

**ASSESSMENT OF EMOTIONAL INTELLIGENCE AND ITS
RELATIONSHIP WITH STUDENTS' ACHIEVEMENT IN MATHEMATICS**

BY

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AUGUST, 2017.

TITLE PAGE

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**PROJECT SUBMITTED TO THE DEPARTMENT OF SCIENCE EDUCATION,
UNIVERSITY OF NIGERIA NSUKKA IN PARTIAL FULFILLMENT FOR THE
AWARD OF MASTERS DEGREE IN EDUCATION (MEASUREMENT AND
EVALUATION)**

SUPERVISOR: PROFESSOR B. C. MADU

AUGUST, 2017.

CERTIFICATION

This is to certify that, this study on: “Assessment of Emotional Intelligence and its Relationship with Students’ Achievement in Mathematics” was carried out by Nnaji, Anayo David, a postgraduate student in the Department of Science Education, with Registration Number PG/MED/14/76555 to complete the requirements of research work for the award of the degree of Master in Science Education. The work incorporated in this thesis is original and has not been submitted in part or full, for any other degree in this or any other university.

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DEDICATION

This work is dedicated to the Most High, Almighty and Most Glorified God, my maker, source, sustainer, giver of wisdom and destiny shaper who in His infinite mercy made this research work a real success with invaluable proofs.

ACKNOWLEDGEMENTS

I am fortunate to triumph because I sagaciously benefited from the insight, advice and encouragement of great people. Without them, completing this thesis would have been living hell. First, I thank my distinguished supervisor, Professor B. C. Madu for abundant patience and generosity. I am very fortunate to have worked with a supervisor who was so involved with my research as well as my general wellbeing. His commitment, encouragement and cooperation helped me to conquer the dreaded. My immense appreciation also goes to Professor B. G. Nworgu, Prof. D. N. Ezeh, Prof. Z. C. Njoku, Prof. Uche Ezeh, Prof. A. A. Nwosu, Prof. U. M. Nzewi, Prof. U. N. V. Agwagah, Dr. J.J. Agah, Dr. C. S. Ugwuanyi (my Content Reader), Dr. Ezeugwu (Late, my Design Reader), Dr. C. N. Obi, Dr. E. U. Okorie, Dr. N. J. Anyaegbunam, Dr. C. U. Ene, Dr. F. O. Ezeudu, Dr. D. U. Ngwoke, thank you for teaching me, influencing me and advertising me ahead of my generation. Your contributions to the success of this research work is overwhelmingly inspiring me for greater glory.

I am greatly indebted to Dr. F. E. Ikeh, for inspiring and encouraging me through each phase of this research work; whose data analysis skills in SPSS software has provided me with sufficient guidance. I heavily appreciate Dr. (Princess) J. N. Nnaji, proprietress, Julia-Gee Cornerstone Schools, Enugu. Your motherly inspiration, monitoring and direction since you employed me have been a great powerhouse for erupting excellence in me especially in my challenges. Director, Prince Chinedu Nnaji, you have been like a brother. Your encouragement and advice have been a handful of great treasure. Seeing this far is possible because I stand with the family of Chief & Barrister Fidelis Ebere-Agbo, it has been your love, encouragement, prayers and support all the way. I am greatly indebted to you. May God who sees the innermost secret of the heart be very present to you whenever you need help. The completion of this work is a testimony to your trust in me and a positive sign that greatness is near. I owe a great deal of immeasurable appreciation to true friends, Adaigwe

Chisom Vera James-Ajaegbu(Sweetie'm), Ijamu Dickson Owoicho and Mr Uzoka Stanley Obidi. You have been very helpful, supportive and instrumental in my struggle for this vision. It was you who really gave me the courage to delve and dare. Thank you.

Last but not the least, I acknowledge the support of my parents Mr O. L. A. Nnaji (Late) and Mrs O. R. Igwe, I am grateful for the way you brought me to this world. There couldn't be a better parenting than setting me up. Also to everyone who have contributed in one way or the other in the course of this work whose names are not mentioned here for space and time sake, I express my overwhelming gratitude. From above comes all good gifts. I give God thanks for the quantum of unmerited favor, love, guidance, protection, and provision He show me in my academic pursuit. Inhabit my praise Oh Lord.

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ABSTRACT

This study focused on assessment of emotional intelligence and its relationship with students' achievement in mathematics in Enugu Education zone, Enugu, Nigeria. The main purpose was to find the influence of emotional intelligence on students' achievement in mathematics, as well as when moderated by gender. Four research questions and three hypotheses were formulated to guide the study. The study adopted a correlational design. The population of the study was 4825 (2813 male and 2012 female) SS2 students from 25 government secondary schools in Enugu Education zone. The sample for the study was 483 SS2 mathematics students comprising of 282 males and 201 females from six senior secondary schools in the study area. Multistage sampling consisting of simple random and stratified sampling techniques were used for selection of the schools for the study. Youth version of emotional quotient inventory (EQ-i2.0) and a mathematics achievement test (MAT) were used for data collection. Data were subjected to descriptive and inferential statistical analysis using multiple linear regression to answer the research questions, and test null hypotheses at 0.05 level of significance. The results revealed that there was a significant positive correlation between emotional intelligence and students' achievement in mathematics. A significant positive relationship also exists between each predictor variable and students' achievement in mathematics. The results also revealed that gender does not significantly moderate on students' achievement in mathematics due to emotional intelligence. Fourthly, the results also showed that the regression model for predicting student's achievement by their emotional intelligence was significant. In the study, stress management dimension of emotional intelligence with a coefficient of determination (r^2) of 0.66 (66%) best predicted students' achievement in mathematics. It was concluded that emotional intelligence influences students' achievement in mathematics, and female students achieved relatively better than male students. Based on the findings of this study, it was recommended that government should organize workshops and seminars for in-service teachers and teacher trainees to enable them understand the concept of emotional intelligence in order to develop their own emotional intelligence and that of their students. Also, planning and teaching of mathematics should encourage gender equality and encourage the use of techniques that cater for the emotional needs of both males and females alike. Finally, teachers should be gender sensitive to encourage both male and female students alike in developing their emotional intelligence in order to improve their achievement in mathematics.

CHAPTER ONE

INTRODUCTION

Background of the Study

Education, formal or informal has been a tool for ages by which survival skills and desirable norms have been transferred from one generation to another. Education emancipates man from the ignorance of self and his environment through scientific inquiry. An evidence for a functional education is accounted when learning takes place. Nworgu (2016) noted that learning is measured by the level of achievement of individuals or groups who have been exposed to pedagogical intervention. Nworgu (2015) described achievement as a measure of the extent to which the objectives of instruction as well as goals of education are attained. However, the effectiveness of a pedagogical intervention depends on learners' interpretation, understanding and emotional concern for the concept taught, especially in mathematics.

Unamehas cited in Tshabalala and Ncube (2013) was of the view that mathematics is bedrock and very key to scientific and technological advancement of any nation. Mathematics is connected to successes and significant achievements in all facets of life. This justifies the emphasis of government and stakeholders on mathematics at all levels of education (Davies & Hersh, 2012), and the commitment of a great deal of resources for enhancing the teaching and learning of mathematics. In Nigeria, mathematics is given a high priority and therefore enjoys favourable educational policies at all educational levels. Since Nigeria's independence, mathematics is a compulsory core subject for all primary and secondary school learners and must be passed at credit level by students seeking admission into any tertiary institution in Nigeria.

It is disheartening to note that with all the interest in mathematics, public examinations result still recorded poor performance in the subject time-after-time. Sa'ad and Usman (2014) and Nworgu (2016) described the poor academic performance of students in Senior Secondary School Certificate Examinations (SSCE) in National Examination Council (NECO) and West Africa Senior Secondary Certificate Examination (WASSCE) respectively. Nworgu (2016) summarized the percentage score of students who passed mathematics in the National Examination Council (NECO) May/June senior secondary certificate examination within the last decade. In 2005, only 27.29% of students had a credit in mathematics, though an improvement characterized the result for 2006, 2007 and 2008 yet a sharp decline to 27.16% in 2009 which continued through 2010 and 2011. There was another improvement in the result in 2012, 2013 and 2014 but a brief decline in 2015. Sadly still, the West Africa Examination Council (WAEC) results over the years has not been redeemed. Sa'ad and Usman (2014) reported that in 2010, over 76% of candidates who sat for WAEC May/June examinations as well as over 70% of candidates who sat for WAEC Nov/Dec failed to meet the minimum entry requirement into tertiary institutions. In 2014 WASSCE May/June results recorded a mass failure in mathematics. Eguridu, head of National Office (WAEC) while announcing the results said a total of 529,425 candidates; representing 31.28% obtained credits in mathematics indicating a marginal decline in the performance of students when compared to 38.81% recorded in 2012 and 36.57% in 2013. However, WAEC Head of Nigeria National Office Adenipekun at the release of May/June 2016 results described the 53% credit recorded as a stepping stone for improvement. Ojimba, (2012) believes that this poor performance in mathematics is the major reason for decline in scientific and technological development in the country. Agwagah as cited in Ugwuanyi (2009) believes that though the indispensability of mathematics in the development of our society has been acknowledged, the output of its teaching and learning is still not

encouraging. Unimpressively, efforts to alleviate this lingering problem of poor academic performance is still a mirage.

Nworgu (2016) assert that the persistently poor academic achievement of students in mathematics cannot but be an evidence of pedagogical failure. Literature have proposed a number of reasons for this eminent problem of poor performance in mathematics among Senior Secondary School students. Sa'ad, Adamu and Sadiq (2014) suggests that the problem of poor performance in mathematics is attributed to the school, student, teacher as well as the government itself. Although a large number of studies have been made on government policies, teacher, school, infrastructure and other pedagogical related issues as the causes of the poor academic achievement witnessed over the years, only a few researchers have studied issues relating to the learner directly (Zakariya & Bamidele, 2015). The learner is often positioned as an active receptor of knowledge, and deemed incapable of a willful thought, lacking creative ability, emotion and control over his own learning. Therefore, materials are loaded on the learner's mind which the learner may be incapable of digesting. Learners colloquialize and often times the quest to pass the prescribed examinations leads to examination malpractice which at the end puts candidates in the struggle for showcasing academic achievement because the learner not only lacks understanding and mastery of basic mathematical concepts but also lacks crucial emotional competencies. Dardello (2007) have shown that cognitive ability alone is insufficient to determine an individual's success. McKee (2013) holds a similar believe, it is unwise of us to relegate decision making to only one aspect of our mind (i.e. our logical minds). Al-Shayeb (2010) opine that success is no more a solitary function of one's intelligence (IQ). Goleman and Senge (2014) believe that intelligence and emotional behaviour constitute indicators of academic success. To this regards, Perera (2015) consider affective constructs of emotion as a panacea for poor academic achievement in schools if intelligently harnessed.

However, Mahadi (2011) record that until the 20th century when researchers began to investigate and recognize other non-cognitive (soft skill) aspects of intelligence, traditional intelligence (IQ) was the only known form of intelligence. The academic literature now discusses practical intelligence, emotional intelligence, social intelligence (Albrecht, 2006; Goleman, 2006, Bar-On, 2006), ecological intelligence (Goleman, 2009), and spiritual intelligence (Zohar & Marshall, 2001) as various softer form of intelligence. Wechsler cited in Bar-On (2006) described the influence of non-cognitive factors on intelligent behaviors, and argued that our models of intelligence would not be complete until they are adequately integrated. In a similar thought, McKee (2013) believes that intuition is a complex process that brings knowledge, experience, cognition and emotion together to help us understand new problems. Vahedi and Nikdel (2011) upheld that Darwin already described evolution of emotional expressions in human species as a mechanism for preparing the organism to respond adaptively to environmental cues and communicate important social information. LeDox (2006) earlier affirmed that emotion can help us gather, filter and use data to make decisions. LeDox showed that when the brain's hemispheres have been surgically separated to interrupt the flow of emotional impulses, people have trouble making even the simplest decisions, such as what color of cloth to wear.

Mayer and Salovey (2004) described emotions as organized responses, crossing the boundaries of many psychological systems, including the physiological, cognitive, motivational and experimental systems. Emotions typically arise in response to an event, either internal or external, that has a positively or negatively valenced meaning for the individual. Emotion is distinguished from the closely related concept of mood in that emotions are generally shorter and more intense. Contrast to emotions is rationality which refers to the characteristics of conformity with reason, adherence to qualities of thought such as intelligibility, coherence, consistency, order, logical structure, completeness, testability,

and simplicity (Australian Theological Forum, 2006). However, Humphrey, Curran, Morris, Farrell and Woods (2007) described a fusion of emotion and reason. Ben-Ze'ev (2000) opined that emotion enables reason to function since the control of the main neurochemical that facilitate cognition, dopamine, is predominantly under the auspices of the emotional system of the brain, the limbic system. LeDox (2006) believes that in this, nature defines intelligence in terms of emotion. Bar-On (2006) noted that researchers explore various ways to describe, define and assess emotional intelligence which makes its incorporation in education more effective for learning.

Emotional Intelligence (EI) is the ability to monitor one's own and other's feelings and emotions, to discriminate among them, and to use this information to guide one's thinking and actions. Bar-On, (2013) described emotional intelligence as a cross-section of interrelated emotional and social competencies, skills and facilitators that determine how effectively we understand and express ourselves, understand others and relate with them, and cope with daily demands and pressures. The term Emotional Quotient (EQ) denotes the extent to which these competencies abound in the individual. Broadly speaking, emotional intelligence as the ability to identify, understand, manage and use emotions in positive ways to relieve stress, communicate effectively, empathize with others, overcome challenges, and defuse conflict in order to achieve one's desired goals effectively. Emotional intelligence can be conceived either as a skill (Mayer & Salovey, 1993) or a trait (Goleman, 1995). However, Joseph and Newman (2010) suggested that in whatever form, conceptualization and measurement of emotional intelligence can be applied to a mixed model definition of emotional intelligence such as the one proposed by Bar-On (1997; 2000, 2006), and operationalized through the emotional quotient inventory (EQ-i), which was more recently modified to EQ-i2.0 by Multi-Health Systems (2011). Five dimensions of emotional

intelligence identified by Bar-On include self-perception, self-expression, interpersonal skills, stress management and decision making.

Self-perception describes students' sensory interpretation of self. Multi-Health Systems (2011) describe self-perception under three indicators: self-regard, self-actualization and emotional self-awareness. Self-regard is a student's concern and esteem for self; the tendency of respecting oneself, understanding and accepting one's strengths and weaknesses. Self-actualization is the willingness to persistently try to improve oneself and engage in the pursuit of personally relevant and meaningful objectives that lead to a rich and enjoyable life. Emotional self-awareness encapsulates recognizing and understanding the student's own emotion, the cause of these emotions as well as the impact of these emotions on the thoughts and actions of oneself and others. Self-perception is indeed a very crucial determinant of academic achievement since it provides the student with an assurance that a task can be attempted and perfectly completed (Drago, 2004).

Self-expression describes a student's inclination to openly communicate and proclaim perception, observation and feeling irrespective of what third parties think (Agrawal & Teotia, 2015). Multi-Health Systems (2011) described self-perception under three indices; emotional expression, assertiveness and independence. Emotional expression describes a student's tendency to openly express feelings verbally and, or non-verbally. Assertiveness involves communicating feelings, beliefs and thoughts openly and defending personal rights and values in a socially acceptable, non-offensive and non-destructive manner. Independence denote a student's discretion and ability to be self-directed and free from emotional dependency on others for decision making, planning, motivation and task completion. Self-expression is very key in displaying one's academic talent and worth. Agrawal and Teotia (2015) maintain that academic performance is anchored to a large extent on how well a

student can express self either verbally (or written) or nonverbally in a manner that will maximize scores.

Bar-On (2013) identified interpersonal skills in a student by interpersonal relationship, empathy and social responsibility. Interpersonal relationship refers to the skill of developing and maintaining mutually satisfying relationships both in school and at home, that are characterized by trust and compassion. Empathy is the student's characteristic of recognizing, understanding and appreciating other people's feeling. The student understands and articulates another's perspective and behaves in a way that respect others' feelings. Tsai and Liu (2015) opine that students show social responsibility when such willingly contribute to society, social groups and generally to the welfare of others. Feitosa, Del Prette and Del Prette (2012) opine that acting responsibly, having social consciousness and showing concern for a greater community summarizes social responsibility. Team spirit is the hallmark of interpersonal skills. The ability to learn in group and contribute meaningfully to the academic success of group members. Tsai and Liu (2015) opine that quality of interpersonal interactions for learning among adolescents ultimately improves their academic achievement.

Decision making according to Multi-Health systems (2011) is a thought process of selecting a logical choice from available options. Decision making is indicated by: problem solving, reality testing and impulse control. Problem solving is the ability to understand emotions and to find solutions to problems when emotions are involved. In reality testing, a student possesses the capacity to remain objective by seeing things as they really are. It constitutes the ability to recognize when emotions can introduce personal bias causing one to lose touch with objectivity. Impulse control denotes the ability of a student to delay or resist impulses, drives and temptations to act in a particular way to avoid rash behaviours and make better decisions. Mati, Gatumu and Chandi (2016) opine that students' decision making produces motivation, a sense of ownership and therefore a higher inclination to abide by the

set rules, personal drive to meet the individual and collective goals, and an overall higher academic performance. Haney-Caron (2014) opine that decision making facilitates mental maturity which correlates positively with higher academic achievement. Tanglang and Ibrahim (2015) observed that decision making positively influence students' academic achievement.

