study is in line with that of Archana (2012); Martin (2014); Laidra *et al.* (2017); Deshpande (2014) who revealed that students' academic achievement relies most strongly on their cognitive abilities through all grade levels. The finding of this study disagreed with that of Habibollah *et al.* (2017); Riggon *et al.* (2018) who revealed no significant relationship exist between students' intelligence and academic achievement. Result in table 3 revealed a positive significant correlation between emotional intelligence and intelligence as predictors to academic achievement of biology undergraduate students in north-central universities,

Nigeria. The finding of this study revealed that the two independent variables (emotional intelligence and intelligence) are good predictors to dependent variable (academic achievement) and that each of the independent variable predict academic achievement of biology students at different rate and that the best predictor to academic achievement between the two independent variables was the intelligence and the least was the emotional intelligence.

### **Conclusion**

Based on the findings of the study the following conclusions were drawn: that the two independent variables emotional intelligence and intelligence have positive relationship with academic achievement of students. There was a moderately positive relationship between emotional intelligence and academic achievement and highly positive relationship between intelligence and academic achievement. This simply implies that increase in emotional intelligence and intelligence leads to increase in academic achievement in biology among undergraduate education students in north-central Universities, Nigeria.

Perhaps the two independent variables (emotional intelligence and intelligence) are good predictors to academic achievement of biology students, but in the scale of their predicting power intelligence was the better predictor to academic achievement than emotional intelligence in biology among undergraduate education students in north-central universities, Nigeria. Therefore, the need for intelligence skills has more potentials of enhancing academic achievement of biology students than emotional intelligence.

### **Recommendations**

From the findings and conclusion of this study, the following recommendations are hereby made:

- (i) Students of all levels should be exposed to emotional intelligence and intelligence skills in re-addressing students with academic problems.
- (ii) Acquiring intelligence skills should be the priority of students of biology at university since they operate at formal operational level. This could improve their academic achievement and this can be achieved by engaging themselves in learning principles of problem solving.
- (iii) Science education departments in federal universities could be sensitized through workshops, conferences and symposia in the need for acquisition of intelligence and Emotional intelligence skills since they are good predictors to academic achievement.

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