Relationship among Emotional Intelligence, Self-Efficacy and Academic Achievement of Secondary School Students in Mathematics in Imo State

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Aims: The study determined the type of relationship between emotional intelligence and academic achievement of secondary school students, the type of relationship between self-efficacy and academic achievement of secondary school students, the type of joint relationship among emotional intelligence, self-efficacy and academic achievement of secondary school students in Mathematics in Imo state.

Study Design: Correlational Survey research design.

Place and Duration of Study: Secondary school II students in Imo State, Nigeria Sample:

Methodology: The study adopted the correlation survey design. Disproportionate stratified sampling technique was used to select a sample size of 1250 SS II students from a population of 6960 SS II students in government owned secondary schools in Imo state. The instruments adopted for data collection were standardized emotional intelligence inventory (EI) and self-efficacy scale (SES). These instruments were administered using direct delivery approach with the help of regular teachers as research assistants from the sampled schools. Research questions 1 and 2 were

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analyzed using Pearson Product Moment Correlation Coefficient, while research question 3 was analyzed using multiple regression analysis. The hypotheses postulated was tested at 0.05 level of significance using multiple regression analysis which determined the R, R-squared and adjusted R-squared. The significant value on the coefficient table was used to test hypotheses 1 and 2, while the ANOVA F-ratio, R, R-squared and adjusted R-squared coefficients derived from multiple regression analysis were used to test hypotheses 3.

Results: The findings of the study revealed a moderate positive relationship of 0.643 existing between secondary school students' emotional intelligence and their academic achievement in Mathematics, Also, a very low positive relationship of 0.310 existing between secondary school students' self-efficacy and their academic achievement in Mathematics, a moderate positive relationship of 0.451 existing among secondary school students' emotional intelligence, self-efficacy jointly with their academic achievement in Mathematics. Furthermore, a significant relationship between emotional intelligence and academic achievement of secondary school students in Mathematics in Imo state. There is a significant relationship between self-efficacy and academic achievement of secondary school students in Mathematics in Imo state. There is a significant relationship existing among secondary school students' emotional intelligence and self-efficacy jointly with their academic achievement in Mathematics in Imo state.

Conclusion: The conclusion of this study creates an insight on the possible reasons for poor academic achievement in accordance with their personality traits and have provided justification for the expressed concerns.

1. INTRODUCTION

Academic achievement can be seen as a test for measurement and comparison of skills in various fields of academic study. It could be high or low [1]. They further stated that achievement is regarded as something good but difficult to attain, and at the same time with hard work which could be carried out successfully. Achievement therefore is defined as the attained ability or degree of competence in school tasks, usually measured by standardized test and expressed in grades or units based on norms derived from a wide sampling of pupils' achievement. Achievement can be described as something which has been accomplished successfully, especially by means of exertion, skill, practice or perseverance. Evidence of low academic achievement has been recorded in recent times. This is as extracted from [2].

In the same vein, Mathematics as a science subjects has been regarded as an essential and integral part of science education whose importance is needed in everyday life, hence the Federal Government of Nigeria, [3] in her National Policy on Education placed mathematics as a core subject all secondary school students must offer at both junior and senior secondary school certificate levels. Mathematics is perceived as an essential precursor to success in modern society. The usefulness of Mathematics in science, technological activities as well as commerce, economics, education and even humanities is almost at par with the importance of education as a whole [4]. [4] further stated that in Nigeria, as in most countries, mathematics occupies a key place in junior secondary and senior secondary level as well as Colleges of Education (CoE), state and federal tertiary institutions curricula. Mathematics is a compulsory subject for every learner at these levels; essentially, it is a gatekeeper and critical filter for further studies in the country. Overtime, it is observed that students' external examination result conducted by examination bodies has maintained a steady decline [4]. This situation is increasing at a very significant rate in several states of the federation particularly in Imo State. This has constituted serious worry for stakeholders in education sector, parents, teachers, school administrators, and the government but it is not clear whether factors like emotional intelligence and self-efficacy among other psychological factors could be a cause of the declining achievement recorded in Mathematics. Mathematics overtime is a compulsory subject which student's study in secondary schools and that a credit pass in the subject is required in most cases by tertiary institutions before admission can be granted to candidates. More so, denial of admission to students could lead to them engaging in social vices like gangsterism, truancy, bullying and