Azila-Gbetteor, Atatsi, Danku, and Soglo (2015) describe stress as an unavoidable part of the normal fabrics of human existence that puts an individual under pressure irrespective of age, occupation, social status, race, cultural background. Intense pressure and stress have however been found to impair students' academic achievement (Owoyele, 2009). Stress management is an appraisal of techniques to diffuse the negative consequences of stress by means of psychotherapies. Multi-Health Systems (2011) identified flexibility, stress tolerance and optimism as indicators of stress management. Flexibility is the ability of a student to adapt emotions, thoughts and behaviours to unfamiliar, unpredictable and dynamic ideas, conditions and circumstances. Stress tolerance involves coping with difficult circumstances that ordinarily may be stressful and believing that one can manage or influence situations in a positive manner. Optimism involves a student's ability to remain hopeful and resilient despite occasional setbacks or poor academic performance. It is an indicator of one's positive attitude and outlook on life (Goleman, 2013). Veena and Shastri (2016) posit that stress management skills in students helps to shield off the problems associated with failed attempts and other difficulties encountered in learning. Owoyele (2009) showed that strong positive relationship exists between stress management skills and academic achievement.

In operational terms, Kapp (2002) describes emotional intelligence as that part of the human mind which motivates one to perform, energizes to demonstrate behaviours such as intentionality, persistence, creativity, impulse control, social deftness, compassion, intuition and integrity. Emotion when properly managed, plays a key role in rational decision making.

Nworgu (2016) opine that the current demand of the Nigerian society requires additional skills in the area of emotional awareness, decision making, social interaction, and conflict resolution to enable children go on to successful adult lives. Vela (2003); Cherniss (2004, 2010); Preeti (2013) all discussed the importance of emotional intelligence as been necessary for improving academic performance, health and psychological well-being at school. The emotional development of students is a necessary factor for consideration, not only when behaviour becomes problematic and disruptive, often resulting to under-achievement, school violence, bullying, cultism, radicalism, drug abuse, lack of motivation, psycho-educational problems and other school vices. Putting some check on emotions and developing emotional skills may prevent problematic behaviours and consequent poor academic achievement. Elias and Weissberg (2000) affirmed that when children are not aware of their feelings, they find it difficult to make reasoned decisions, control impulsive actions, or say what they really mean. In view of this demand, Oyinloye (2005); Preeti (2013) both attributed the problem of poor academic achievement to low level of emotional intelligence among secondary school students. They believe that students who lack emotional intelligence suffer some maladaptive challenges or in some ways fail to effectively handle the demands of school work, also incapable of attaining personal goals which include high academic achievement. Goleman (2006) surmised that intelligence account for only 20% of the total success, while emotional and social intelligences share 80% of academic success.

Students low on emotional intelligence find failure more difficult to deal with, which undermines their academic motivation (Drago, 2004). Ultimately, being emotionally intelligent means to effectively manage personal, social and environmental change by realistically and flexibly coping with the immediate situation, solving problems and making decisions. According to Bar-On (2006), to do this, we need to manage emotions so that they work for us and not against us, and we need to be sufficiently optimistic, positive and self-

motivated. Emotionally intelligent people are more likely to succeed in everything they undertake. They are able to recognize emotions of self and others, manage them and defuse work stress and engage people in a way to attract them. Emotional intelligence curriculum in schools can affect academic achievement positively not only during the year they are taught, but during the years that follow as well (Svetlana, 2007). Emotional intelligence in our schools may just be a panacea for improving students' mathematics achievement. Goleman (2013) claimed that emotional intelligence is more powerful than IQ. In fact, Goleman claimed that 67% of abilities deemed essential for effective performance are emotional (soft) competencies. The good is that research shows that unlike traditional intelligence (IQ), emotional intelligence (EQ) can be taught and improved.

Nnamani and Oyibe (2016) describe gender as a psychological experience of being a male or female, a phenomenon that is brought about as societies ascribe different roles, duties, behaviours, and mannerisms to the two sexes. Gender is differentiated from sex, which is merely the distinction between male and female based on biological characteristics, gender encompasses other personality attributes as roles, orientation and identity based on individual's conceptualization of self. The concern for differences in academic achievement due to gender has generated heated debate over the years with considerable interest in educational measurement (Madu, 2012). This controversy has remained in all fields of human endeavor. Onyekutu (2002) has shown that boys and girls in the early ages perform equally in all subjects. However, the issue of gender and students' academic achievement has remained a controversial one. While some propose that, males perform better than females in academics, others argue that, the reverse is the case. Harbour-Peters (2002) believe that boys outperform girls in Mathematics. Sweeney (2003) noted still that female students are lower in mathematics ability, as males were superior to females on problem solving. Conflicting in views, Agwagah (2004) believe that female students perform significantly better than their

male counterparts in mathematics. Powell (2004) held a similar opinion that girls do better at all levels than boys in achievement not only in arithmetic where boys seemed to excel, girls seem to have better grades. Meanwhile, other research findings have argued that there is no gender disparity in mathematics achievement (Olangunju, 2001; Unameh, 2011). Schutte, Malouff and Thorsteinsson, (2013) have shown that emotional intelligence varies with gender. Similarly, literatures believe emotional intelligence assessed as a trait is higher for women (Goldenberg, Matheson, & Mantler, 2006; Van Rooy, Viswesvaran & Pluta, 2005). However, Perera, (2015) noted that females have been shown to be more emotional than males. The present study will seek the extent of variation in student's academic achievement in mathematics due to their emotional intelligence with gender as moderating variable.

Statement of the Problem

With the increasing demands of the Nigerian society for development in all facets of the economy, especially technical and scientific developments to drive the much sought-after non-oil sectors, emotional intelligence becomes an invaluable skill with mathematics at the fulcrum of development. The persistent fall in students' achievement in mathematics in Nigeria has been a major source of concern to stakeholders and policy makers in the education sector. A lot of measures taken over the years to curb the ugly trend has not yielded the desired results. Targeting solely at teacher and infrastructural improvement without watching out for measures to improve the learners' kinetics for effective learning appears to be an error of pedagogy. Poor academic achievement in mathematics limits students' potentials for career advancement in the increasingly competitive global world we live. Poor performance in mathematics frustrates students and their parents, its effects are equally grave on the society in terms of manpower dearth in all spheres of the economy and polity. Sound curriculum contents structured with due regards to the emotional development of students provides students with the required mind frame to regulate, control and use their own

learning for the purpose of healing and accommodating the pain of one poor performance and not allowing it deter further learning. The exigency of mathematics for the country's developmental needs therefore necessitates the operation of emotional intelligence as an effort to interrupt the ugly trend of poor academic achievement in Mathematics.

Education in Nigeria seldom accord regards to the emotional needs of the learners though emotional intelligence have been thought to be an important variable capable of improving learners' kinetics and enhancing students' achievement in mathematics. Many educationists, teachers and students in Nigeria have little or no idea of emotional intelligence and how it relates to achievement in mathematics. This is evident in the poor literature backing on the subject matter in Nigeria. Of utmost importance, therefore, this study assesses emotional intelligence and its relationship with students' achievement in mathematics in the Nigerian context. Against this backdrop, this study will assess emotional intelligence and its relationship with students' achievement in mathematics.

Purpose of the Study

The purpose of the study is to access students' emotional intelligence and its relationship with their achievement in mathematics. Specifically, the study will determine the:

- i. amount of variation in students' achievement in mathematics that can be attributed to each dimension of emotional intelligence (self-perception, self-expression, interpersonal skills, stress management and decision making).
- ii. amount of variation in students' achievement in mathematics that can be accounted for by all the dimensions of students' emotional intelligence (self-perception, self-expression, interpersonal skills, stress management and decision making, altogether).
- iii. amount of variation in the prediction of students' achievement in mathematics by their emotional intelligence that is moderated by gender.

- iv. regression model that can be used in predicting students' academic achievement in mathematics based on their emotional intelligence.

Significance of the Study

The significance of the study is discussed under two perspectives; theoretical and practical significance. Theoretically, the result of this study will enhance the teaching and learning of mathematics by strengthening LeDoux theory of emotion and Bar-On's theory of emotional intelligence, which when applied will facilitate the realization of the nation's educational needs. The result of this study will impact on LeDoux theory of emotion which exposed how supportive emotion serves cognition, and the usefulness of emotional information in teaching and learning. LeDoux calls to mind the need for intelligence in the indulgence of emotion, in order to allow the learner recognize and manage emotions to avoid its disruptive tendencies. The result of this study will also strengthen Bar-On's theory of emotional intelligence. Bar-On's theory of emotional intelligence enlightens the influence of non-cognitive factors on intelligent behaviors. Bar-On's theory of emotional intelligence emphasizes a cross-section of interrelated emotional and social competencies, skills and facilitators that determine how effectively we understand and express ourselves, understand others and relate with them, and cope with daily demands and pressures. Players in the education sector will grow insight on dimensions of emotional intelligence that best improve learning.

Practically, students, teachers, parents, government and the entire nation of Nigeria will benefit from the findings of this study. Students' achievement in mathematics will be enhanced by the result of this study. The study will determine the dimensions of emotional intelligence which most effectively improve students' achievement in mathematics, therefore students no longer have to study in frustration or stress. They will kindly know the right dimension of emotional intelligence they need to engage to improve their performance in

mathematics, while maintaining good health. The findings of this study will help students to consciously perceive, identify, understand and manage their own emotions as well as those of others, so that emotions work in their advantage, for effective learning mathematics.

Teachers will benefit from the findings of this study by predicting more accurately the performance of students according to components of individual learner's emotional intelligence. This will guide teachers in planning lessons to make up for individual learner's emotional deficiencies, improve teacher-student relationship and inform the most effective and less stressful instructional delivery approach which will make teaching more effective and fun in order to help students improve performance in mathematics. The findings of this study will also inform teachers on emotional requirements of gender categories of students, their strong and weak areas in order to improve mathematics achievement in various gender groups.

Parents and government in their interest to help learners improve their performance in mathematics will consider the dimensions of emotional intelligence which improves mathematics achievement when they invest in education. The huge investment will now yield fulfilling results which will in the long run sort out the country's developmental and manpower needs, and a great future for Nigeria.

Scope of the Study

This study will be delimited to the relationship between emotional intelligence and academic achievement of senior secondary school students (SS II only) in mathematics, in Enugu Education Zone. The content scope include the five aspects of emotional intelligence which are self-perception, self-expression, interpersonal skills, stress management and decision making.

Research Questions

The following research questions were posed to guide the study.

1. What is the amount of variation in students' achievement in mathematics that can be attributed to each dimension of emotional intelligence?
2. What is the amount of variation in students' academic achievement in mathematics that can be accounted for by all the dimensions of their emotional intelligence?
3. What amount of variation in the prediction of students' academic achievement in mathematics by their emotional intelligence is moderated by gender?
4. What is the regression model that can be used in predicting students' achievement in mathematics based on their emotional intelligence?

Hypotheses

The following null hypotheses were formulated to guide the study. They will be tested at 0.05 level of significance.

H₀₁: The regression coefficient associated with the predictor variables (students' self-perception, self-expression, interpersonal skills, decision making and stress management) in predicting students' achievement in mathematics is not significant.

H₀₂: Gender does not significantly moderate the prediction of students' achievement in mathematics by emotional intelligence.

H₀₃: The regression model for predicting students' achievement in mathematics by their emotional intelligence is not significant.

CHAPTER TWO

LITERATURE REVIEW

The review of literature for this study is organized under the following sub-themes: conceptual framework, theoretical framework, empirical studies and summary of review of literature.

Conceptual Framework

- Concept of Emotional Intelligence
- Academic Achievement in Mathematics
- Concept of Gender

Theoretical Framework

- LeDoux's Theory of Emotion
- Bar-On's Theory of Emotional Intelligence

Review of Related Empirical Studies

- Emotional Intelligence and Academic Achievement
- Moderating influence of Gender on Emotional Intelligence and Achievement
- Gender difference in Emotional Intelligence

Summary of Review of Literature

Conceptual Framework

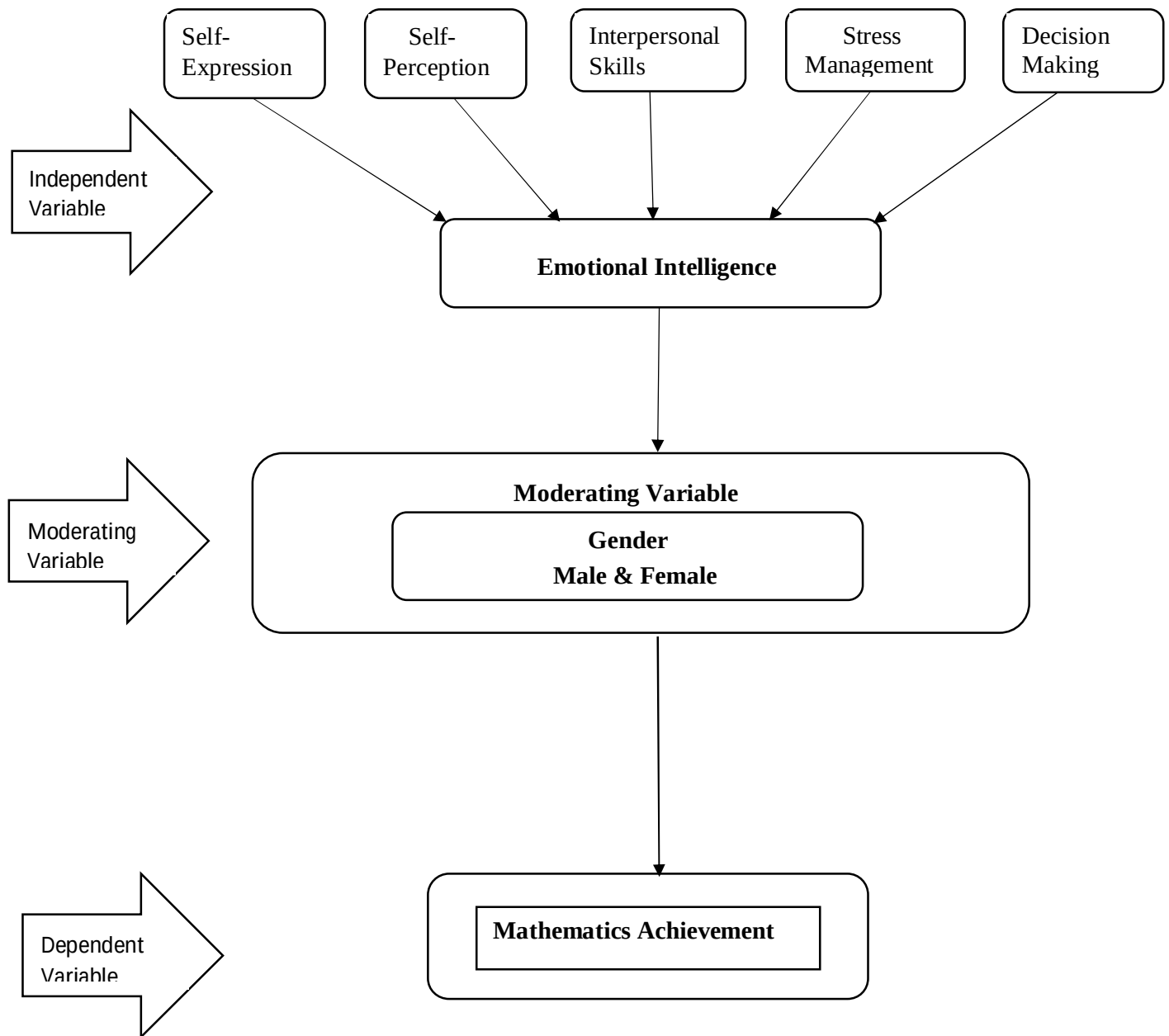


Figure 1: Conceptual framework for the study

The schema above which was developed by the researcher conceptualize students' achievement in mathematics as influenced by emotional intelligence which consist of five indicator sub-constructs - self-expression, self-perception, interpersonal skills, stress management and decision making, and moderated by gender.

Concept of Emotional Intelligence

Historic fact holds that emotions have a strong influence on human behaviour. People have believed that emotion leads to wrong decision therefore should be excused from the logical mind whenever serious business is coordinated, even though these assumptions are not always true (Beytekin, 2013). The Greeks see emotion as opposite to rationality. Emotions were understood as composed of bodily feelings and ideas to which these feelings attached themselves (Roberts, Matthews, & Zeidner, 2010). Mahadi (2011) connote emotion as irrational, private, weak, feminine, and even de-legitimized for a scholarly topic. The play down of emotion creates a conflict between our thought (what we think we know) and reality (what we actually observe). Classical Greek philosophers consider rational intellectual reasoning superior to impulses of emotion (Alavinia & Mollahosseini, 2012).

