EMOTIONAL INTELLIGENCE AND MATHEMATICS ACHIEVEMENT OF UNDERACHIEVING HIGH ABILITY SENIOR SECONDARY SCHOOL STUDENTS: A PERSPECTIVE OF INCLUSIVITY IN REGULAR SECONDARY SCHOOLS IN CALABAR EDUCATION ZONE, CROSS RIVER STATE, NIGERIA

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(Received 8, November 2023; Revision Accepted 27, November 2023)

ABSTRACT

Some high ability students who show great mathematics potentials fails to perform at a level commensurate with their abilities in mathematics. Most of them lack self-efficiency, goal directedness or self-regulation skills which has resulted to poor performance in Mathematics. The dwindling performance in Mathematics in both internal and external examinations among high ability students in Nigeria are not because they do not have the intellect but because of prevailing factors of emotional intelligence which influence their performance in schools. The main purpose of the study is to examined the relationship between emotional intelligent and Mathematics achievement of high ability students in Calabar Education Zone of Cross River State, Nigeria. This study adopted correlational survey design which determined emotional intelligence (wellbeing, self control and sociability) as relate to Mathematics achievement of high ability students in Calabar Education Zone of Cross River State, Nigeria. It was guided by three research questions and three null hypotheses. A sample of 400 Senior Secondary II students was selected from public schools using the stratified random sampling technique, school record, and teachers’ nomination checklist. Two instruments, emotional intelligence Questionnaire (EIQ) and Mathematics Achievement Test (MAT), were used for data collection. The reliability of the questionnaire, established using Cronbach Alpha with a coefficient of .81 and .84 while the reliability estimate of the high ability students’ MAT was established through Kuder Richardson formula K-R20 which yielded .83. The hypotheses were tested using Pearson product Moment Correlation Coefficient at .05 level of significance. The findings of the study revealed that wellbeing, self control, sociability significantly relate with mathematics achievement of underachieving high ability senior secondary school students. Based on the findings of this study, it was recommended amongst others that the attributes of emotional intelligence should be taken into consideration during planning of educational curriculum so as to enrich the current Mathematics curriculum and enhance high ability students’ performance in the subject.

KEYWORDS: Emotional intelligence, high ability, self control, sociability, Mathematics achievement, wellbeing

INTRODUCTION

Mathematics is one of the subjects that has been made compulsory for all students in both junior and senior secondary education in Nigeria. This is because its relevance is innumerable and cuts across every facet of human endeavour, and life in general. Every individual needs the knowledge of Mathematics to function intelligently.
and efficiently because the subject is an integral part of the human life (Ibok, et al, 2019). In spite of this wide range of applicability, relevance and usefulness of Mathematics, it is heart-breaking to know that the performance of high ability students in the Calabar education zone, Cross River State and the nation at large is poor (Ibok, & Unoh, 2019). The poor underachievement in mathematics by high ability students could be felt in low contribution academically to themselves and the society low contribution to scientific and technological advancement of any society. This poor mathematics achievement may seriously jeopardize the aim and objectives of the government on the education for students with high ability, special gift and talent aimed to be provided for the interest of the nation’s economic and technological development. The dwindling performance in mathematics has often been attributed to inability of the high ability students in Calabar Education zone of Cross River State to maximize their potentials, optimum achievement in mathematics. The dwindling performance in Mathematics in both internal and external examinations among high ability students in Nigeria is a major source of concern for educators and parents. According to Dada and Fagbemi (2018) it has been observed in most schools, that some high ability students who show great mathematics potentials fails to perform at a level commensurate with their abilities especially in mathematics this generally brings to mind the concept of underachievement by high ability students in regular schools. Most of them lack self-efficiency, goal directedness or self-regulation skills and other low achievers and from either obvious or hidden personalities that do not support them in optimising them potentials. In achieving the set academic goals in Mathematics, high ability students interacts with different group of peoples including their teachers, fellow students with an aim of obtaining support to improve their academic achievement in Mathematics. One of the major characteristics of mathematics underachievement among high ability students are as a result of inappropriate educational conditions or poor social influence a psychological conditions (Nanjwan, et al, 2021). Specific factor conceptualized in this study is the level of emotional intelligence that is not matching with their potentials. Mathematics achievement of underachieving high ability students can be caused or hindered by their emotional intelligence.