theft. Therefore, if one weighs the role Mathematics plays in the society against the backdrop of the continuous decline in academic achievement, it becomes imperative that further steps needs to be taken to address the situation. More so, it is however disheartening that despite the importance of Mathematics subject and efforts made by the federal government, secondary school students still record poor academic achievement in Mathematics.

Emotional intelligence is defined by [5] as the subset of social intelligence that involves the ability to monitor one's own and others feelings and emotions, to discriminate among them and use this information to guide ones thinking and actions. Simply state, emotional intelligence is a learned ability to identify, understand, experience and express human emotions in healthy and productive ways. Similarly, [6] defined emotional intelligence as the intelligent use of emotions where one intentionally makes one's own emotion work for one by using them to help guide one's behaviour and thinking in ways that enhances one's result. Emotional intelligence skills such as empathy, self-expression, social skills among others enable students to reduce negative stress in their life, build healthy relationships, communicate effectively, and develop good emotional health. Poor academic achievement can be attributed to the level of emotional intelligence among secondary school students. Emotional intelligence is one of the pertinent factors influencing achievement of students in Mathematics. According to [7], they identified 10 qualities of an emotional intelligent person as empathy, self-awareness, curiosity, analytical mind, belief, needs and want, passionate, optimistic, adaptability, and desire to help others to succeed. This means that strong emotional intelligence could be an exceptional advantage to Mathematics students to pursue higher academic achievement and career development in Mathematics.

The goals of education developed is related to students' beliefs and expectations about their capabilities to perform successfully, hence the concept of self-efficacy. According to [8], self-efficacy is the belief in one's capabilities to organize and execute the courses of action required for producing a given attainment. The way people think, feel, act, and motivate themselves are affected by self-efficacy. Researchers such as [9] studied self-efficacy and suggested that people lacking in self-efficacy have problems with motivating themselves to carry out tasks. Furthermore, [9] referred to self-efficacy as student's perceptions of their competence to do their class work. Operationally, self-efficacy is defined as students' belief in their capabilities to organize and execute the course of action required in high academic achievement.

According to [10], self-efficacy falls within the psychological needs of an individual. Psychological needs when satisfied promotes the sense of belonging, self-worth and curiosity. It also enhances creativity, competence, self-expression, autonomy, inspiration, purpose, beauty and celebration which Maslow called the growth enablers [11]. Self-efficacy needs are easily ignored among learners, unlike other survival needs, psychological needs are not life-threatening which makes them to be easily overlooked. [10] further asserted that self-efficacy is one of the fundamental factors found to be significantly influence the academic achievement of students in learning subjects in education, as well as similar observation with emotional intelligence. Nevertheless, existing literature revealed that the existing relationship among emotional intelligence, self-efficacy and academic achievement in Mathematics has not been empirically established amongst secondary school students in Imo State. Based on this and the aforementioned decline in academic achievement in Mathematics the present researchers are motivated to determine the relationship among emotional intelligence, self-efficacy and academic achievement of secondary school students in Mathematics in Imo State.

1.1 Research questions

The following research questions guided the study

1. What is the type of relationship between emotional intelligence and academic achievement of secondary school students in Mathematics in Imo state?
2. What is the type of relationship between self-efficacy and academic achievement of secondary school students in Mathematics in Imo state?
3. What is the type of joint relationship among emotional intelligence, self-efficacy and academic achievement of secondary school students in Mathematics in Imo state?

1.2 Hypotheses

The following null hypotheses guided the study.