The positive relationship between emotions and cognition was established by the cognitive theorists who supposed that emotions depended on personal interpretation and appraisal of a particular event (Gayathri& Meenakshi, 2013). Intelligence involves thinking and rationalizing, while emotions combine the quality of thinking along with feeling. Gayathri and Meenakshi believes emotion has a lot of potential to be analyzed and assessed like any other intelligence. This is the cornerstone of emotional intelligence theory which emphasizes on the importance of emotional regulation and emotional management in an individual's life. Massey, in Mahadi (2011) believes that there are four basic constraints on rationality based on what we know about the functioning and development of the human brain. First, emotion predates cognition in human evolution. Second, even after developing the physiological capacity for rational cognition, it took additional time to develop the mental devices necessary for rational cognition and analysis. Next, emotional cognition precedes rational cognition, not only in historical time but also in real time of awareness. Finally, emotional traffic dominates the feedback between the emotional and rational brain. Clearly,

this shows the importance of emotion as a valid construct for scientific enquiry owing to its impact on human behavior. Greengrass, (2002) in this account believes it is imperative to say that, interaction between emotion and cognition is a complex phenomenon; generally emotional experiences of people depend on what they focus on in a situation. After reviewing the studies on interaction of human cognition and emotions, Phelps (2006) concluded that it is unrealistic to separate the study of human cognition from emotion, rather emotions should be taken into consideration for better insight of human cognition.

Developed from the interaction of emotion and thought in the 1990s, emotional intelligence has broadly generated heated interest in the 21st century, both to the lay and learned that it has overshadowed other less speculative classical psychological concepts (Grewal & Salovey, 2005; Sternberg, 2002). Google Scholar shows 57,000 references to emotional intelligence in scientific work during the years 1995 to 2000, 121,000 references during the years 2001 to 2006, and 162,000 references in the years 2007 to 2012 (Schutte, Malouff & Thorsteinsson, 2013), and about 8, 340, 000 references in August 2016. Emotional intelligence has been variously described, but each basing on one's view of the construct; all of which aim to understand the abilities and traits related to one's own and others' emotions (Emmerling & Goleman, 2003), although, there is a consensus of opinion that emotional intelligence is the ability of perceiving emotions, understanding emotions, managing emotions and using emotions of self and others. Sociological and epistemological reasons explain the fast and wide diffusion of emotional intelligence within organizational and educational fields, both for evaluative and formative tasks (Feldman-Barret & Salovey, 2002; Mayer, Salovey, & Caruso, 2004). A number of literatures defend (Ashkanasy & Daus, 2005; Mayer, Salovey, & Caruso, 2004), criticize (Brody, 2004; Matthews, Roberts, & Zeidner, 2004), and even attempt to kill and bury the term emotional intelligence (Locke, 2005). Researchers at first described emotional intelligence in cognitive terms, such as memory and

problem-solving. However, other researchers recognized that the non-cognitive aspects played also important role in human intelligence. Cherniss (2010) recounted that Wechsler saw emotional intelligence in terms of both intellective and non-intellective intelligence elements, by which he meant affective, personal, and social factors.

Thorndike proposed that humans possess several types of intelligence, one form being called social intelligence, or the ability to understand and manage men and women, boys and girls, and to act wisely in human relations (Beytekin, 2013). Lately, Howard Gardner (1983), through his innovative look at the way intelligence was to be regarded, did a great deal in paving the way for the advent of emotional intelligence. He introduced eight different types of intelligence, one of which Cherniss (2010) believed made way for the extensive development of emotional intelligence. Since the publication of Daniel Goleman's bestselling book on the topic of emotional intelligence literature have revealed unparalleled interest in emotional intelligence (Nourizade & Mohseni, 2014).

Mayer, Salovey, Cruso and Siterenios (2001) reviewed the psychological activities of the past century on emotional intelligence, and identified five periods in the evolution: Separate Narrow Fields, Precursors to EI, Emergence of EI, Popularization and Broadening of EI, and Research and Institutionalization of EI. Rohr (2005) elaborated on these five periods in a chronological and historical development of emotional intelligence concept during last century;

- Between 1900 and 1969 intelligence and emotions were seen as separate narrow fields. Psychometric approach to intelligence was developed and refined. The first debate on the subject of emotion and intelligence resulted in the most distal roots of emotional intelligence which lie in Darwin's initial account of the adaptive function of emotional expressions described in Darwin's theory for heritability. According to Darwin, emotional

expressions evolved in the human species as a mechanism for preparing the organism to respond adaptively to environmental cues and communicate important social information. Followed closely was E. L. Thorndike's (1920) concept of social Intelligence, which refers to the ability to understand and manage social partners (Thorndike & Stein, 1937), marking the end of this period.

- The Precursors to EI was between 1970 and 1989. The field of cognition emerged to examine how emotions interacted with thoughts. Gardner (1983) propounded the theory of multiple intelligences which described intrapersonal intelligence and interpersonal intelligence. From the multiple intelligence perspective, intrapersonal intelligence refers to the ability to understand oneself and to use this knowledge to function adaptively in the environment whereas interpersonal intelligence refers to the ability to understand the behavior, thoughts and feelings of others. In this period, empirical work on social intelligence developed four components: social skills, empathy skills, prosaically attitudes, and emotionality (sensitivity); and brain research began to separate out connection between emotion and cognition. Rohr (2005) observed that occasional use of EI appeared within this period; first extensively employed in the dissertation of Payen (1986) though previously incidentally used by Van Ghent (1961) and Leuner (1966).
- The Emergence of EI began between 1990 and 1993 with Mayer and Salovey publishing a series of articles on EI. They published the first ability measure of EI which yielded them a lot of queries and arguments for the existence of EI, even from the journal editor. Within this period further developments for EI in the brain sciences yielded more fruits.
- The Popularization and Broadening of emotional intelligence was between 1994 and 1997 when Goleman (1995) published a book on Emotional Intelligence which became worldwide bestseller. In the scientific study of EI, Goleman's work may have done more

harm than good as it spurred the development of a number of EI models with terminal conceptual and measurement frailties (Pérez, Petrides & Furnham, 2005). Gibbs (1995) noted that Time magazine used the term “EQ” on its cover page. There was also a tremendous success in the publication of emotional intelligence measures using mixed model theories. At the end of this period, Bar-On (1997) described emotional intelligence as a function of an individual’s self and others awareness, management and ability to maintain social relationships and cope with changing environmental demands, which also denoted the first wide use of the concept of emotional quotient (EQ)

- Research on the institutionalization of EI progressed from 1998 to present with a number of refinements to the concept of emotional intelligence, introducing new measures of emotional intelligence as well as the appearance of peer-reviewed articles on the subject.

More proximal roots of EI can be traced to the concept of alexithymia, which denotes affective personality dysfunction characterized by difficulties in identifying, expressing and experiencing emotions (Parker, Taylor, & Bagby, 2001). Today, there is a fleet of explosion in the evolutionary trend of emotional intelligence like the current study which seeks to assess emotional intelligence and its relationship with students’ achievement in mathematics.

In a general point of view, Emotional intelligence (EI) is about the intelligent use of emotions and utilizing the powerful information contained in emotion to make effective decisions (Matthews, Roberts & Zeidner, 2004). Martinez in Nourizade and Mohseni (2014) described emotional intelligence as an array of non-cognitive skills, capabilities and competencies that influence a person's ability to cope with environmental demands and pressures. Goleman (1996; 1997) assert that we must disregard traditional ideas of intelligence, as emotion is also relevant to the individual’s daily living skills and work performance. Therefore, it is very important to see traditional intelligence in the perspective

of emotional intelligence. It is also believed that emotional intelligence allows the person other ways of being and behaving as compared to those emphasized by traditional ideas of intelligence. Developing these alternative ways of being aids the individual to become more effective and efficient in both day-to-day living and in the workplace (Hayward, 2005). Goleman (1995) popularized the concept of emotional intelligence which was first propounded by Mayer and Salovey (1990). Mayer and Salovey initially considered emotional intelligence as a form of intelligence that involves the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions. Seven years later, they redefined emotional intelligence as the ability to perceive emotion, integrate emotion to facilitate thought, understand emotions, and to regulate emotions to promote personal growth (Gayathri& Meenashi, 2013). Reuven Bar-On is another prominent researcher of the emotional intelligence construct, being the originator of the term "emotional quotient (EQ)". From a slightly different perspective, he defined emotional intelligence as being concerned with understanding oneself and others, relating to people, and adapting to and coping with the immediate surroundings to be more successful in dealing with environmental demands (Vierimaa, 2013; Bar-On, 2006). While intelligent quotient (IQ) measures academic competencies or one's ability to use knowledge in making decisions but not adapting to changing situations, emotional quotient (EQ) is a measure of one's ability to identify emotional expressions in oneself and others, make decisions and adapt themselves to changing situations (Bar-On, 2006). Irrespective of the discrepancies between definitions of emotional intelligence, it is clear that whatever is being talked about or referred to is completely different from standard intelligence (or IQ) but an intelligent use of emotional resources as Bar-On described in emotional intelligence. Today, the concept of emotional intelligence is being increasingly drawn upon in research and practice. The shift of

focus is from emotions being considered as disruptive to its consideration as assisting cognition.

Some scholars however still doubt the viability of the construct due to the lack of consensus regarding the definition of emotional intelligence. They argue that the inconsistencies in concepts of emotional intelligence undermine the validity of the construct. However, there have been attempts to integrate different models of emotional intelligence. Zeidner, Matthews, Roberts, and MacCann (2003) have proposed a multi-level investment model in which different concepts of emotional intelligence are located on a developmental continuum. In theories of intelligence, investment refers to the engagement of cognitive processes or traits that underlie development of human abilities (Zeidner, Matthews, Roberts, & MacCann, 2003; Lee, 2010).

Zeidner et al. (2003) presented three concepts of emotional intelligence as competencies associated with qualitatively different levels of processing emotional information. The three levels of EI in the investment model are biological temperament, learned rule-based skills, and self-aware emotional regulation. According to Zeidner et al (2003) model, infants are born with different temperamental factors that, in turn, influence perception and expression of basic emotions and primitive control strategies (first level of EI). Preschool children differ in how easily they learn simple regulative strategies that often have a rule-based nature (second level of EI). Finally, school-aged children acquire a more sophisticated understanding of the self as a social being, and use this knowledge to guide emotional regulation (third level of EI). Lee (2010) pointed out that the levels in Zeidner et al (2003) model correspond to the concepts of EI in mixed or trait models, as well as ability models, the investment model can be considered as a framework that can integrate different

models of emotional intelligence, however, the model suggests that ability and mixed models of emotional intelligence are not mutually exclusive.

Contrary to the argument of the invalidity of emotional intelligence, Goleman (1998) put forward that each theory represents the theoretical orientation and context in which each of these authors have decided to frame their theory, all researchers share a common desire to understand and measure the abilities and traits related to recognizing and regulating emotions in ourselves and others. Goleman and Emmerling (2003) asserted that the existence of several theoretical viewpoints within the emotional intelligence paradigm does not indicate a weakness, but rather the robustness of the field. This kind of alternative theorizing, of course, is not unique to the study of emotional intelligence and should not be viewed as undermining the validity and utility of this emerging field (Goleman and Emmerling, 2003).

Though such a lack of conceptual coherence promotes confusion among researchers and potential misunderstandings by the public, Ybarra, Kross, Lee, Zhao, Dougherty, and Sanchez-Burks (2013) declares that this does not however imply that emotional intelligence is of no use. After all, Cherniss (2010) pointed out that, even after hundred years of research, there is still not a consensus about what IQ is or the best way to measure it. Existing literature suggests that judging or criticizing EI to a different standard definitely needs rethinking. In fact, more studies on emotional intelligence may blossom into invaluable knowledge that will transform teaching and learning theories and metamorphous instructional techniques in order to effectively achieve the desired objective of education with minimum input. Hence, there is need to strengthen more research in this field of study in order to clarify contending issues for criticizing the authenticity and validity of the emerging soft skill construct.

Academic Achievement in Mathematics

Education is key to economic growth of a country (Agi & Yellowe, 2013). Science and technology are the fulcrum of development which distinguishes the developed from the developing nations of the world (Mefor, 2014). An indication of education quality is the extent of achievement, demonstrated by students' performance in external or standardized examination (Nworgu, 2015). The former Minister of Education in Nigeria, Rufa'i, pointed out that there could be no meaningful progress in the country without promoting the study of mathematics. Therefore, the trend of poor academic performance in mathematics must be checked if the country must progress economically (Rufa'i, 2012); at the flagging-off of the 2012 Nigeria Mathematical Year, in Abuja.

Disheartening is the poor performance of students in mathematics in external public examinations. Nworgu (2016) assert that the persistently poor academic achievement of students in mathematics cannot but be an evidence of pedagogical failure. He summarized the percentage score of students who passed mathematics in the National Examination Council (NECO) senior secondary certificate examination within the last decade as an evidence of the ugly trend of poor academic achievement in mathematics.

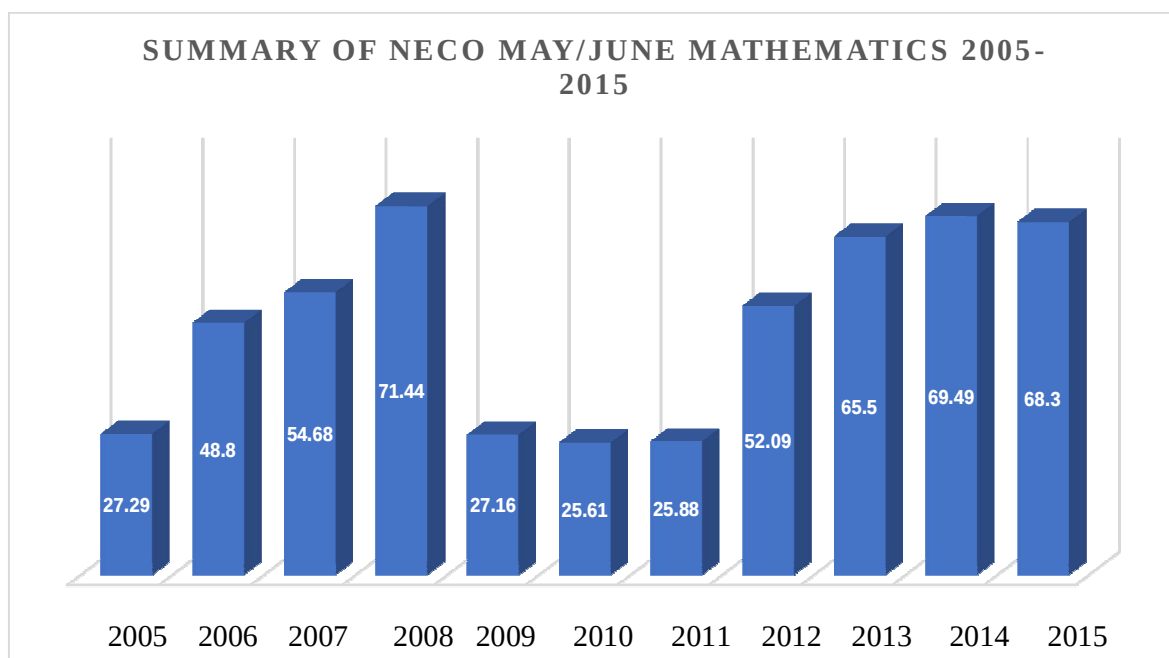


Figure2: A bar chart showing NECO percentage pass of students in Mathematics from 2005 to 2015.

In 2005, only 27.29% of students who sat for NECO May/June credited mathematics, but an improvement in 2006, 2007 and 2008 characterized the result until a sharp decline in 2009 which continued through 2010 and 2011. There was another improvement in the result in 2012, 2013 and 2014 but a brief decline in 2015.

Sad still, WAEC results over the years has not been salvaged. Sa'ad and Usman (2014) reported that 76% of candidates who sat for May/June WAEC 2010 examinations failed to meet the minimum entry requirement into tertiary institutions. Sa'ad and Usman (2014) happened that over 70% of candidates who sat for WAEC NOV/DEC failed to obtain a credit in mathematics. Only 29.17% of the total number of candidates who sat for the Examination credited mathematics. WAEC released its May/June 2014 WASSCE results, recording mass failure in mathematics. Head of National Office, WAEC Charles Eguridu, while announcing the results said a total of 529,425 candidates; representing 31.28% obtained credits in mathematics. In his words, when compared to the 2012 and 2013 May/June

WASSCE, there was marginal decline in the performance of candidates as 38.81% was recorded in 2012 and 36.57% in 2013.

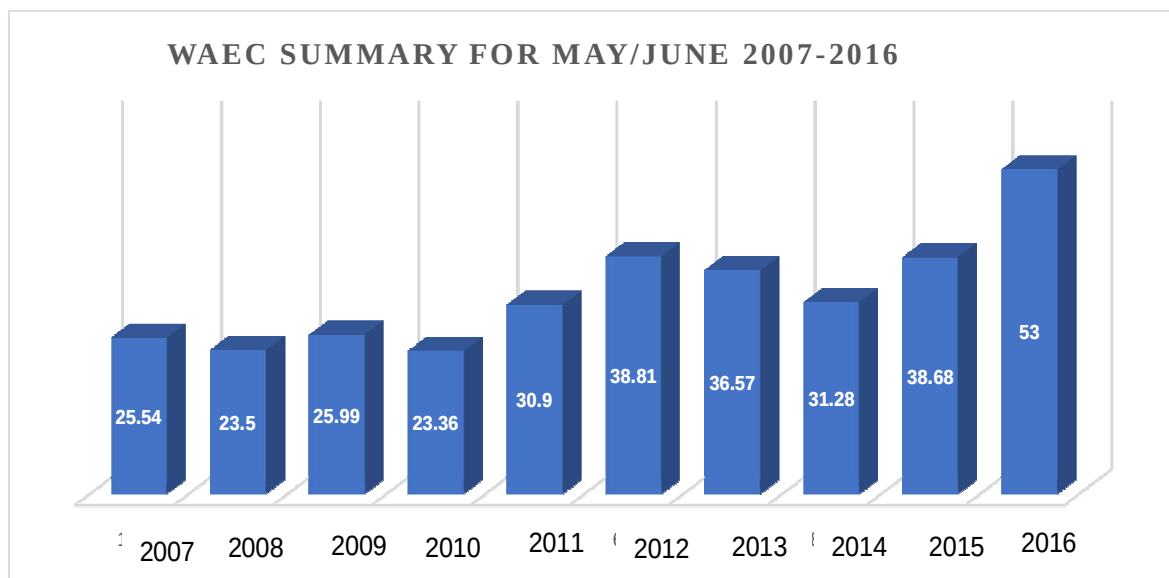


Figure3: A bar chart showing WAEC percentage pass of students in Mathematics from 2007 to 2016.