The basic tenet of emotional intelligence described the collection of emotional self perceptions situated at the lesser parts or levels of personality, (Muhammed & Kajuru, 2019). According to Nwokolo, and Ahaneku, (2021), the level of emotional intelligence allows one to empathize with others effectively. It helps one build a stronger relationships to succeed at schools, achieve one’s career and personal goals as well as enhance academic achievement in mathematics. Ali and Ali (2016) in their study found that emotional intelligence is positively correlated to students’ academic achievement. Alghamdi, (2014) believes that higher levels of emotional intelligence predict academic achievement. Emotional intelligence according to Oram et al (2022) are classified into three structures, namely; wellbeing, self-control, and sociality. These three structures or factors gave birth to 15 (fifteen) sub-factors and they include, adaptability, assertiveness, emotional perception, emotional regulation, emotional management, emotional expression, impulsiveness, relationship, self-esteem, social awareness, stress management, trait empathy, trait happiness and trait optimism. According to Dada (2015), indices are cogent and reflect in personality traits that are used to measure their behaviour with regards to their social relationships specifically for high ability students in optimising their potentials in schools. By inclusion, high ability students but underachievement in mathematics are found largely in regular schools or conventional learning environment. Inclusive education addressing and responding to the diversity of needs of all learners through increasing participating in learning, cultures, approaches and reducing exclusion within and from education (Innocent, et al, 2022).

High ability students according to Ogar (2017) are students with IQ of 120 and above and their characteristics remain a mystery to regular class teachers. Most regular class teachers are confused of so many attributes of high ability students such as high intelligence, high curiosity, high speed to information processing, self-management. Generally, high ability students get their work done and demand for more tasks. They seek advance challenges, ask analytical questions and have interest in the work that are
meant for older students. These characteristics are functions of the intelligence of high ability students (Igba, et al, 2022). Some of the emotional intelligence identified in this study which can influence high ability achievement in Mathematics include wellbeing, self-control and social emotional intelligence. Wellbeing of underachievement high ability student in mathematics is significant association between emotional intelligence. According to Mangarin, and Montefolka, (2023), wellbeing, emotional intelligence influences high ability student by fostering adaptive methods of coping with mathematics challenges, social stress and interpersonal conflicts. Wellbeing could increase positive emotions and enhance emotional regulations. Orim et al (2022) opined that wellbeing promotes positive relationships with others and also enhances individual capability of mastering the key concepts in mathematics and other relevant subjects. Self-control emotional intelligence of the underachieving high ability students in mathematics concerns with the ability to keep an individual’s disruptive emotions and impulses in check, and to maintain effectiveness under stressful or even hostile conditions, which does not require suppressing emotions. People with strong control skills tend to be high in conscientiousness (Moradi & Maghbouli,2021). They are people who are thoughtful about how they influence others and take responsibility for their own actions. Social emotional intelligence refers to the ability to be aware of one’s own feelings in the present moment. This includes important skills such as communicating the problem faced by them in solving mathematics effectively with others, working in groups and controlling impulses. Nwokolo, and Ahaneku (2021) examined the relationship among emotional intelligence, self-efficacy and academic achievement of secondary school students in Mathematics in Imo State and found a significant relationship between emotional intelligence and academic achievement of secondary school students in Mathematics in Imo State. In the same vein, Moradi and Maghbouli (2021) study to examined the relationship between emotional intelligence (EQ) and mathematic performance and found no significant relationship between emotional intelligence (EQ) and mathematical performance. Prafitriyani, et al (2019) determine whether there is a positive effect of emotional intelligence on mathematics achievement of students in Buru and found a significant influence emotional intelligence on mathematics achievement. Uchendu (2020) conducted a descriptive study on the influence of emotional intelligence on Mathematics achievement of students of public senior secondary schools in Rivers State and found emotional intelligence in term of wellbeing, self control, self-awareness, self-regulation, motivation, empathy, and social skills) significantly influenced Mathematics achievement of students of public secondary schools in Rivers State Mangarin, and Montefolka (2023) examined the relationship between social-emotional intelligence and attitude towards Mathematics instruction and found no significant relationship between social-emotional intelligence and attitude towards Mathematics instruction. In the same vein, Odochi, and Ebele (2021) investigated how mathematics anxiety and emotional intelligence predicted secondary school students’ academic achievement in Mathematics and found emotional intelligence significantly predicts secondary school students’ achievement in Mathematics. Emotional Intelligence have identified to influence students’ academic achievement in Mathematics. Musonda, Shumba, and Tailoka (2021) examined the relationship between Emotional Intelligence and Academic Achievement in Algebra of First Year Mathematics and Science Education Students at the Copper belt University in Zambia and found no significant relationship between emotional intelligence and academic achievement in algebra. In the similar way, Syaiful (2021) conducted a survey design to determine the emotional intelligence of junior high school students and found emotional intelligence of students to significantly influence students’ achievement in mathematics. Kanhai (2014) in his study found Mathematics achievement significantly related with Emotional Intelligence. Conclusively, there is a need for researchers and educationists to give more attention on emotional intelligence as its associated with students’ academic achievement in mathematics.
Research questions
This study answered the following research questions:

i. How does wellbeing relate with mathematics achievement of underachieving high ability senior secondary school students in Calabar Education Zone?

ii. How does self-control relate with mathematics achievement of the underachieving high ability senior secondary school students in Calabar Education Zone.

iii. To what extent does socialibity relate with mathematics achievement of underachieving high ability senior secondary school students in Calabar Education Zone?

Research hypotheses

The following null hypotheses were tested at 0.05 significant level, to guide the study: 

Ho1: Wellbeing does not significantly relate with mathematics achievement of underachieving high ability senior secondary school students in Calabar Education Zone.

Ho2: Self-control does not significantly relate with mathematics achievement of the underachieving high ability senior secondary school students in Calabar Education Zone.

Ho3: Socioability does not significantly relate with mathematics achievement of underachieving high ability senior secondary school students in Calabar Education Zone.

RESEARCH METHODS

The study area was Calabar education Zone of Cross River State, Nigeria. The research design used for this study was the correlational survey design. The researchers used this design to establish the relationship between emotional intelligence (in terms of wellbeing, self-control and sociability) and mathematics achievement of the underachieving high ability senior secondary school students in Calabar Education Zone. The population for the study consists of all the SSS 2 high ability students public secondary schools in Calabar Education Zone of Cross River State. Multi stage sampling procedure was adopted for the study which consisted of stratified sampling technique, purposive and simple random sampling techniques. Stratification was used on the basis of Education Zone so as to give adequate representation of the subjects in each Education Zone and equal opportunity for all the schools in the different Local Education Authorities was selected. From the each selected schools, researchers used school Mathematics Record and Teacher Nomination Checklist to select the required sample for the study. A sample of 400 high ability students were selected for the study. The instruments used for data collection were the questionnaire titled “Emotional intelligence” and achievement test in Mathematics. The questionnaire was made of 18 items, with 6 items to measure each sub-level of emotional intelligence. It was based on a four point scale of strongly agreed, agreed, disagreed and strongly disagreed. Mathematics Achievement Test was made up of 50 items constructed by the researchers with help of two experts in Mathematics education. The items were constructed based on SSS 2 Mathematics syllabus with four options A, B, C, D. A correct answer attracts one mark while incorrect answer attracts zero (0) mark. The instrument was face-validated by two experts in Measurement and Evaluation and two Mathematics Educators, both from the University of Calabar. Corrections were pointed out by the experts and adjusted by the researchers and the document was considered valid. The reliability of the questionnaire ranches from .81 to .84 while the reliability estimate of the High ability Students’ Mathematics achievement test was established through Kuder Richardson formula K-R20 which gave .83. Since the reliability index is above 0.50, the estimates were considered high enough for the study (Bok & Unoh, 2019). The Statistical Package for Social Sciences (SPSS) computer programme was used to analyze the data collected. The hypotheses were tested using Pearson Product Moment Correlation Coefficient for the three hypotheses of the study.