1. There is no significant relationship between emotional intelligence and academic achievement of secondary school students in Mathematics in Imo state.
2. There is no significant relationship between self-efficacy and academic achievement of secondary school students in Mathematics in Imo state.
3. There is no significant correlation among emotional intelligence, self-efficacy and academic achievement of secondary school students in Imo state.

2. REVIEW OF RELATED LITERATURE

Azuka [12] carried out a study on the relationship between emotional intelligence and achievement of senior secondary school students in Federal Capital Territory, Abuja. Five research questions and five hypotheses guided the study. The research design for the study was correlation survey design. Proportionate stratified sampling was used to draw 1160 SS II students in public schools in the federal capital territory, Abuja Nigeria. The instruments adopted for the study were the Emotional Intelligence Inventory and Mathematics Achievement Test. The Emotional Intelligence Inventory had a reliability coefficient of 0.79 while the Mathematics Achievement Test had a reliability coefficient of 0.94. Data was collected using the direct delivery approach. Data collected were analyzed using mean and Pearson Product Moment Correlation. To test the level of significance of the correlation coefficient the t-test was used. The result showed that there was a significant low positive relationship between the emotional intelligence of SS2 students and their academic achievement in mathematics among others.

Nwadinigwe and Azuka-Obieke [13] investigated the impact of emotional intelligence on academic achievement of senior secondary school students in Lagos, Nigeria. Two research hypotheses were formulated to guide the study. The study adopted the quasi-experimental research design (pre-test/post-test control group design). A sample of 156 participants randomly drawn from three senior secondary schools was used. The schools were randomly assigned to the two treatment conditions (emotional intelligence training techniques) and control group. The exploring and developing emotional intelligence skills questionnaire and mathematics and English language achievement test were employed to generate data for the study. The

instruments had reliability co-efficient of 0.81 and 0.64 respectively. The direct delivery approach was used for data collection. Data collected was tested using descriptive statistical method, analysis of covariance (ANCOVA) and Pearson product moment correlation coefficient statistics. The findings of the study revealed among others that there is a positive relationship between emotional intelligence skills and academic achievement such that developing emotional intelligence skills of a student will lead to the enhancement of their academic achievement.

Ogundokun and Adeyemo [14] Carried out a study on emotional intelligence and academic achievement: The moderating influence of age, intrinsic and extrinsic motivation. Five hypotheses guided the study. The study adopted the survey research design. The participants drawn for the study was 1563 (male = 826, female = 737) secodary school students from Oyo state, Nigeria. Two instruments were used to assess emotional intelligence and academic motivation while academic achievement test on English language and mathematics were used as a measure of academic achievement. The direct delivery approach with the help of some researc assistants was employed for data collcetion. Data collected was analyzed using descriptive statistics, Pearson product moment correlation and hierachical regression analysis. The findings of this study revealed among others that emotional intelligence, age and academic motivation are potent predictors mildly associated with academic achievement.

Anyanwu [15] carried out a study on influence of self-efficacy on students acdemic achievement among secondary school students in Anambra state, Nigeria. Two research hypotheses guided the study. The study adopted the ex-post facto research design. The sample size drawn for the study was 300 secondary school students. Simple random sampling technique was used to sample three out five local government areas in Awka Education Zone. The instrument for data collection was a structured questionnaire titled Influence of Self-efficacy on Academic Achievement Questionnaire (ISAAQ), the reliability coefficient of the instrument stood at 0.79. However, the instrument was also validated by three experts. The data collected were analyzed using t-test statistics at 0.05 level of significance. The findings of the study among others showed that there is no significant difference in the influence of self-efficacy on

academic achievement means scores of male and female secondary school students.