In the bar chart, above, in 2009 only 25.99% made at least five credits in mathematics and English but in 2010 there was a decline to 23.36%. In 2011 the percentage pass of students in WAEC rose to 30.9% and fortunately continued to rise to 38.81% in 2012. However, in 2013 the performance declined to 36.57%, and unfortunately continued to decline to 31.28% in 2014.

According to Vanguard online newspaper of August 10, 2015, the West African Examination Council (WAEC) head of National office (Nigeria), Mr. Charles Eguridu, in his speech at the release of 2015 May/June WASSEC result, in Lagos-Nigeria, admitted to the lingering poor performance of students in Mathematics over the years. This time he said, though an improvement in the performance of candidates when compared with 2013 and 2014 examinations as 616, 370 out of 1, 605, 248 candidates who registered and 1, 593, 442 candidates who sat for the examination representing a 38.68% passed the examination with at least five credits including Mathematics; unimpressively, this has not yet alleviated the

lingering poor academic performance. The release of the May/June 2016 WAEC results show an applause of improvement in the performance of students to the tune of 53%. The Head of Nigeria National Office, WAEC, Mr. Oluwatise Adenipekun, attributed the improvement to the hard work and commitment of students, teachers, government and other stakeholders in the education sector. Good as it is considered in face value but 53% is not yet an excellent score. It is hoped that the findings of this research will further strengthen the improvement of students' performance in mathematics to a point where students' achievement in mathematics can fully support the desired developmental needs of the country. The present study seeks to assess emotional intelligence and determine its relationship with students' achievement in mathematics.

Concept of Gender

Gender refers to the social attributes and opportunities associated with being male and female and the relationships between girls and boys, as well as the relationship between women and men (Nnamani and Oyibe, 2016). Such attributes, opportunities and relationships are socially constructed and are learned through socialization processes and evolve over time. Gender also includes the expectations held about the characteristics, aptitudes and likely behaviors of both females and males (Shettima, 1996). In most societies, there are differences and inequalities between women and men in responsibilities assigned, activities undertaken, access to and control over resources, as well as decision-making opportunities (Umoh, 2003).

Okeke cited in Ezeudu and Obi (2013) described the males' attributes as bold, aggressive, tactful, economical use of words while the females are fearful, timid, gentle, dull, submissive and talkative. Across cultures, females have been found to have a stronger ethic of care and to be more interdependent, compassionate, nurturing, cooperative and in care giving roles, while males have been found to be more independent and competitive (Sweeney, 2003). These sex roles really affect their achievement in schools, that is why

males are more likely to take difficult subject areas and challenging subjects while females on the other hand prefer simple subjects and often shy away from difficult tasks and problem-solving situations. Ekeh (2003) discovered that male secondary school students performed better than females in science and mathematics subjects.

Over the years, there have been heated debate on the issue of gender; how it relates to students' achievement as well as work performance. AbdulRahman (2014) assert that this debate is so because male and female gender groups process information differently. Literature reveals that men and women process emotional data differently (Phillips, Lowe, Lurito, Dzemdzc, & Mathews, 2001). Sociologists and behavioral scientists believe that gender differences exert a great influence on performance and insight due to the biological nature of the sexes, the role of the sexes in the society and ultimately on achievement of students (Duckworth & Seligman, 2006). Schmithor (2009) showed in his neuroimaging research that cognitive functions are related to differences in brain structure giving preference to the female folks. The report of Nasir and Masrur (2010) shows that females are keener, more enthusiastic and easily motivated than males. More scientifically put, due to their emotional nature females are easily motivated extrinsically. Petrides and Furnham (2000) explained that the emotional brain in girls is larger and perhaps more enhanced than that of their male counterpart.

Dunn (2002); Aquino (2003); Lafferty (2004); Tapia and Marsh (2006) all in their separate studies concur that females have higher empathy, ability to perceive and understand emotions, as well as high in managing interpersonal relationships than males. This is expressed in their sensitivity to their relationship with parents, siblings and friends; supporting the opinion of Sunew (2004), that high emotional intelligence of females is largely an effect of childhood experience. Harrod and Scheer (2005) also concur with Sunew asserting that females develop their emotional intelligence at childhood and adolescent years.

In fact, AbdulRahman (2014) declared that girls are more adept at observing both verbal and non-verbal emotional indicators as well as expressing and communicating their feelings. Bindu and Thomas (2006) maintain that females score higher in empathy while males score higher in regulating emotion. Wing and Love (2001), and Singh (2002) all found females higher than males in emotional intelligence while on the other hand, Chu (2002) found males higher in emotional intelligence. Similarly, although Bar-On (2006) reported no gender differences in overall EI, consistently (i.e. over a number of population samples reported in the EQ-i Technical Manual), females tend to have significantly higher Interpersonal EQ than males, while males tend to have significantly higher Intrapersonal EQ, Adaptability EQ, and Stress Management EQ than females. Palmera, Manochab, Gignaca, Stough (2003) also reported that females tend to be higher on overall or general emotional intelligence than males. Consistent with gender differences reported by Bar-On however, females tend to be higher on Interpersonal EQ and Emotional Self-Awareness. Studies on the influence of gender on achievement in mathematics are inconclusive as to whether females and males differ in mathematics achievement. Owing to this inconclusive result on gender difference in mathematics achievement, it is imperative to find out if there are any gender differences in mathematics achievement due to gender differences. In this study, gender is a moderating variable in assessing emotional intelligence and its relationship with students' achievement in mathematics.

Review of Related Theoretical Studies

LeDoux Theory of Emotion

LeDoux (1994) propounded a theory of emotion that calls to mind the salient need for intelligence in the engagement of emotion (often referred to as primitive and disruptive mind), in order to allow the learner recognize and manage emotions to avoid its disruptive tendencies. Emotional memories give the emotional quality to concrete memories because the

brain fuses the two so it seems like they are coming from the same place. The theory also leads an explanation to such disorders as phobias, fears, panic attacks and post-traumatic stress disorder students experience in Mathematics. LeDoux showed that the thalamus is the major integrating center of the brain where all sensory impulses and information from internal and external environments are received and relayed to other parts of the brain. The amygdala, part of the limbic system, is key in the production of emotional states which receives impulses from the thalamus via two routes: auditory thalamus and auditory cortex. Sensations that produce the primary emotions may travel to this unit bypassing any cognitive apparatus, to produce an immediate reaction that is key to survival. Other inputs first travel through the cortex (the center for thought, and storage of facts and concrete memories), where they are cognitively evaluated prior to moving on to the limbic system and amygdala to be processed as secondary emotions.

Emotional data is designed to provide more important information to the cognitive brain for assessing situations and making valued judgement, however, if this information are negatively interpreted during Mathematics lesson, fear, tension, panic and phobia creates a resultant effect which translates to poor academic achievement in Mathematics and a consequent poor performance in Mathematics. Deductions from the theory explains that sensory inputs are translated by the cognitive brain during Mathematics lessons and forged into a representation with meaning that first passes through the emotional brain where it is rapidly evaluated. Neural schemata if not intelligently handled tend to become rigid patterns of information processing, shaping subsequent patterns and making sense of the content of mathematics lessons. Emotional stimulation inevitably necessary for activating certain schematic thought patterns, if not intelligently handled, may lead to frustration. This fusion of emotion and cognition in an intelligent manner to achieve ones' target is the hallmark of emotional intelligence. It requires emotional sensitivity, the ability to evaluate emotions

within a variety of social circumstances to succeed in life, since emotions influence how people think, make decisions, and perform different tasks. Mathematics require a high level of concentration, emotional stability and intelligence so that the fusion of the both emotion and cognition result in maximum achievement in mathematics. Therefore, based on the assertion of LeDoux (1994), the present study seeks to assess emotional intelligence and its relationship with student's achievement in Mathematics.

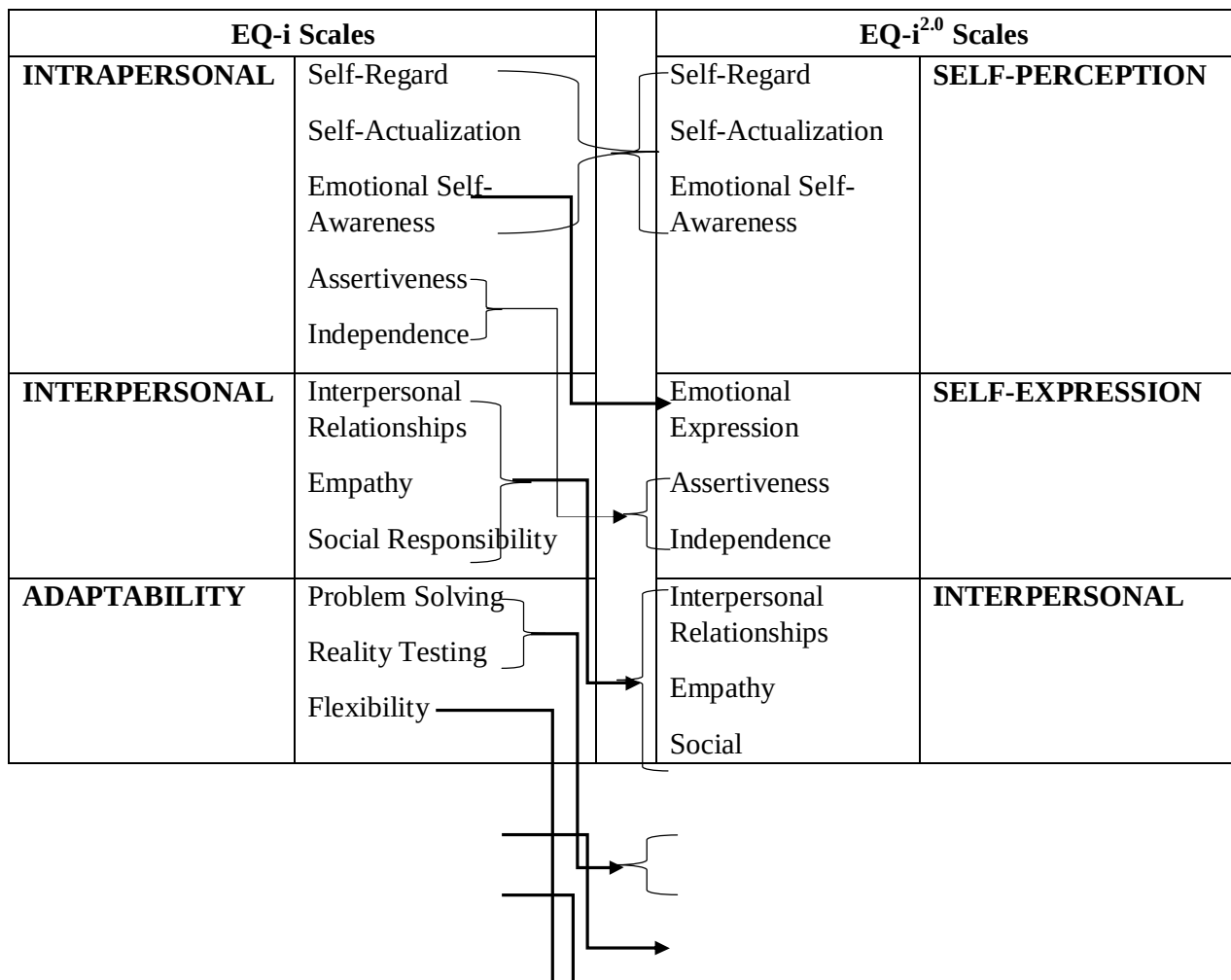
Bar-On's Theory of Emotional Intelligence

Bar-On (1997) advanced a theory of emotional intelligence which describes emotional intelligence as such emotional skills that influence our understanding and expression of ourselves, our understanding for others and interaction with them, and the ability to deal with everyday demands. To Bar-On, emotional intelligence is a cross-section of interrelated emotional and social competencies, skills and facilitators that determine how effectively we understand and express ourselves, understand others and relate to them, and cope with daily demands. Bar-On's research on emotional intelligence revealed five broad areas of skills and competencies from the personality domain. Within each are more specialized skills that contribute to success. Specifically, the five broad areas of skills and competencies are subdivided in fifteen sub-factors: 1) Intrapersonal Skills refers to the ability of being aware and understand emotions, feelings, and ideas in the self, and it is subdivided into five sub-factors: Self-Regard, Emotional Self Awareness, Assertiveness, Independence, and Self-Actualization; 2) Interpersonal Skills refers to the ability of being aware and understanding emotions, feelings, and ideas in others, and it is subdivided into three sub-factors: Empathy, Social Responsibility, and Interpersonal Relationship; 3) Adaptability refers to the ability of one to be open as to change feelings depending on the situations, and indicated by the following sub-factors Reality-Testing, Flexibility, and Problem-Solving; 4) Stress Management refers to the ability to cope with stress and control emotions, it is composed of

two sub-factors Stress Tolerance and Impulse Control; and 5) General Mood refers to the ability of feeling and expressing positive emotions, and being optimistic, and comprises two sub-factors Optimism and Happiness (Bar-On, 2006). Reuven Bar-On's theoretical approach to emotional intelligence was originally propounded in 1985 and broadened in 1997. Bar-On's model of emotional intelligence was developed over a period of seventeen years following six steps: identifying and grouping relevant competencies that impact on human effectiveness; defining the competencies and skills clusters; constructing an experimental assessment tool, which initially consisted of over a thousand items; cutting down the items to 15 scales and 133 items in the EQ-i; creating norms for the EQ-i on 3 831 adults in the USA and finally conducting further validation studies on EQ-i worldwide (Bar-On, 2006).

In order to evaluate the factors proposed in his model, Bar-On developed the first commercial instrument available to measure emotional intelligence, the Emotional Quotient Inventory (EQ-i; Bar-On, 1997). Later, Bar-On designed a large amount of measuring instruments (i.e., interviews, questionnaires for external raters, self-report measures for different ages, and different versions of these instruments) distributed by Multi-Health System (MHS). For research purposes the most employed measure is the Emotional Quotient Inventory (EQ-i; Bar-On, 1997), a self-reported measure comprising 133 items that evaluate the Bar-On's emotional intelligence theoretical model. Bar-On pointed out that the EQ-i is a wide inventory that includes many emotional and social competencies, giving not just an estimation of the emotional intelligence level, but also an affective and social profile (Bar-On, 2000). This led some authors to consider Bar-On's proposals as a mixed model of EI, since it combines social, emotional, cognitive, and personality dimensions. Several studies have examined the psychometric properties of the EQ-i, its predictive, construct, and incremental validity upon other classical constructs (i.e., personality and cognitive intelligence) and its contribution to different everyday life criteria (Bar-On, 2000, 2004,

2006). Further studies gave birth to modifications and renaming the dimensions of EQ-i model of emotional intelligence to the present model of EQ-i 2.0, on which basis the present study survives.



			Responsibility	
STRESS MANAGEMENT	Impulse Control Stress Tolerance		Problem Solving Reality Testing Impulse Control	DECISION MAKING
GENERAL MOOD	*Happiness* Optimism		Flexibility Stress Tolerance Optimism	STRESS MANAGEMENT

Figure 4: Model Evolution from EQ-i to EQ-i 2.0, Adapted from Multi-Health systems (2011).

Happiness, previously included in the EQ-i as one of the 15 components of emotional intelligence is now conceptualized in the EQ-i 2.0 as a product of emotional intelligence rather than a contributing factor to emotional intelligence. This, coupled with the fact that most coaches, consultants, and counselors, found it difficult to directly coach to Happiness. Self-regard, self-actualization and emotional self-awareness which were part of intrapersonal dimension of EQ-i scale have been collapsed into self-perception dimension of the EQ-i^{2.0} scale. Assertiveness, independence and emotional expression obtained from emotional self-awareness all from EQ-i Intrapersonal dimension constituted the EQ-i^{2.0} self-expression dimension. The interpersonal dimension of EQ-i is maintained as the interpersonal dimension of EQ-i^{2.0} (interpersonal relationships, empathy and social responsibility). The problem solving and reality testing of the adaptability dimension as well as impulse control of the stress management dimension of the EQ-i scale forms the EQ-i^{2.0} decision making dimension. Flexibility of the adaptability dimension, stress tolerance of the stress management dimension as well as optimism of the general mood dimension all of the EQ-i scale are combined into the stress management dimension of the EQ-i^{2.0}. Based on Bar-On's theory of emotional

intelligence, this study shall assess emotional intelligence on the basis of Bar-On's EQ-i^{2.0} dimensions and its relationship with students' achievement in mathematics.