PRESENTATION OF RESULTS

The result of the analysis is presented in tables 1, 2 and 3. The hypotheses were tested at .05 significant level.

Ho1: Wellbeing does not significantly relate with mathematics achievement of underachieving high ability senior secondary school students in Calabar Education Zone.

The independent variable in this hypothesis is wellbeing while the dependent variable is Mathematics achievement of underachieving high ability senior secondary school students. In testing this hypothesis, mean, standard deviation of wellbeing and mathematics achievement of
underachieving high ability senior secondary school students were computed, compared and correlate using Pearson Product Moment Correction. The results are presented on Table 1

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>r-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wellbeing</td>
<td>400</td>
<td>16.876</td>
<td>2.897</td>
<td>.632</td>
<td>.000</td>
</tr>
<tr>
<td>Mathematics achievement</td>
<td>400</td>
<td>34.876</td>
<td>4.765</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the .05 level, df =398

The result presented on Table 1 shows that wellbeing significantly relate with mathematics achievement of underachieving high ability senior secondary school students (r=.632; p=.000). With this result, the null hypothesis was rejected while the alternative was retained at the 0.05 level of significance. The positive r-value indicated that the more high ability students in SS2 are consciousness of their wellbeing, they better their achievement in Mathematics. Ten to be. On the other hand, when there are not conscious of their wellbeing, the poorer their achievement in Mathematics tend to be.

Table 2: Person Product Moment Correlation analysis of the relationship between self-control and Mathematics achievement (N= 400)

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>r-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-control</td>
<td>400</td>
<td>15.998</td>
<td>2.987</td>
<td>.588</td>
<td>.000</td>
</tr>
<tr>
<td>Mathematics achievement</td>
<td>400</td>
<td>34.876</td>
<td>4.765</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the .05 level, df =398

The result presented on Table 2 shows that self-control significantly relate with mathematics achievement of underachieving high ability senior secondary school students (r=.588; p=.000). With this result, the null hypothesis was rejected while the alternative was retained at the 0.05 level of significance. The positive r-value indicated that the more high ability students exhibit high self-control, the better their achievement in Mathematics tend to be. On the other hand, when there is no self control, the poorer their achievement in Mathematics achievement tend to be.

**Ho2:** Self control does not significantly relate with mathematics achievement of underachieving high ability senior secondary school students in Calabar Education Zone. The independent variable in this hypothesis is self-control while the dependent variable is Mathematics achievement of underachieving high ability senior secondary school students. In testing this hypothesis, mean, standard deviation of self-control and mathematics achievement of underachieving high ability senior secondary school students were computed, compared and correlate using Pearson Product Moment Correction. The results are presented on Table 3.

EMOTIONAL INTELLIGENCE AND MATHEMATICS ACHIEVEMENT OF UNDERACHIEVING HIGH ABILITY SENIOR SECONDARY
Table 3: Person Product Moment Correlation of the relationship between sociability and Mathematics achievement (N= 400)

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>r-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sociability</td>
<td>400</td>
<td>17.912</td>
<td>2.765</td>
<td>.612</td>
<td>.000</td>
</tr>
<tr>
<td>Mathematics achievement</td>
<td>400</td>
<td>34.876</td>
<td>4.765</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the .05 level, df =398

The result presented on Table 3 shows that sociability significantly relate with mathematics achievement of underachieving high ability senior secondary school students (r=.612; p=.000). With this result, the null hypothesis was rejected while the alternative was retained at the 0.05 level of significance. The positive r-value indicated that the more high ability students positively associated with others, the better their achievement in Mathematics tend to be. On the other hand, when they are not social, the poorer in their achievement in Mathematics tend to be.