Hammed and Toyin [16] conducted a study on the infleunce of self-cencept and self-efficacy on academic achievement in English language among senior secondary school students in Oyo and Ogun States. Four research hypotheses guided the study. Descriptive survey research design was adopted. The sample consisted of 300 participants drawn using simple random sampling technique from ten selected senior secondary schools with the mean age of 19 years and a standard deviation of 5.21. Three valid and reliable instruments were used for data collection; Self-Concept Scale (SCS) (r =0.76), Self-Efficacy Scale (SES) (r =0.82) and English Language Achievement Test (ELAT) (r =0.81). Data collected was analyzed using correlation analysis and multiple regression analysis. The results show that self-concept and self-efficacy jointly and relatively contributed to academic achievement in English language of the participants among others.

Ogunmakin and Akomolafe [17] academic self-efficacy, locus of control and academic performance of secondary school students in Ondo state, Nigeria. Two resaerch questions guided the study.Descriptive research design of correlational type was used for the study. The sample consisted of three hundred and sixty four students randomly selected from ten secondary schools. Two standardized instruments (self-efficacy scale & locus of control scale) were used to collect data from the sample while students' scores in their previous promotion examination were used to measure their academic performance. The instruments had a reliability coeffcient of 0.91 and 0.75. Data collected was analyzed using multiple regression analysis. The researchers found that academic self-efficacy and locus of control jointly predicted academic performance among others.

Onabamiro [18] carried out a study on determinant of students' achievement in senior secondary school Mathematics in South-western, Nigeria. The study adopted a survey design with a hypothesized model. Two states (Oyo and Ogun) were randomly selected. Proportional sampling technique was used to select thirty Local Government Areas (LGAs) from the two states, while the simple random sampling technique was used to select five schools from each LGA; making a total of 150. In all, participants were 162 SS2 Mathematics teachers and 5,251 SS2 students. Principals Supervisory Role Rating Scale (r = 0.70, CVR = 0.73); Teachers Job Satisfaction Rating Scale (r = 0.76, CVR = 0.72), Teachers Classroom Management Scale (r = 0.80, CVR = 0.71), Mathematics Achievement Test (r = 0.74, CVR = 0.69) and Multifactor Leadership Scale with four components (r = 0.70, CVR = 0.78) were used to collect data. Data were analyzed using multiple regression and path analysis at p≤0.05. The findings for the study revealed among others that principal's leadership styles and socio-demographic factors significantly influenced teachers job satisfaction, classroom management and ultimately students' achievement in senior secondary schools in Oyo and Ogun states respectively.

Omeodu and Fredrick [19] Carried out a study on the effect of game teaching method on students mathematics achievement in Aboh-Mbaise local governemnt area, Imo state. Two research questions and two hypotheses guided the study. The study adopted the Quasi-experimental design. The sample for the study was 120 students comprising 70 males and 50 females in four schools in Aboh Mbaise Imo State using purposive sampling technique. The instrument used for data collection was Quadratic equation achievement test (QAT). The reliability coefficient of the instruments was established using pearson's product moment correlation which yielded 0.76 coefficient value. Data collected were analyzed using Mean and standard deviation. The result of the analyses revealed among others that students taught the concept of quadratic equation using game teaching method achieved better than their counterparts who were taught using expository method.

3. METHODS

The study adopted the correlation survey design. The study was carried out in Imo state, Nigeria. Disproportionate stratified sampling technique was used to select a sample size of 1250 secondary school (SS) II students from a population of 6960 SS II students in government owned secondary schools in Imo state. The reason for delimiting the study to SS II class students and also restricting the study to achievement scores in Mathematics is because SS II students apart from not being in a major examination preparatory class have been exposed to academic achievement test and assessment in Mathematics more than SS I.