Review of Related Empirical Studies

Emotional Intelligence and Academic Achievement

Mendelson, Guity, Mantz and Mendelson (2016) investigated the role of emotional intelligence on the academic achievement of Latin American students in secondary school. The purpose of the study was to determine the influence of emotional intelligence on academic achievement of students. One hypothesis guided the study. The design of the study was correlational design. The sample involved 187 students enrolled at 6 different high schools in a large school district in the Southeast region of the United States of America, of Latin ancestry. Students were asked to complete an emotional intelligence assessment at the beginning of the 2015-2016 school year. Measures used include the EQi 2.0 (EQi 2.0, 2013) as well as demographic data collected by the school district including ethnicity, age, gender, unweighted grade point average (GPA), attendance, and derogatory behavior incidents. Pearson Correlation Coefficient was used to measure whether or not there was a relationship between the different variables, Further, the level of significance of the correlation was measured using t-tests between all possible combinations of the variables included in the study at 0.05 level of significance. The results of the research showed that a significant correlation exists between unweighted GPA and EQ. There is also notable relationship between several individual facets of EQ and GPA. The analyses indicate that each facet of emotional intelligence contribute in significant fashion to the GPA generated by students. Also, noteworthy is the fact that while self-perception and stress management did not generate significance at a 0.95 confidence interval, each of these facets of emotional intelligence were significant at a 0.90 confidence interval. Decision-making; conversely, does not indicate significance and would not be considered significant unless the confidence

interval were decreased to 0.85. All variables generated positive Pearson Correlation Coefficients, indicating that while their relationships do not meet the criteria for significance at 0.95, each of the variables examined has a positive linear relationship with GPA. As the level of each of the facets of emotional intelligence increases, so too does the GPA of the participant in question. In the study, EQ-i 2.0 was used for secondary school students but however, the youth version of EQ-i 2.0 is more appropriate for the age bracket of secondary students. The study considered a general performance using GPA of students. However, the present study will assess students' achievement in mathematics, assess emotional intelligence using a youth version of EQ-i 2.0 appropriate for ages 7 – 18 years.

Seng, Hanafi, Taslikhan and Raman (2016) studied the influence of emotional intelligence on students' academic achievement. The purpose of the study was to determine the influence of emotional intelligence on students' achievement. The design of the study was correlational design. Five hypotheses guided the study. A sample of 406 students from nine schools in Limbang District, Sarawak were involved in the study. Malaysia Intelligence Emotional Inventory – Teens (IKEM-R), consisting of 49 items with all Cronbach alpha values exceeding 0.900 was used to assess the level of students' emotional intelligence. Dimensions of emotional intelligence investigated include Self-awareness, Self-regulation, Self-Motivation, Empathy and Social skills. Exploratory factor analysis and KMO value for pilot study was 0.607. The result of the study show that all the emotional intelligence dimensions are at high level. The data collected was analyzed using SPSS version 20 to measure reliability value per item, and emotional intelligence dimensions. Exploratory factor analysis was used to test reliability (factor loadings) and validity (KMO). Further, the results revealed that there is no significant influence of all the dimensions of emotional intelligence on academic achievement. All the emotional intelligence dimensions namely emotional awareness, emotional regulation, self-motivation, empathy and social skills do not affect

students' academic achievement. However, the study design was not mentioned. The study was conducted in Limberg district, Sarawak Malaysia and investigated Self-awareness, Self-regulation, Self-Motivation, Empathy and Social skills as dimensions of emotional intelligence. No clear subject on which academic achievement was measured was mentioned in the study. The current study shall however assess emotional intelligence as self-perception, self-expression, interpersonal skills, stress management and decision making and its relationship with students' achievement in mathematics adopting a correlation design. The current study shall be conducted in Enugu education zone, Enugu state, Nigeria.

Durgut, Gerekan and Pehlivan (2013) studied the impact of emotional intelligence on the achievement of accounting subject. The purpose of the study was to determine the importance of emotional intelligence on accounting education. Two research questions guided the study. The sample was 177 students who are attending accounting lessons in two different state universities in Turkey were involved in the study. The instrument for the study was Emotional Quotient Inventory developed by Bar-On (1997). Survey method was used as data collection technique, and analysis was done by SPSS version 16. Correlation and regression analyses were performed for data analysis. It was found that Independency, self-fulfillment, social responsibility, flexibility and problem solving which are the components of emotional intelligence had an impact on the achievement of accounting subject. Therefore, they concluded that some sub-components of the emotional intelligence are influential on accounting achievement. The study was anchored on achievement in accounting students in Turkey but the present study will assess emotional intelligence of SS II students and determine its relationship with achievement in mathematics, in Enugu education zone, Enugu State, Nigeria.

Qualter, Gardner, Pope, Hutchinson and Whiteley (2012) investigated the long-term effects of ability and trait EI on academic performance of British adolescents. The purpose of the study was to determine the effect of ability EI and trait EI on academic performance of adolescent students. Two hypotheses guided the study. The sample comprised 413 students from three secondary schools in the North-West of England. Students completed tests of ability EI, trait EI, personality, and cognitive ability in Year 7 (mean age = 11 years 2 months). Performance data at the end of Year 11 (mean age = 15 years 10 months) were collected. Trait EI was assessed using the Bar-On EQ-i:Yv consisting of 60 items with four main subscales: interpersonal, intrapersonal, stress management, and adaptability. For this sample, internal consistency scores for the subscales were reasonable for girls and boys respectively: $\alpha = 0.64$ and 0.62 (intrapersonal), 0.82 and 0.75 (stress management), 0.79 and 0.74 (adaptability) and 0.82 and 0.78 (interpersonal). Ability EI was measured using the MSCEIT-Yv (youth version) designed for pre-adolescents and adolescents consisting of 101 items (of which 97 are scored) to measure how well children perform tasks and solve emotional problems. Multi-Health Systems, the test distributor, using expert norms, scored the data. Internal consistency scores of the MSCEIT-Yv are provided in the manual for the four branches, with split half reliabilities ranging from $\alpha = 0.67$ (Section A: Perceiving emotion) to 0.86 (Section C: Understanding emotions); the overall measure $\alpha = 0.91$. Internal consistency scores are currently not available from the test publisher for male and females separately. Structural Equation Modelling was used to examine the longitudinal relationships between latent variables of these constructs. Results show that the importance of ability EI resides in the fact that it moderates the effect of cognitive ability on performance in Year 11. Trait EI has a direct effect on Year 11 performance for boys only. The study investigated long term effect of two conceptions of emotional intelligence on academic achievement of students. The present study shall however concentrate on a single conception of emotional

intelligence and determine its relationship with students' achievement in mathematics in Enugu education zone, Enugu, Nigeria.

Nwadinigwe and Azuka-Obieke (2012) investigated the impact of emotional intelligence on academic achievement of senior secondary school students in Lagos, Nigeria. The purpose of the study was to examine the relationship between emotional intelligence and academic achievement among senior secondary school students. Two research hypotheses guided the study. Quasi-experimental (pre-test/post-test control group) design was employed in the study. The sample consisted of 156 randomly selected participants from three senior secondary schools. The schools were randomly assigned to the two treatment conditions emotional intelligence training technique and control group. The instruments for the study were Exploring and Developing Emotional Intelligence Skills Questionnaire (EDEISQ) two sections of 130-item instrument and a 60-item multiple choice objective test constructed by the researcher to measure achievement in Mathematics, English Language and Biology. The reliability coefficients of the instruments were 0.81 and 0.64. Hypotheses were tested using descriptive statistical method, analysis of covariance (ANCOVA) and Pearson product moment correlation coefficient. The study revealed 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 his/her academic achievement. The ex-post facto study was conducted in Lagos Nigeria, however, the present correlation study shall be conducted in Enugu education zone of Enugu Nigeria, to assess emotional intelligence and determine its relationship with students' achievement in mathematics.

Festus (2012) investigated the relationship between emotional intelligence and academic achievement of senior secondary school students in the Federal Capital Territory,

Abuja-Nigeria. The purpose of the study was to determine whether there is a significant relationship between emotional intelligence and academic achievement of students in mathematics. Five research hypotheses guided the study. The instruments used for the correlation survey design study were the Emotional Intelligence Inventory for adolescents developed by Fani-Shing, Ying-Ming, Ching-Yua and Chia-An (2007) and Mathematics Achievement Test. The Emotional Intelligence Inventory has reliability coefficient of 0.79 while the Mathematics Achievement Test has reliability coefficient of 0.94. The population for the study was senior secondary school class 2 students in public schools in the Federal Capital Territory, Abuja, Nigeria. The sample for the study was 1160 SS2 students in public schools in the Federal Capital Territory, Abuja, Nigeria sampled by proportionate stratified sampling. Data were analyzed using mean and Pearson Product Moment Correlation. t-test was used to test the level of significance of the correlation coefficient. The result of the study showed that there was a significantly but low positive relationship between the emotional intelligence of SS2 students and their academic achievement in mathematics. The result also indicated that there was a significantly low positive relationship between the emotional intelligence of SS2 students, urban school students, and rural school students, and their academic achievement in mathematics. The study was conducted in Abuja Nigeria based on Facilitating Thought (FT), Emotional Management (EM), Emotional Perception (EP), Emotional Awareness (EA), Emotional Concern of Others (ECO), and Emotional Control (EC) as dimensions of emotional intelligence. However, the present study will hinge on Bar-On's dimensions of emotional intelligence and determine its relationship with students' achievement in mathematics in Enugu education zone, Enugu state, Nigeria.

Moderating Influence of Gender on Emotional Intelligence and Achievement

Adigwe (2015) studied the influence of emotional intelligence on problem solving achievement of secondary school chemistry students. The purpose of the study was to

investigate the influence of emotional intelligence on problem solving achievement of secondary school chemistry students and to identify the influences of gender and school location on students' emotional intelligence. Seven hypotheses guided the study. Ex post facto design was adopted, the population was secondary school students in Nsukka Education Zone, who study chemistry. Stratified sampling technique was used to draw three urban and three rural schools from the three local government areas in the Education zone. The sample consisted of 310 students: 141 male students and 169 female students. Instrument for the study were a chemistry problem solving test consisting of fifty multiple-choice items based on problem solving in chemical stoichiometry, and Bar-On EQ -i YV self-report scale. These tests were administered to all the subjects and were collected on the spot. 3x2x2 ANOVA and correlational analyses involving the achievement scores and the dimensions of emotional intelligence were made. It was found that emotional intelligence significantly influenced students' achievement in solving chemical stoichiometric problems, gender has no significant influence on the students' emotional intelligence, school location has no significant influence on the students' emotional intelligence, there is no significant interaction influence of gender and levels of emotional intelligence on students' achievement, there is no significant interaction influence of school location and levels of emotional intelligent on students' achievement, there is no significant interaction influence of gender and school location on emotional intelligence of the students , and there is no significant 3-way interaction of gender, school location and levels of emotional intelligence on students' achievement. Adigwe's study was conducted in Nsukka education zone in the subject of chemistry. However, the current study shall access emotional intelligence and its relationship with students' achievement in mathematics, in Enugu education zone.

Umaru and Umma (2015) investigated the effect of instruction in emotional intelligence Skills on locus of control and academic self-efficacy among junior secondary

school students in Niger state, Nigeria. The purpose of the study was to determine the effect of instruction in emotional intelligence Skills on locus of control and academic self-efficacy among junior secondary school students in Niger state, Nigeria. Four research questions and four hypotheses guided the study. The study employed a quasi-experimental, non-equivalent control group, pre-test – post-test design. The population of the study was 105,034 secondary school students out of which 40 students were purposively sampled and used for the study. The instrument used for data collection were locus of control scale (LOCS) and Academic Self Efficacy Scales (ASES). Data were analysed using mean, standard deviation and t-test. The findings reveal that, Emotional intelligence skills was effective in moderating locus of control ($t=23.98$, $p=.000$) and improve academic self-efficacy ($t=22.88$, $p=.000$) of secondary school students. And there was no gender difference in the effect of emotional intelligence skills on locus of control ($t=1.02$, $p=.064$) and academic self-efficacy ($t=3.41$, $p=.003$) of respondents. The study showed that emotional intelligence skills such as emotional self-awareness, self-management, social-awareness and relationship management are very effective tools for re-addressing students with academic problems. The sample is 0.038% of the population of junior secondary school students in Niger state and purposively sampled instead of intact classes been used for the quasi experiment. However, besides the microscopic sample size, there was no account of an instrument which was used to collect data on emotional intelligence. The present study shall employ an adequate sample size, use a youth version of Emotional Quotient Inventory (EQ-i2.0) to assess emotional intelligence while Mathematics Achievement Test (MAT) shall be used to collect students' achievement scores in mathematics.

Billings, Downey, Lomas, Lloyd, and Stough (2014) investigated emotional intelligence and scholastic achievement in pre-adolescent children. The purpose of the study was to investigate the relationship between ability EI and scholastic achievement in pre-

adolescent children, using a newly created measure of EI for younger children – the Swinburne University Emotional Intelligence Test – Early Years (SUEIT-EY), a 68-item questionnaire designed to assess a four-factor model of EI in pre-adolescents. Four hypotheses guided the study. Scholastic achievement scores were standardized across schools using a 5-point scale where 5 was the highest score and 1 was the lowest score. These scores were computed for reading, writing, literacy, and maths/numeracy. Overall achievement was calculated by averaging students' literacy and numeracy scores. The study adopted correlational design. The sample comprised of 407 primary school students (200 males, 207 females) attending four primary schools in Melbourne, Australia between the ages of 9 and 13 years who were assessed on the SUEIT-EY, and scholastic results were collected for literacy and numeracy ability. Multiple Linear Regression Analyses was used to analyze data collected. Results indicated that a significant relationship exist between the 'Understanding and Analyzing Emotions' (UAE) branch of the SUEIT-EY and measures of achievement in literacy and achievement in numeracy, for boys and girls, over and above the effect of age. Sequential Multiple Linear Regression Analyses found earlier developing UAE abilities to better predict scholastic achievement variables than the more complex UAE abilities, and accounted for 11% of the variation of both literacy and numeracy scores. The subjects for the study were primary school pupils in Australia, but the present study will assess emotional intelligence in SS II students in Enugu education zone, Enugu State, Nigeria and determine its relationship with their achievement in mathematics.

Al-Rfou' (2012) investigated the relationship between emotional intelligence and instructional achievement of Tafilah Technical University Students, Jordan. The purpose of the study was to reveal the relationship between the emotional intelligence and academic achievement of Tafila Technical University students. Three hypotheses guided the study. The study adopted a correlational design. The sample of the study consisted of 210 students; of

which there are 100 male students and 110 female students, who were chosen from different specializations using a stratified random sampling technique. The instrument for the collection of data was Bar-On's EQ-I (YV) scale. The reliability of the instrument clusters was 0.64, 0.68, 0.63, 0.55, 0.66, 0.75 respectively. The Pearson correlation coefficient findings of the study revealed that there is no statistically significant difference due to gender, and for high achievers excluding the correlation between adaptability and academic achievement. The correlation study of Al-Rfou' was conducted in Jordan while academic achievement was determined on a general scale. However, the present study shall assess emotional intelligence and determine its relationship with students' achievement in mathematics in Enugu education zone, Enugu, Nigeria.

Ogundokun and Adeyemo (2010) examined the moderating influence of emotional intelligence, age and academic motivation on academic achievement of secondary school students. The purpose of the study was to investigate the relationship between emotional intelligence and academic achievement among secondary school students. Five research hypotheses were employed to guide the study. The survey research involved 1563 secondary school students in Oyo state Nigeria (826 male and 737 female) as sample. The instrument for data collection were emotional intelligence behaviour inventory (EQBI) by Akinboye (2004), with Cronbach alpha reliability coefficient of 0.88, intrinsic and extrinsic motivation scale (IEMS) by Lepper, Corpus and Iyengar (1997), with Cronbach alpha reliability coefficient of 0.75, English language achievement test and mathematics achievement test (MAT), with Cronbach alpha reliability coefficient of 0.77. Descriptive statistics, Pearson's product moment correlation and hierarchical regression were used to analyze the data. The findings of the study showed that emotional intelligence, age and academic motivation are mildly potent predictors of academic achievement. The study was conducted in Oyo state, Nigeria and took a pore on Akinboye's dimensions of emotional intelligence. However, the

present study shall assess emotional intelligence from the view point of Bar-On's EQ-I 2.0 and its relationship with students' achievement in mathematics in Enugu education zone, Enugu state, Nigeria.