**DISCUSSION OF FINDINGS**

The result of hypothesis one revealed that wellbeing significantly relate with mathematics achievement of underachieving high ability senior secondary school students in Calabar Education Zone. The level of emotional intelligence allows one to empathize with others effectively. It helps one build a stronger relationships to succeed at schools, achieve one’s career and personal goals as well as enhance academic achievement in mathematics. The finding is in line with Prafitriyani, et al (2019) who determine whether there is a positive effect of emotional intelligence on mathematics achievement of students in Buru and found a positive influence of emotional intelligence on mathematics achievement. Orim et al (2022) opined that wellbeing promotes positive relationships with others and also enhances students’ performance in schools.

The result of hypothesis two revealed that self control significantly relate with mathematics achievement of underachieving high ability senior secondary school students in Calabar Education Zone. Students’ with strong control controls tend to be high in conscientiousness They are people who are thoughtful about how they influence others and take responsibility for their own actions. The finding agreed with Moradi and Maghbouli,(2021) who stated student with strong control skills tend to be high in conscientiousness They are people who are thoughtful about how they influence others and take responsibility for their own actions. The finding agreed with Uchendu (2020) who conducted a descriptive study on the influence of emotional intelligence on Mathematics achievement of students of public senior secondary schools in Rivers State and found emotional intelligence ( wellbeing, self control, self-awareness, self-regulation, motivation, empathy, and social skills) significantly influenced Mathematics achievement of students of public secondary schools in Rivers State.

The result of hypothesis three revealed that sociability significantly relate with mathematics achievement of underachieving high ability senior secondary school students in Calabar Education Zone. Students’ with social emotional intelligence. High ability students can interacts with different group of peoples including their teachers, fellow student s and parents with an aim of obtaining support to improve their academic achievement in Mathematics. The finding disagreed with Mangarin, and Montefolka (2023) who examined an quantitative non-experimental descriptive-correlational to determine the significant influence of social-emotional intelligence to attitude towards Mathematics instruction both in individual and aggregate capacity and found no significant relationship between social-emotional intelligence and attitude towards Mathematics instruction. The finding agreed with Odochi, and Ebele (2021) who investigated how mathematics anxiety and emotional intelligence predicted secondary school students’ academic achievement in Mathematics and found emotional intelligence predict secondary school students’ achievement in Mathematics. The finding is in greement with Musonda, Shumba,
And Tailoka (2021) who examined the relationship between Emotional Intelligence and Academic Achievement in Algebra of First Year Mathematics and Science Education Students at the Copper belt University in Zambia and found no significant relationship between emotional intelligence and academic achievement in algebra from both cohorts.

CONCLUSIONS
The level of emotional intelligence of the high ability students could allow them interact with others effectively. If properly guided, it build a stronger relationships to succeed at schools, achieve one’s career and personal goals as well as enhance academic achievement in mathematics. Based on the findings of the study, it was concluded that emotional intelligence such as wellbeing, self control, sociability significantly relate with mathematics achievement of underachieving high ability senior secondary school students in Calabar Education Zone. Therefore, emotional intelligence are very important factors and should be considered by educational authorities among other strategies to enhance high ability academic achievement in Mathematics.

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

i) School counsellors should educate high ability students on the negative and positive influence of emotional intelligence on their academic achievement. This would made them to be conscious of their wellbeing, self control and sociability in order to enhance their performance in Mathematics.

ii) The attributes of emotional intelligence should be taken into consideration during planning of educational curriculum so as to enrich the current Mathematics curriculum and enhance high ability students’ performance in the subject. It was also suggested that the curriculum planners and researchers in the field of education should make use of this study in their areas of endeavour to stimulate new interest and areas for further research, which could bring about new developments.

iii) Curriculum experts should develop an affective instructional curriculum that incorporates emotional intelligence skills wellbeing, self control, and sociability. These would help to reduce negative anxiety and enhance high ability students’ performance in Mathematics.

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