However, lapses discovered in the academic achievement of these students could be revisited before the students are finally presented for the yearly national examinations. Disproportionate stratified sampling technique was employed because the population of SS II students in the secondary schools selected were not of equal number. The instruments adopted for data collection were standardized emotional intelligence inventory (EI) and self-efficacy scale (SES). The EII is divided into 4 sub-sections with 10 items in sub-sections namely; emotional awareness, emotional management, social emotional awareness and relationship management. The options for each item are weighted 0 to 4 thus; 0 = Never, 1 = Rarely, 2 = sometimes, 3 = Often, 4 = Always, giving a maximum score of 40 for each subsection. The self-efficacy scale is a 10-item scale and the response patterns ranged from; 1 = Not at all true, 2 = Hardly true, 3 = Moderately true and 4 = Exactly true. These instruments were administered using direct delivery approach with the help of regular teachers as research assistants from the sampled schools. However, a total of 1250 instruments were administered while 1247 were retrieved and used for data analyses. Pearson r correlation and t-tests were used to analyze the data. Research questions 1 and 2 were analyzed using Pearson Product Moment Correlation Coefficient, while research question 3 was analyzed using multiple regression analysis. The hypotheses postulated was tested at 0.05 level of significance using multiple regression analysis which determined the R, R-squared and adjusted R-squared. The significant value on the coefficient table was used to test hypotheses 1 and 2, while the ANOVA F-ratio, R, R-squared and adjusted R-squared coefficients derived from multiple regression analysis were used to test hypotheses 3.

4. RESULTS AND DISCUSSION

Research question 1: What is the type of relationship between emotional intelligence and academic achievement of secondary school students in Mathematics in Imo state?

Hypothesis 1: There is no significant relationship between emotional intelligence and academic achievement of secondary school students in Mathematics in Imo state.

In Table 1 it was observed that a moderate positive relationship of 0.643 exists between secondary school students' emotional intelligence and their academic achievement in Mathematics. Table 2 reveals that at 0.05 level of significance and 2044df, the calculated t 3.396 with Pvalue 0.001 which is less than 0.05, the null hypothesis is rejected. This implies that there is a significant relationship between self-efficacy and academic achievement of secondary school students in Mathematics in Imo state.This finding slightly differs from the findings of [12] which result showed that there was a significant low positive relationship between the emotional intelligence of SS2 students and their academic achievement in mathematics among others. Result relating to the corresponding hypothesis shows that there is a significant relationship between emotional intelligence and academic achievement of secondary school students in Mathematics in Imo state. This finding again agrees with the finding of [12] which found a significant and low positive relationship between the emotional intelligence of SS2 students and their academic achievement in mathematics. Justifying these findings, there is ample evidence to suggest that emotional intelligence has a positive association with academic achievement.

Research question 2: What is the type of relationship between self-efficacy and academic achievement of secondary school students in Mathematics in Imo state?

Hypothesis 2: There is no significant relationship between self-efficacy and academic achievement of secondary school students in Mathematics in Imo state.

In Table 3 it was observed that a very low positive relationship of 0.310 exists between secondary school students' self-efficacy and their academic achievement in Mathematics. Furthermore, Table 4 reveals that at 0.05 level of significance and 2044df, the calculated t 4.613 with Pvalue 0.000 which is less than 0.05, the null hypothesis is rejected. This implies that there is a significant relationship between self-efficacy and academic achievement of secondary school students in Mathematics in Imo state. The findings relating to research question further revealed a very low positive relationship existing between secondary school students' self-efficacy and their academic achievement in Mathematics. This finding also conforms with the findings of [16] which found that self-concept and self-efficacy jointly and relatively contributed to academic achievement in English language of the participants among others. Similarly, this

finding is in agreement with [14] as they reported that academic self-efficacy and locus of control jointly predicted academic performance. In line with the hypothesis tested, there is a significant relationship between self-efficacy and academic achievement of secondary school students in Mathematics in Imo state. This result is in disagreement with the finding of [1] which reported there is no significant difference in the influence of self-efficacy on academic achievement means scores of male and female secondary school students. On the other hand, [18] reported that that principal's leadership styles and socio-demographic factors significantly influenced teachers job satisfaction, classroom management and ultimately students' achievement in senior secondary schools. This however aligns with the finding of the present study.

Research question 3: What is the type of joint relationship among emotional intelligence, self-efficacy and academic achievement of secondary school students in Mathematics in Imo state?