Gender difference in Emotional Intelligence

AbdulRahman (2014) investigated Emotional Intelligence and Academic Achievement: A Comparative, Gender-Based Study of Undergraduate English Language Learners in Saudi Arabia. The purpose of the study was to investigate the effects of EI on academic achievement of male and female English language undergraduates in Saudi Arabia. Three research questions and seven hypotheses in all guided the study. The design for the study was correlational design. The sample comprised of 100 male and 100 female students in Saudi Arabia was randomly selected. Instruments for data collection were Emotional Quotient Inventory (EQ-I, 125) and their performance in English language tests (semester final tests results). The data was analyzed by regression analysis. The study found that higher EI levels of female undergraduates had positive impact on their performance in English language tests. Females also scored better in EI constructs: intrapersonal, interpersonal, stress management and general good. However, adaptation was not significant in both genders. According to AbdulRahman (2014), results demonstrate a trend of social and educational change in Saudi Arabia as female students are performing better compared to their male counterparts. Accordingly, if EI skills are strengthened and enhanced in students of both genders, they may potentially display better levels of personal and academic achievements. The present study, like the former will adopt a correlation design but adopt the dimensions of EQ-I 2.0 while accessing emotional intelligence and its relationship with students' achievement in mathematics. The present study will be conducted in Enugu, Nigeria.

Aiyappa and Acharya (2014) examined gender differences in emotional intelligence of adolescents. The purpose of the study was to determine the effect of gender on emotional intelligence of adolescent students. One hypothesis guided the study. The study adopted ex-post facto design. The sample comprised of 973 Pre-University college students ranging in age between 16-18 years studying in second year Pre-University in Dakshina Kannada and Udupi districts of Karnataka, India. There were 464 male and 509 female adolescents. The participants were administered emotional intelligence scale developed by Mangal & Mangal (2004). It consisted of 100 items measuring four components of emotional intelligence; intrapersonal awareness, interpersonal awareness, intrapersonal management and interpersonal management each having 25 items. The participants were required to respond either yes or no. The scoring was one mark for yes and zero for no response. For the study, the Cronbach alpha for the Kannada translation of the scale was established and the value obtained was 0.78. t test was used for analysis. The results of the study indicated significant difference between males and females only in two components of emotional intelligence. Male adolescents showed a higher intrapersonal awareness which means they have higher understanding of their own emotions and female adolescents showed higher ability to manage emotions in interpersonal relationships. These findings suggest a gendered emotional socialization reflective of Indian culture. Cronbach alpha reliability coefficient for a dichotomously scored emotional intelligence instrument is unacceptable, and the dimensions of emotional intelligence assessed by the instrument include intrapersonal awareness, interpersonal awareness, intrapersonal management and interpersonal management which are though related but better organized in the youth version of EQ-i 2.0 which shall be employed in the present study to assess emotional intelligence in Enugu education zone in Nigeria.

Shehzad and Mahmood (2013) investigated university teachers' emotional intelligence level with regard to their gender. The purpose of the study was to determine the

effect of gender on emotional intelligence of university teachers. One hypothesis guided the study. The study adopted ex-post facto design. Bar-On Emotional Quotient Inventory Short Version (EQ-i:S; Bar-On, 2002) was administered to conveniently selected university teachers (female= 399, male= 480) in Punjab, Pakistan to assess their emotional quotient (EQ). It comprises five sub-scales: interpersonal, intrapersonal, stress management, adaptability, and general mood. t-test was used in data analysis. Findings of the study revealed that female teachers' mean score ($M = 39.47$, $SD = 6.75$) was significantly higher than that of male ($M = 38.36$, $SD = 6.38$) only on interpersonal skills $t(879) = 2.518$, $p = 0.012$, with small effect size (Cohen's $d = 0.017$). Both gender groups were similar as far as remaining sub-factors and overall Emotional Intelligence (EI) were concerned. The results clearly indicate that both male and female teachers are equal on EQ-i scores and handle all the difficulties in a similar way. The subject of the study were university teachers whereas the present study shall involve SS II students who study mathematics in Enugu education zone, Enugu State, Nigeria.

Ahmad, Bangash and Khan (2009) investigated Emotional intelligence and gender differences. The purpose of the study was to determine effect of gender on emotional intelligence in students. One hypothesis guided the study. Ex-post facto design was adopted for the study. Snowball sampling technique was used to select subjects. The sample was comprised of one hundred and sixty subjects ($N = 160$) who were categorized in two groups. They were eighty males ($n = 80$) and eighty females ($n = 80$) from N.W.F.P. All of them were educated and their age was 25 years or above. They were similar with regard to socioeconomic status and cultural background. The duration of a research study was one year. Personal information sheet was used to obtain the demographic information. The instrument for data collection was Emotional Quotient Inventory EQ-i by Bar-On (1997) used to find out the level of emotional intelligence among the subjects. It consisted of 117 items

distributed into 15 subscales of EQ-i. The EQ-i have five-point self-rating response format. The data were analyzed by using the Statistical Package for Social Sciences (SPSS). The t-test were computed to determine the significance of difference between male and female on Emotional Quotient Inventory (EQ-i). Gender difference on Emotional Quotient Inventory reveals that males have high emotional intelligence as compared to females ($t=4.522$, $p<.01$).

Summary of Review of Literature

The review of literature for the current study captured in a diagrammatic schema, showed the independent variable, emotional intelligence in its five levels of competencies, skills and traits influencing academic/learning outcome of students (dependent variable) and moderated by gender. The concepts of emotional intelligence, academic achievement in mathematics as well as gender were discussed. The review of literature for the current study also examined theories on which this study on emotional intelligence construct is anchored. The study took a pore over LeDoux theory of emotion and Bar-On's theory of emotional intelligence. Emotional intelligence theorists claimed that positive emotion influences one's academic achievement. Based on this assertion, the present study seeks to assess emotional intelligence and determine its relationship with student's achievement in mathematics.

The review of related empirical studies for the study was grouped under three categories in chronological order: emotional intelligence and academic achievement, moderating influence of gender on emotional intelligence and achievement, and Gender differences in emotional intelligence. Invaluable is the position of literature that emotional intelligence and gender could influence students' academic achievement. However, literature shows that studies on the relationship between emotional intelligence and academic achievement is insufficient, especially in Nigeria, and have shown no consensus of findings with regards to gender, posing contradictory views in the reporting of various researches. These insufficient studies as well as contradictory views generated the present study to assess

emotional intelligence and its relationship with students' achievement in mathematics in Enugu Education Zone, Enugu State, Nigeria.

CHAPTER THREE

RESEARCH METHOD

The researcher in this chapter discussed the methods that were used in carrying out the study. They are discussed under the following sub-headings: design of the study, area of the study, population of the study, sample and sampling techniques, instrument for data collection, validation of the instrument, reliability of the instrument, method of data collection and method of data analysis.

Design of the Study

The study adopted a correlational research design. Nworgu (2015) described correlation research design as one which seeks to establish what relationship exists between two or more variables. The design is considered appropriate because the study seeks to determine the relationship between students' emotional intelligence and their academic achievement in mathematics.

Area of the Study

The study was conducted in Enugu educational zone of Enugu State. An area encompassing of Enugu North, Enugu East and Isiuza Local Government Areas, with 25 public secondary schools. The study area has been chosen due to the poor performance of students in mathematics in the area. More still, incessant drop-outs from schools and high rate of students' truancy characterize schools in the area (Post Primary School Management Board Enugu, 2016). The area comprises of federal, state and privately owned secondary schools.

Population of the Study

The population of the study consist of 4825 SS II Mathematics students in the 25 secondary schools within the study area. The population is made up of 2813 male and 2012 female students (Post Primary School Management Board Enugu, 2016).The choice of SS II students was informed by the consideration that students in SS II have been introduced to a fair degree of mathematical concepts in view of preparation for SSCE, as well as a fair maturity in emotional indicators.

Sample and Sampling Technique

A sample size of 483 (282 male and 201 female) SS II Mathematics students was used for the study. Multistage sampling technique was employed in drawing the sample of the study. At the first stage, simple random sampling technique was used to sample two (2) local government areas that makeup the zone. At the second level, stratified sampling technique was used to sample three (3) senior secondary schools from each of the two sampled local government areas. This was done after the schools have been stratified with gender.

Instrument for Data Collection

Two instruments were used in the study for data collection. The instruments for data collection include Youth Version of Emotional Quotient-Inventory (EQ-i2.0) and Mathematics Achievement Test (MAT). The EQ-i2.0 was adapted from Bar-On's emotional quotient inventory – youth version (Bar-On's EQ-I YV™), to suit age and grammatical needs of students in Enugu, Nigeria. The EQ-i2.0 comprises of two sections, A and B. Section A captures demographic data of the respondent while section B is on student's emotional intelligence, divided into five (5) clusters: cluster A seeks information on self-perception, cluster B seeks information on self-expression, cluster C seeks information on interpersonal skills, cluster D seeks information on decision making while cluster E seeks information on stress management. EQ-i2.0 is a 60 item 4-point Likert scale instrument with responses:

Strongly agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD) scored 4, 3, 2, 1 for positive items and 1, 2, 3, 4 for negative items, respectively (see Appendix A, page 79)

Mathematics Achievement Test (MAT) is a 50-item instrument developed by the researcher based on the following list of topic contents; include logarithm, approximation, sequences and series, quadratic equation, simultaneous, linear and quadratic equations, gradient of a curve, logical reasoning, linear inequalities, algebraic fractions, chord property, circle theorems, trigonometry, and bearings. The test was prepared using a test blueprint MAT is an objective test with four answer options ranging from A to D, one (1) mark for one correct answer and zero (0) for wrong answer (see Appendix C, page 86).

Validation of the Instrument

The instruments for this study were validated by three experts in the Department of Science Education (two from Measurement and Evaluation unit, and one from Mathematics Education unit), University of Nigeria, Nsukka. The experts were asked to scrutinize the relevance of the items of the instruments to the study and the clarity of the items of the instrument. All comments and recommendations made by the experts were carefully incorporated into the version of the instruments to be used in the study. To ascertain the content validity of MAT, a well-prepared table of specification was used to construct the items of the instrument (see Appendix B, page 85 for table of specification).

Reliability of the Instrument

The instruments were subjected to trial testing using forty (40) SS II Mathematics students from Julia-Gee Cornerstone Secondary School Abakpa, Enugu-East LGA, Enugu who are not part of the study. Responses obtained from the students on emotional intelligence were subjected to Cronbach alpha while Mathematics Achievement Test (MAT) results were subjected to Kuder-Richardson's KR-20. The reliability coefficients of 0.83, 0.76, 0.80, 0.71

and 0.87 were obtained respectively for cluster A, B C, D, and E of EQ-i2.0, while the overall reliability index of the instrument was 0.93. The reliability coefficient for MAT was found to be 0.890 (see Appendices E and F, page 102 and 108 respectively).

Method of Data Collection

The instruments for data collection was administered to the students in the sampled schools with the help of their mathematics teachers. The teachers (research assistants) were briefed on the modalities of the collection of the instrument.

Method of Data Analysis

Multiple linear regression was employed to answer all research questions and test all hypotheses. All the hypotheses were tested at 0.05 alpha level of significance.

CHAPTER FOUR

RESULTS

The results of this study are presented in this chapter according to the research questions and hypotheses that guided the study.

Research Question One

What is the amount of variation in students' achievement in mathematics that can be attributed to each dimension of emotional intelligence(self-perception, self-expression, interpersonal skills, stress management and decision making)?

Table 1: Regression analysis of amount of variation in students' achievement in mathematics that can be attributed to each dimension of emotional intelligence

Variables	Correlation Coefficient (R)	Coefficient of Determination (R ²)
Self-Perception	.61	.60
Self-Expression	.64	.61
Interpersonal Skills	.58	.56
Decision Making	.51	.48
Stress Management	.72	.66

(R) Correlation Coefficient (R²) = Coefficient of Determination

To answer research question one, the responses of the students on the different dimensions of emotional intelligence were correlated with their academic achievement in mathematics. The result in Table 1 revealed that the correlation coefficient (r) of .61, .64, .58, .51 and .72 with associated coefficient of determinant (r²) of .60, .61, .56, .48 and .66 were obtained between students' self-perception, self-expression, interpersonal skills, decision making and stress management and their achievement in mathematics respectively. The coefficient of determinant (r²) implies that 60%, 61%, 56%, 48% and 66% variations in mathematics achievement is predicted by students' self-perception, self-expression, interpersonal skills, decision making and stress management respectively. Based on the result, it can be deduced that stress management with a coefficient of determinant (r²) of .66

(66%) is the amount of variation that best predicted students' achievement in mathematics. This is followed by self-expression with a coefficient of determinant (r^2) of .61 (61%), then self-perception with a coefficient of determinant (r^2) of .60 (60%), followed by interpersonal skills with a coefficient of determinant (r^2) of .56 (56%) and lastly decision making with a coefficient of determinant (r^2) of .48 (48%).

Research Question Two

What is the amount of variation in students' academic achievement in mathematics that can be accounted for by all the dimensions of their emotional intelligence jointly?

Table 2: Model summary of the amount of variation in students' achievement in mathematics that can be accounted for by all the dimensions of their emotional intelligence jointly

Model	R	R ²	Adjusted R ²
1	.76	.69	.62

(R) Correlation Coefficient (R²) = Coefficient of Determination

Result in Table 2 revealed the amount of variation in students' academic achievement in mathematics that is accounted for by all the dimensions of emotional intelligence. From the Table, the result showed that a correlation coefficient (r) of .76 was obtained between students' academic achievement in mathematics and all the dimensions of emotional. This means that, there exist direct positive relationships between students' academic achievement in mathematics and all the dimensions of emotional intelligence. Table 2 also revealed that, the coefficient of determination (R²) associated with the correlation coefficient of 0.69 was 0.62. This coefficient of determination (R²) indicates that 62% of variation in students' academic achievement in mathematics is attributed to all the dimensions of emotional intelligence. This is an indication that 38% of the variation in students' academic achievement in mathematics is attributed to other factors other than emotional intelligence.

Research Question Three

What amount of variation in the prediction of students' academic achievement in mathematics by their emotional intelligence is moderated by gender?

Table 3: Regression analysis of amount of variation in students' achievement in mathematics by their emotional intelligence that is moderated by gender

Model	Gender	N	R	R ²	Adjusted R ²
1	Male	282	.76	.69	.62
2	Female	201	.72	.75	.63

The result in Table 3 shows that the correlation coefficients (r) of .76 and .72 with associated coefficients of determinant (r^2) of .69 and .75 were obtained for male and female students respectively between their academic achievement in mathematics and all the dimensions of emotional intelligence. The obtained coefficients of determinant of .69 and .75 indicates that 69% and 75% variation in students' academic achievement in mathematics was attributed to male and female students' emotional intelligence respectively. The variation of male and female students' academic achievement in mathematics as predicted by all the dimensions of emotional intelligence is jointly 6% in favour of the female students. Hence, gender moderated 6% of the variation in students' academic achievement in mathematics in favour of the female than their male counterparts.

Research Question Four

What is the regression model that can be used in predicting students' academic achievement in mathematics based on their emotional intelligence?

Table 4: Regression model for predicting students' academic achievement in mathematics based on their emotional intelligence

Model	Coefficients				
	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	

1	(Constant)	28.59	4.314		6.63	.000
	Self-Perception	.42	.047	.31	1.34	.000
	Self-Expression	.44	.040	.34	1.28	.001
	Interpersonal Skills	.39	.986	.22	1.58	.000
	Decision Making	.34	.001	.19	1.03	.028
	Stress Management	.53	.798	.49	2.17	.000

a. Dependent Variable: Achievement

Result in Table 4 revealed the regression model that can be used in predicting students' academic achievement in mathematics based on their emotional intelligence. From the Table, the five dimensions of emotional intelligence prove potent at predicting students' academic achievement in mathematics to an appreciable extent with stress management (.49) having the highest predictive capacity followed by self-expression (.34), then self-perception (.31), followed by interpersonal skills (.22) and lastly, decision making (.19).

The regression model shows that one unit change in students' stress management will contribute .49 change in students' academic achievement in mathematics, while one unit change in students' self-expression will contribute .34 change in students' academic achievement in mathematics. Again, one unit change in students' self-perception will contribute .31 change in students' academic achievement in mathematics, while one unit change in students' interpersonal skills will contribute .22 change in students' academic achievement in mathematics. Lastly, one unit change in students' decision making will contribute .19 change in students' academic achievement in mathematics, while 28.59 is the level of students' academic achievement in mathematics without the influence of the dimensions of emotional intelligence.

Hypothesis One

The regression coefficient associated with the predictor variables (students' self-perception, self-expression, interpersonal skills, decision making and stress management) in predicting students' academic achievement in mathematics are not significant.

Table 5: t-test analysis of significance of the regression coefficients associated with the predictor variables in predicting students' academic achievement in mathematics based on their emotional intelligence

		Coefficients				
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	28.59	4.314		6.63	.000
	Self-Perception	.42	.047	.31	1.34	.000
	Self-Expression	.44	.040	.34	1.28	.001
	Interpersonal Skills	.39	.986	.22	1.58	.000
	Decision Making	.34	.001	.19	1.03	.028
	Stress Management	.53	.798	.49	2.17	.000

a. Dependent Variable: Achievement

The result in Table 5 shows that the t-values of 6.63, 1.34, 1.28, 1.58, 1.03 and 2.17 with associated probability values of .000, .000, .001, .000, .028 and .000 were obtained for students' self-perception, self-expression, interpersonal skills, decision making and stress management respectively. Since the associated probability values for all the dimensions of emotional intelligence were less than 0.05 level of significance, the regression coefficients were all considered to be significant. Thus, the null hypothesis is rejected and the researcher concludes that the regression coefficient associated with the predictor variables (students' self-perception, self-expression, interpersonal skills, decision making and stress management) in predicting students' academic achievement in mathematics are significant.

Hypothesis Two

Gender does not significantly moderate the prediction of students' academic achievement in mathematics by their emotional intelligence

Table 6: t-test analysis of the significant difference between the correlation coefficients of male and female students in the prediction of their academic achievement in mathematics by their emotional intelligence

Variable (Gender)	N	R	Df	t	P-value
Male	282	.76	481	.814	.231
Female	201	.72			

To test hypothesis two, t-test analysis of significant difference between two samples correlation coefficients (r) of male and female students in prediction of their academic achievement in mathematics by their emotional intelligence. Result in Table 6 shows the t-test for independent samples assuming equal variance. The results from the test shows $t(481) = .814$, $P > 0.05$. Thus, the null hypothesis of no significant difference is accepted since the P-value (.231) is greater than 0.05 level of significance. The researcher therefore, conclude that, gender does not significantly moderate the prediction of students' academic achievement in mathematics by their emotional intelligence.

Hypothesis Three

The regression model for predicting students' academic achievement in mathematics by their emotional intelligence is not significant.

Table 7: Analysis of variance of significance of the regression coefficients associated with the predictor variables in predicting students' academic achievement in mathematics based on their emotional intelligence

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	389.793	5	77.959	41.420	.002 ^a
	Residual	26190.236	477	54.906		
	Total	26580.029	482			

The result in Table 7 shows that an F-ratio of 41.420 with associated exact probability value of 0.002 was obtained for the significance of the regression model. This probability value of 0.002 was compared with 0.05 set as level of significance for testing the hypothesis and it was found to be significant. This is because the exact probability level of 0.002 is less than 0.05 level of significant. Thus, the null hypothesis was rejected. The researcher therefore, concludes that the regression model for predicting students' academic achievement in mathematics by their emotional intelligence is significant.

Summary of the Findings

Based on the analysis of data in the study, the following findings emerged;

1. Stress management dimension of emotional intelligence with a coefficient of determination (r^2) of .66 (66%) is the amount of variation that best predicted students' achievement in mathematics.
2. 69% of variation in students' academic achievement in mathematics (criterion variable) is accounted by the dimensions of their emotional intelligence (predictor variables) jointly.
3. Gender does not significantly moderate the prediction of students' academic achievement in mathematics by their emotional intelligence.
4. The regression model for predicting students' academic achievement in mathematics by their emotional intelligence is significant.

CHAPTER FIVE

DISCUSSION OF FINDINGS, CONCLUSION, IMPLICATIONS, RECOMENDATIONS AND SUMMARY OF THE STUDY

In this chapter, the researcher discussed the results of data analysis presented in chapter four, draw conclusions based on the results. Educational implications of the study, limitations of the study, recommendations, suggestions for further studies and summary of the entire study are presented.

Discussion of the Findings of the Study

The discussion of the findings is presented under the following sub-headings:

- Influence of Each Dimension of Emotional Intelligence on Students' Achievement in Mathematics
- Influence of emotional intelligence on students' achievement in mathematics.
- Moderating influence of gender on student's achievement in mathematics.
- Regression model for predicting students' achievement in mathematics by emotional intelligence.

Influence of Each Dimension of Emotional Intelligence on Students' Achievement in Mathematics

This study sought to investigate the influence of each dimension of emotional intelligence on students' achievement in mathematics. The result of this study showed that stress management has the greatest influence on students' achievement in mathematics. This was followed by self-expression, then closely followed by self-perception, followed next by interpersonal skills and lastly decision making. A plausible explanation to this result is the premise that stress pose a great deal of psychological discomfort sufficient to deter learning. Therefore, its management will invariable promote maximum achievement. One's expression

is often related to one's perception but interpersonal relationships can only be effective to the extent one's perceptions and expressions are acceptable by others. However, decision making is possible only if stress, expression, perception and interpersonal skills are redeemed. Based on the result of this study, engaging approaches to stress management will yield greatest impact on students' achievement in mathematics by 66%, while self-expression will yield 61%, self-perception 60%, interpersonal skills 56% and decision making yielding the lowest at 48%. Therefore, stress management is the most vital of all dimensions of emotional intelligence in predicting students' achievement in mathematics. Least to consider, in predicting students' achievement in mathematics is decision making. The result of this study agrees with the findings of Mendelson, Guity, Mantz and Mendelson (2016), that stress management and self-perception facets of emotional intelligence were the most influential on students' achievement while decision-making was the least influential.

Influence of Emotional Intelligence on Students' Achievement in Mathematics

This study sought to investigate the influence of emotional intelligence on students' achievement in mathematics. The result of this study revealed that there was a significant relationship between emotional intelligence and students' achievement in mathematics. All predictor variables and jointly as emotional intelligence correlated positively with students' achievement in mathematics. This implies therefore that emotional intelligence has an influence on students' academic achievement in mathematics. It signifies that higher emotional intelligence increases students' achievement in mathematics. The result of this study confirms the findings of Mendelson, Guity, Mantz and Mendelson (2016) that found out in their study that a significant positive correlation existed between unweighted GPA and EQ. Also, the finding of this study agreed with the findings of Durgut, Gerekan and Pehlivan (2013) who studied the impact of emotional intelligence on the achievement of accounting

subject and found that emotional intelligence has a significant influence on students' achievement in accounting.

However, the findings of this study disagreed with the finding of Seng, Hanafi, Taslikhan and Raman (2016) who studied the influence of emotional intelligence on students' academic achievement and found no relationship existing between predictor variables and student's academic achievement. Also, the finding of this study does not totally agree with the finding of Festus (2012) who found a significantly low but yet positive relationship between emotional intelligence and student's academic achievement in mathematics.

Moderating Influence of Gender on Students' Achievement in Mathematics

The study sought to find the moderating influence of gender on students' achievement in mathematics. The results of this study revealed that gender does not significantly moderate the prediction of students' achievement in mathematics by their emotional intelligence. Female students were found to achieve slightly more than their male counterparts. This finding may be due to socially constructed attributes, opportunities and characteristics defined in being male or female. Maybe male students have relaxed so much while females are now overtaking in mathematics achievement defiling results of previous studies, or perhaps confirming the work of Nasir and Masrur (2010) who showed that females are keener, more enthusiastic and easily motivated than males. The finding of this study clearly lends support in explaining the neuroimaging research of Schmithor (2009) who showed that cognitive functions are related to differences in brain structure, giving preference to the females, and as well, the explanation of Petrides and Furnham (2000) that the emotional brain in girls are larger and perhaps more enhanced than that of their male counterparts. This finding is in line with the findings of Adigwe (2015) and Al-Rfou' (2012) who found no significant difference in their study regarding gender, while Ahmad (2009) found a significant difference in favour

of females. AbdulRahman (2014) on the contrary found a significant difference in the gender groups in favour of females.

Regression Model for Predicting Students' Achievement in Mathematics by Emotional Intelligence

This study also sought to find the regression model for predicting students' achievement in mathematics by their emotional intelligence. The findings of the study showed that the regression model for predicting students' academic achievement in mathematics by their emotional intelligence was significant. Also, all predictor variables were significant in their regression coefficients at 0.05 level of significance, in predicting students' achievement in mathematics. This disagrees with the findings of Mendelson, Guity, Mantz and Mendelson (2016) who found that all other predictor variables were significant only at a 0.10 level of significance, while decision-making was only significant at 0.85 level of significance.

Conclusion Reached from the Findings of the Study

The study set out to assess emotional intelligence and determine its relationship with students' achievement in mathematics, investigated gender as a moderating factor in Enugu education zone, Enugu state. Based on the findings of this study, the following conclusions have been reached.

1. Besides cognitive factors, emotional intelligence influence students' academic achievement in mathematics. The very rigid IQ is not the only determinant of a students' academic success, therefore, since emotional intelligence can be improved by training, then enhancing the emotional intelligence of students may be a way of improving students' achievement in mathematics.

2. The result of the study led to the conclusion that since stress management best predicts students' achievement in mathematics while decision making least predicts, therefore more emphasis in stress management will increase students' achievement in mathematics.
3. The results of the study also led to the conclusion that gender does not significantly influence students' achievement in mathematics. However, female students achieved slightly better than the male counterparts. This slight difference in achievements may be attributed to gender stereotyping which encourages female students to be more engaging and emotional, adept to maintaining social relationships, humane and also related to the roles expected of them in the society.

Educational Implications

The results of this study have implications to both students and teachers. Emotional intelligence has been found to be a strong predictor of academic achievement. Teachers of a necessity need to consider emotional intelligence in planning mathematics instruction. Understanding students' emotional states as well as emotional intelligence, and bearing in mind the strong influence of emotional intelligence and each of its dimensions on students' achievement in mathematics, teachers can easily assist students in both emotional and academic needs with minimal work stress. A good understanding of the five dimensions of emotional intelligence will improve healthier learning environments too.

Students on the other hand can tap from the findings of this study, become aware of and manage their emotions to relieve stress and cope with daily academic demands in mathematics. Engaging students in emotional drills will help them build their emotional intelligence to improve their achievement in mathematics. Emotional intelligence skills when acquired could enable the students adjust appropriately to ever dynamic global trend of events and cater for employment needs.

Limitations of the Study

The generalizations drawn from this study are subject to the following limitations. The result of the present study was based on senior secondary two mathematics students (SS2) in Enugu education zone in Enugu state only. It might not be sufficient to draw generalization on the whole population of Enugu state mathematics students since Enugu education zone is not an absolute representative of education zones in Enugu state or the entire country.

Recommendations

Based on the findings of this study, it was recommended that:

1. Government should organize workshops and seminars for in-service teachers and teacher trainees to enable them understand the concept of emotional intelligence in order to develop their own emotional intelligence and that of their students.
2. Much emphasis should be placed on techniques to improve stress management skills in order to maximize achievement in mathematics.
3. Gender should be considered with more focus on building emotional competencies in both gender groups while planning for mathematics instruction. Teachers should be gender sensitive to encourage both male and female students alike in developing their emotional intelligence in order to improve their achievement in mathematics.

Suggestions for Further Studies

1. This study is limited to students' achievement in mathematics in Enugu education zone, a similar study could be carried out in different education zones of Enugu state or perhaps the entire state.
2. Another investigation could be carried out on the effect of emotional intelligence on academic achievement in mathematics.

3. A comparative study could be carried out on the influence of emotional intelligence on cooperative learning in mathematics.
4. A willing researcher may conduct a case study on the influence of emotional intelligence on students' achievement in mathematics.

Summary of the Study

This study focused on the assessment of emotional intelligence and its relationship with students' achievement in mathematics; gender investigated as a moderating factor in Enugu education zone. The main purpose was to find out the influence of emotional intelligence. Literature related to the study was reviewed and it was discovered that no investigation of this sort had been carried out in Enugu education zone of Enugu state. This created a gap that this study seeks to fill. The study adopted a correlational research design. Four research questions and three hypotheses were formulated to guide the study. The population of the study was 4825 SS II (made up of 2813 male and 2012 female) Mathematics students in 25 government secondary schools in Enugu education zone, in Enugu state. The sample for the study was 483 (282 male and 201 female) SS II Mathematics students drawn by multistage sampling technique to sample two local government areas from three that make up the zone, later three senior secondary schools from each of the two sampled local government areas in Enugu education zone, in Enugu state.

The instruments for data collection were Youth Version of Emotional Quotient-Inventory (EQ-i2.0) and Mathematics Achievement Test (MAT). The instruments for data collection were administered to the students in the sampled schools with the help of their mathematics teachers (research assistants) who were briefed on the modalities of the collection of the instrument. Multiple linear regression was employed to answer all research questions and test all hypotheses, with the help of the Statistical Package for Social

Sciences(SPSS)Version 20.0 (SPSS Inc. 2013). All the null hypotheses were tested at 0.05level of significance ($\alpha = 0.05$).

Chapter five presented the discussions according to the three hypotheses that guided the study and conclusions were made from the results of the investigation. It was concluded that emotional intelligence influences students' achievement in mathematics. The result of the study shows that gender does not significantly moderate the influence of emotional intelligence on students' achievement in mathematics, however, female students achieved slightly better than male students. Some recommendations were made to Government and teachers, the education implications that stem from the study were also highlighted by the researcher. Lastly, the limitations and suggestions for further study were proposed.

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APPENDICES**APPENDIX A****EMOTIONAL QuOTIENT INVENTOTY (EQ-i2.0)**

Department of Science
Education,
Faculty of Education,
School of Post-Graduate
Studies,
University of Nigeria,
Nsukka.

Dear respondent,

REQUEST FOR PARTICIPATION IN STUDY

I solicit your cooperation in responding to items in this questionnaire to enable me carry out an academic research work on Emotional Intelligence. Be assured that all information provided will be strictly confidential, and not for any other purpose except the purpose of this study.

This test contains a number of statements carefully constructed to measure Emotional Intelligence construct. You are required to select a degree of agreement, what you yourself think about each statement. There are no right or wrong answers. Your opinion is what is wanted.

Please tick your response to the items. Each item is on a 4-point scale rating, 1 equals "strongly disagree" and 4 equals "strongly agree". 1 represents the lowest and most negative impression on the scale, 3 represents an adequate impression, and 4 represents the highest and most positive impression. Please select the option that best reflects your opinion, using the rating system below.

Thanks.

Yours faithfully,

Nnaji, David Anayo
(Student Researcher)

SECTION A

1 – Strongly Disagree	2 – Disagree	3 – Agree	4 – Strongly Agree
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Gender: male female

Age: below 14 15 16 17 and above

Class/Academic Grade:

SECTION B

	ITEMS	SD	D	A	SA
A	SELF-PERCEPTION				
i	Self-Regard	1	2	3	4
1	I believe in my ability.				
2	I doubt whatever I do myself				
3	I respect myself				
4	I don't feel good about myself				
ii	Self-Actualization	1	2	3	4
5	I am an important person				
6	I don't know anything I can do well				
7	I have once in a while been successful at a task				
8	I don't enjoy most things I do				
iii	Emotional Self-Awareness	1	2	3	4
9	I easily show others how I feel				
10	I always take note of how I feel				
11	I don't like telling people how I deeply feel				

12	It is often hard for me to interpret my innermost feeling	1	2	3	4
B	SELF EXPRESSION	SD	D	A	SA
i	Emotional Expression	1	2	3	4
13	I quickly tell whoever cares how I feel				
14	Whenever I am happy, I look excited				
15	I secretly hide my feeling from showing				
16	I prefer not to talk about my feelings				
ii	Assertiveness	1	2	3	4
17	I can't clearly tell others my idea				
18	I will rather not tell others that I am angry with them				
19	I can easily say "I disagree with you" when I don't agree with you				
20	I cannot say "yes" when I mean "no".				
iii	Independence	1	2	3	4
21	I like my teacher telling me what to do				
22	I enjoy using other people's idea in a group work				
23	I prefer other people to make choices for me				
24	I can hardly choose what is good for me.				

C	INTERPERSONAL SKILLS	SD	D	A	SA
i	Interpersonal relationship	1	2	3	4
25	I hardly show others that I like them				
26	I do not trust anyone				
27	My friends love me				
28	I easily make friends				
ii	Empathy	1	2	3	4
29	I often examine the way my friends feel				
30	I can hardly understand how other people feel				
31	My friends can confide intimate secrets in me				
32	I easily give my best gifts to others				
iii	Social Responsibility	1	2	3	4
33	I like helping people				
34	I like taking advantage of people				
35	Other people find it hard to trust me				
36	I am concerned with what happens to other people				
D	DECISION MAKING	SD	D	A	SA
i	Problem Solving	1	2	3	4
37	I conquer my problems in a step-by-step approach				
38	I always investigate difficult situations and collect necessary information				

39	I find it hard to perceive solution to my problem	1	2	3	4
40	I always find myself rushing to solve a problem I don't understand				
ii	Reality Testing	1	2	3	4
41	I only consider the reality of a problem				
42	I don't allow my personal experiences to overtake my judgement				
43	Often, people misunderstand my judgement				
44	Sometimes, I lost my mind in imagination				
iii	Impulse Control	1	2	3	4
45	When I am angry, I can't control myself				
46	I calculate my words before I say them				
47	I can decide to delay what gives me enjoyment				
48	People say I have a harsh voice				
E	STRESS MANAGEMENT	SD	D	A	SA
i	Flexibility	1	2	3	4
49	I am excited when I have to try a new thing				
50	I easily change my plans whenever there is a need	1	2	3	4
51	I don't like following difficult instructions				
52	I hardly allow what other people do to affect my behaviour				

ii	Stress Tolerance	1	2	3	4
53	I can easily endure sad and annoying people				
54	I believe that every problem can be easily solved, with constant practice				
55	I am brave and composed when faced with a totally new problem				
56	I am not nervous when I am under pressure				
iii	Optimism	1	2	3	4
57	I always trust my ability to overcome difficult tasks				
58	I always hope for the best results				
59	Whenever I fail in my task, I don't feel like giving it a second try				
60	I know that things can only get better				

MATHEMATICS ACHIEVEMENT TEST (MAT) 50 ITEM TEST BLUEPRINT FOR SS2 MATHEMATICS (First and Second Term)									
			KNOWLEDGE	COMPREHENSION	APPLICATION	ANALYSIS	SYNTHESIS	EVALUATION	Σ
	TOPICS	WEIGHTS	35%	25%	20%	10%	5%	5%	100%
1	Logarithm	11%	2 (1, 2)	1 (3)	1 (4)	1 (5)	0	0	5
2	Approximation	7%	1 (6)	1 (7)	1 (8)	0	0	0	3
3	Sequences and Series	9%	2 (9, 10)	1 (11)	1 (12)	1 (13)	0	0	5
4	Quadratic Equation	12%	2 (14, 15)	2 (16, 17)	1 (18)	1 (19)	0	0	6
5	Simultaneous Linear and Quadratic Equations	8%	1 (20)	1 (21)	1 (22)	1 (23)	0	0	4
6	Gradient of a Curve	4%	1 (24)	1 (25)	0	0	0	0	2
7	Logical Reasoning	7%	1 (26)	1 (27)	1 (28)	0	0	0	3
8	Linear Inequalities	8%	1 (29)	1 (30)	1 (31)	1 (32)	0	0	4
9	Algebraic Fractions	10%	2 (33, 34)	1 (35)	1 (36)	1 (37)	0	0	5
10	Chord Property	6%	1 (38)	1 (39)	1 (40)	0	0	0	3
11	Circle Theorems	4%	1 (41)	1 (42)	0	0	0	0	2
12	Trigonometry	5%	1 (43)	1 (44)	1 (45)	0	0	0	3
13	Bearings	9%	2 (46, 47)	1 (48)	1 (49)	1 (50)	0	0	5
	Σ	100%	18	14	11	7	0	0	50

APPENDIX C

MATHEMATICS ACHIEVEMENT TEST (MAT)

INSTRUCTION: Read and attempt all questions. Circle one option which correctly answers the question. Do not ask for any explanation. Tick according to your gender.