Hypotheses 3: There is no significant correlation among emotional intelligence, self-efficacy and academic achievement of secondary school students in Imo state.

The findings presented in Table 5 of this study showed a coefficient of 0.451. This implies is a moderate positive relationship existing among secondary school students' emotional intelligence, self-efficacy jointly with their

academic achievement in Mathematics. Similarly, results for the corresponding hypothesis presented in table 6 revealed a significant relationship existing among secondary school students' emotional intelligence and self-efficacy jointly with their academic achievement in Mathematics in Imo state. The findings of this study align with [13] which found a positive relationship between emotional intelligence skills and academic achievement such that developing emotional intelligence skills of a student will lead to the enhancement of their academic achievement. it also conforms with the finding of [17] which found that emotional intelligence, age and academic motivation are potent predictors mildly associated with academic achievement. Justifying these findings could be that individuals who have high expectancies for both types of expectations are ensured greater success as they will continue to be persistent when confronted by difficulties that hamper steady progress. Those who have low expectancies will falter in the presence of difficulty. Specifically, how efficacious individuals perceive themselves to be regarding an activity or experience contributes to the individuals' specific choice of activity and attention to that activity. The level of success at which the activity is completed is also affected by an individual's perception of self-efficacy. The importance of self-efficacy beliefs becomes obvious by their potential to explain differences in school achievement. Domain specific self-efficacy beliefs can help to raise the accuracy of prediction of differences in school achievement in subjects learnt.

Table 1. Pearson r on emotional intelligence and academic achievement of secondary school students in Mathematics (*n=1247*)

Sources of variation	N	Emotional intelligence r	Mathematics r	Remark
Emotional intelligence	1247	1.00	0.643	Moderate positive relationship
Mathematics	1247	0.643	1.00	

Table 2. t-test on the relationship that exist between emotional intelligence and academic achievement of secondary school students in Mathematics *(n=1247)*

N	Cal. r	df	Cal. t	P-value	Remark
1247	0.643	1244	3.396	0.001	Significant

Table 3. Pearson r on self-efficacy and academic achievement of secondary school students in Mathematics (*n=1247*)

Sources of variation	N	Self-efficacy r	Mathematics r	Remark
Self-efficacy	1247	1.00	0.310	Low positive relationship
Mathematics	1247	0.310	1.00	

Table 4. t-test on the relationship that exist between self-efficacy and academic achievement of secondary school students in Mathematics *(n=1247)*

N	Cal. r	Df	Cal. t	Pvalue	Remark
1247	0.310	1244	4.613	0.000	Significant

Table 5. Summary of regression analysis on secondary school students' emotional intelligence, self-efficacy and academic achievement in Mathematics (*n=1247*)

R	R Square	Adjusted R Square	Remark
0.451	0.203	0.201	Moderate positive relationship

Table 6. Summary of regression analysis on the relationship existing among secondary school students' emotional intelligence, self-efficacy and academic achievement in Mathematics *(n=1247)*

N	R	R Square	Adjusted R Square	df	Cal. F	Pvalue	Remark
1247	0.451	0.203	0.201	1244	13.362	0.000	Significant

5. CONCLUSION

Owning to the fact that in recent years the quality of education in Nigeria, especially in our secondary schools has been a subject of public concern. The conclusion of this study creates an insight on the possible reasons for poor academic achievement in accordance with their personality traits and have provided justification for the expressed concerns. Based on the findings of this study summarized above, it was concluded that the type of relationship existing among emotional intelligence, self-efficacy jointly with academic achievement of secondary school students is moderate and significant. The study also concluded that majority of the secondary school students sampled as respondents in the study possess effective functioning emotional intelligence. On the other hand, majority of the secondary school students possess high self-efficacy. This could likely be the resultant outcome of the joint relationship between emotional intelligence, self-efficacy and academic achievement in mathematics where a high number of the students had excellent achievement.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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