Time Allowed: 2 hours.

Male ☐

Female ☐

1. Using logarithm table, find the logarithm of 12.34
 a.) 2.0913 b.) 1.0913 c.) 3.0913 d.) 1.3913
2. Use table to calculate the result of $\frac{76.7 \times 308.2}{8.04}$
 a.) 2941 b.) 30.001 c.) 3.031 d.) 29.41
3. $\log_{10} 0.0028 = \bar{3}.4427$. What is the characteristic of the log?
 a.) 3 b.) $\bar{3}$ c.) 0.4427 d.) 4427
4. Solve for x if $\log_x 8 = 3$. x = ?
 a.) 2 b.) 10 c.) 8 d.) 24
5. Evaluate using mathematical table $\sqrt{\frac{2.067}{0.0348 \times 0.538}}$
 a.) 1.051 b.) 1051 c.) 10.51 d.) 105.1
6. Round off 146.83 to 2 significant figures.
 a.) 150 b.) 140 c.) 14 d.) 15
7. Simplify $\frac{1.386+0.247}{12.6581}$ to 1 significant figure.
 a.) 0.1 b.) 0.2 c.) 3.7 d.) 2.1
8. A boy measured a stick of length 1.75m as 1.80m. Find the percentage error in his measurement.
 a.) $+2\frac{6}{7}\%$ b.) -2.76% c.) +0.53% d.) +0.05%
9. Find the next two terms of the following sequence 10, 9, 7, 4, 0, -5, -11, ...
 a.) 26, 18 b.) -18, -26 c.) 15, -20 d.) 18, -15
10. The nth term of a GP is given by the expression ar^{n-1} . What is the 10th term of the sequence 5, 10, 20, 40, 80, ...?
 a.) 331 b.) 4237 c.) 2410 d.) 2560
11. The 28th term of an AP is -5. Find its common difference if its first term is 31.

- a.) $-5\frac{1}{2}$ b.) 1.2 c.) $-1\frac{1}{3}$ d.) $7\frac{1}{4}$
12. How many terms are there in the series $\frac{1}{2}, \frac{3}{4}, 1, \dots, 5\frac{1}{2}$?
- a.) 4 b.) 5 c.) 21 d.) 7
13. A librarian stacked 702 books progressively in shelves so that the first shelf has no book while the last shelf has 108 books. In how many shelves did he stack the books, and how many books more are there in successive shelves?
- a.) 39, 31 b.) 13, 9 c.) 10, 28 d.) 14, 60
14. Which of the following is a quadratic equation?
- a.) $ap^2 + bp = c$ b.) $ax + bx + c = 0$ c.) $x^3 + ax^2 + bx + c = 0$ d.) $x^3 + x^2 - 5 = 0$
15. Solve the equation $(x - 4)(x - 9) = 0$
- a.) 4, -9 b.) 4, 7 c.) 2, 10 d.) 4, 9
16. What must be added to $d^2 - 5d$ to make it a perfect square?
- a.) 5 b.) $-5d^2$ c.) 2.55 d.) $(-2.5)^2$
17. The possible value of x the equation $x^2 - 8x + 3 = 0$ is
- a.) $4 - \sqrt{13}$ b.) 4 c.) $\sqrt{13} - 4$ d.) $4\sqrt{13}$
18. The difference between the ages of two boys is 5, and the product of their ages is 266. Find their ages.
- a.) 4, 9 b.) 14, 8 c.) 19, 14 d.) 4, 19
19. A woman is 4 times older than her son. 5 years ago, the product of their ages was 175. What are the ages of the woman and her son?
- a.) 35, 5 b.) 7, 28 c.) 10, 40 d.) 15, 60
20. Solve the simultaneous equations $2x + 5y = 1$, $3x - 2y = 30$.
- a.) $x = 4, y = 4$ b.) $x = -3, y = 8$ c.) $x = \frac{1}{2}, y = 0$ d.) $x = 8, y = -3$
21. Find the values of x and y if $3^{2x-y} = 1$ and $\frac{16^x}{4} = 8^{3x-y}$.
- a.) $x = 2, y = 4$ b.) $x = 4, y = 3$ c.) $x = \frac{1}{2}, y = 0$ d.) $x = 5, y = 6$
22. Solve the equations $3x + y = 10$, $2x^2 + y^2 = 19$.

a.) $x = 3, 2\frac{5}{11}$ and $y = 1, 2\frac{7}{11}$

b.) $x = 1, 2\frac{5}{11}$ and $y = 3, 2\frac{7}{11}$

c.) $x = 1, 2$ and $y = 3, -1\frac{1}{3}$

d.) $x = 1, -1\frac{1}{13}$ and $y = 3, 1\frac{3}{11}$

Solve the equation $3x + 4y = 11$, $x \neq y = 2$.

a.) $(1, -1\frac{1}{3}), (\frac{3}{4}, 1\frac{1}{3})$ b.) $(1, 2), (\frac{3}{4}, 2\frac{2}{3})$ c.) $(1, 2), (2\frac{2}{3}, \frac{3}{4})$ d.) $(1, \frac{3}{4}), (2\frac{2}{3}, \frac{3}{4})$

23. A tangent to a curve at point P passes through the points A(2, 5) and B(3, -3). Calculate the gradient of the curve at point P.

a.) -8

b.) 8

c.) 7

d.) 13

24. The equation of a line is given by $5x - 2y = 5$. Find the gradient of the line.

a.) $5\frac{1}{2}$

b.) 5

c.) $2\frac{1}{2}$

d.) $7\frac{1}{5}$

25. State the negation of the closed statement: $S = \text{Teachers are kind}$. $\sim S =$

a.) Teachers are not kind

b.) No teacher is kind

c.) Teaching makes one

wicked

d.) Teachers are good people

26. Consider the following premises and conclusion.

$X_1 = \text{All dogs chew bones}$.

$X_2 = \text{Watchman chews bone}$.

$X_3 = \text{Bones are only found in Abuja}$.

$Y = \text{Watchman is a dog or lives in Abuja}$.

The conclusion Y makes the argument valid.

a.) True

b.) False

c.) Sometimes

d.) Maybe

27. $X = \text{All drivers are careful and patient}$. $\sim X =$

a.) All drivers are not careful and patient

b.) All drivers are not careful or patient

c.) Some drivers are not careful or patient

d.) No driver is careful and patient

28. What is the smallest value of x in the inequality $-2x < -6$?

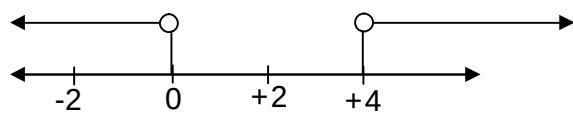
a.) 4

b.) 3

c.) -3

d.) -6

29. Which of these defines the number line below?



a.) $0 > x > 4$

b.) $0 \geq x \geq 4$

c.) $0 \leq x \leq 4$

d.) $0 \leq x \leq 4$

30. Solve the inequality $\frac{2}{3} - 3x \leq 2(1 - x)$

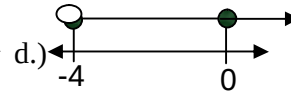
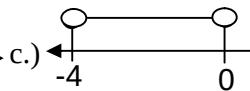
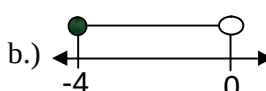
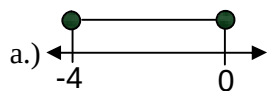
a.) $x \leq 1\frac{1}{3}$

b.) $x = 1\frac{1}{3}$

c.) $x \geq -1\frac{1}{3}$

d.) $x < -1\frac{1}{3}$

31. Sketch the inequality $0 > x \geq -4$



32. Simplify $\frac{a^2 - b^2}{b^2 - ab}$

a.) $\frac{c}{a-2m}$

b.) $\frac{5c-3b}{a+3m}$

c.) $-\frac{1}{b}(a+b)$

d.) $\frac{m}{b}(am-b)$

33. Divide $\frac{m^2 - a^2}{m^2 - bm + am + ab}$ by $\frac{m^2 - 2am + a^2}{cm + bc}$

a.) $\frac{c}{m-a}$

b.) $-\frac{1}{b}(a+b)$

c.) $\frac{m}{b}(am-b)$

d.) $\frac{5c-3b}{a+3m}$

34. Simplify $\frac{1}{a-2m} - \frac{2}{a+3m}$

a.) $\frac{7m-a}{(a-2m)(a+3)}$

b.) $\frac{14m-7a}{(a-2m)(a+3m)}$

c.) $\frac{7m-8}{(a-2)(a+3m)}$

d.) $\frac{7m-a}{(a-2m)(a+3m)}$

35. If $x = \frac{2a+3}{3a-2}$, express $\frac{x-1}{2x+1}$ in terms of a.

a.) $\frac{a-1}{2a+1}$

b.) $\frac{x-1}{2a+1}$

c.) $\frac{5-a}{4+7a}$

d.) $\frac{5a-1}{6a+1}$

36. For what values of x is $\frac{x^2-2x+3}{(x+3)(x-8)}$ undefined?

a.) $x = -8, 3$

b.) $x = 8, 3$

c.) $x = 3, 3$

d.) $x = 8, -3$

37. A straight line which divides a circle into two unequal parts is called _____

a.) Chord

b.) Diameter

c.) Circumference

d.) Radius

38. A chord of a circle is 12cm long. Calculate the distance of the midpoint of the chord from the center of the circle whose radius is 10cm.

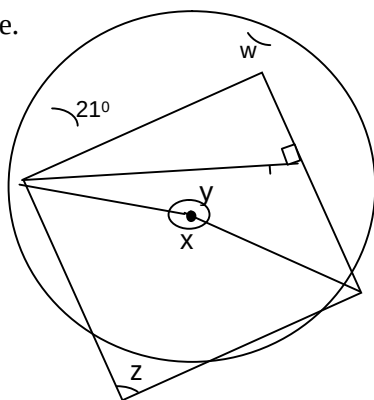
a.) 8cm

b.) 64cm

c.) 12cm

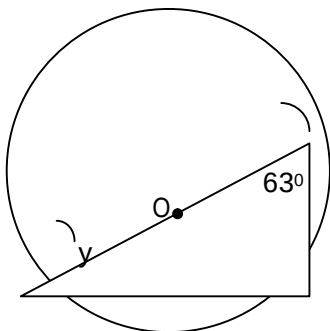
d.) 6cm

39. Calculate the value of the angle z in the figure below where O is the center of the circle.



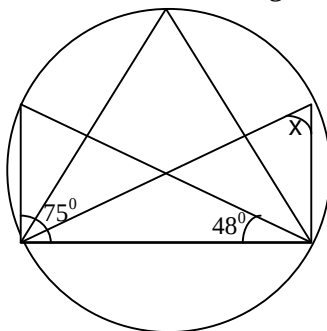
- a.) 111° b.) 48° c.) 222° d.) 148°

40. Calculate the size of the angle y in the figure below where O is the center of the circle.



- a.) 62° b.) 74° c.) 27° d.) 117°

41. What is the value of the angle marked x in the figure below?



- a.) 57° b.) 81° c.) 62° d.) 123°

42. Which of the following is positive for $x = 288^\circ$?

- a.) $\cos x$ b.) $\sin x$ c.) $\tan x$ d.) All of the above

43. Find the angle A in $\triangle ABC$ in which $a = 12.5\text{cm}$, $c = 17.7\text{cm}$ and $C = 116^\circ$.

- a.) 32.4° b.) 62.31° c.) 39.40° d.) 74.81°

44. Calculate the value of the angle C in $\triangle ABC$ in which $a = 7.1\text{cm}$, $b = 9.5\text{cm}$ and $B = 63^{\circ}18'$
- a.) 62.31° b.) 74.81° c.) 32.4° d.) 39.40°
45. Determine the direction of A from B is to find
- a.) The bearing of A from B b.) The bearing of B from A c.) All of the above d.) None of the above
46. The bearing of X from Y is 181° . Which of the following is correct?
- a.) X is $S1^{\circ}W$ of Y b.) Y is $S1^{\circ}W$ of X c.) X is $S1^{\circ}E$ of Y d.) Y is $181^{\circ}E$ of X
47. A tree is on a bearing $S36^{\circ}W$ from a point X and $S76^{\circ}E$ from a point Y. If X is 200m due East of Y, calculate the distance of the tree from Y to the nearest meter.
- a.) 32.4m b.) 43.5m c.) 453m d.) 177m
48. Two planks of lengths 1m and 1.2m, lean against each other at an angle of 36° . How far are the planks apart on the ground?
- a.) 0.176m b.) 0.0716m c.) 0.706m d.) 7.60m
49. Two ships leave a port at the same time. One travels at 5km/h on a bearing of 046° . The other travels at 9km/h on the bearing 127° . How far apart are the ships after 2hours?
- a.) 19.2km b.) 21.9km c.) 18.02km d.) 9km

APPENDIX D

Solution to MAT

1. Log 12 under 3+ difference 4 = $0.0913 + 1 = \underline{1.0913}$
2. $\begin{array}{rcl} \text{Log } 76.7 & \longrightarrow & 1.8848 \\ \text{Log } 308.2 & \longrightarrow & 2.4889 \end{array} \left. \vphantom{\begin{array}{r} 1.8848 \\ 2.4889 \end{array}} \right\} \begin{array}{c} + \\ - \end{array} \longrightarrow \begin{array}{c} 4.3737 \\ - \\ \hline 0.9053 \end{array}$
 Log 8.04 $\longrightarrow$ 0.9053 $\longrightarrow$ 0.9053
 3.4684

Antilog of 3.4684 = 294.1

3. 3

4. $\text{Log}_x 8 = 3$

$$2^3 = x^3$$

$$\underline{\underline{x = 2}}$$

5. $\begin{array}{rcl} \text{Log } 2.067 & 0.3154 & 0.3154 \\ \text{Log } 0.0348 & 2.5416 & \\ \text{Log } 0.538 & 1.7308 & \end{array} \left. \vphantom{\begin{array}{r} 2.5416 \\ 1.7308 \end{array}} \right\} \begin{array}{c} + \\ - \end{array} \longrightarrow \begin{array}{c} \underline{2.2724} \\ 2.0430 \div 2 = \underline{\underline{1.0215}} \end{array}$

Antilog of 1.0215 = 10.51

6. $146.83 \approx \underline{\underline{150}}$

7. $\frac{1.386 + 0.247}{12.6581} = \frac{1 + 0.2}{10} = \frac{1.2}{1.0} = 0.12 \approx \underline{\underline{0.1}}$

8. % error = $\frac{\text{error}}{\text{True measure}} \times \frac{100}{1}$

$$= + \frac{0.05}{1.75} \times \frac{100}{1}$$

$$= + 2 \frac{6}{7} \%$$

9. 10, 9, 7, 4, 0, -5, -11, -18, -26

10. $a = 5, r = 2, n = 10 \implies ar^{n-1} = 5 \times 2^{10-1} = \underline{\underline{2560}}$

$$11. \quad U_n = a + (n - 1) d$$

$$-5 = 31 + (28-1) d$$

$$-5 - 31 = 27d$$

$$d = \underline{-1\frac{1}{3}}$$

$$12. \quad l = a + (n-1)d$$

$$5\frac{1}{2} = \frac{1}{2} + (n-1) \frac{1}{4}$$

$$5\frac{1}{2} - \frac{1}{2} = \frac{1}{4} (n-1)$$

$$20 = n-1$$

$$n = \underline{\underline{21}}$$

$$13. \quad S_n = \frac{1}{2} n (a + l)$$

$$702 = \frac{1}{2} n(0+108)$$

$$1404 = 108n$$

$$n = \underline{\underline{13}}$$

$$l = a+(n-1)d$$

$$108=0+(13-1)d$$

$$108 = 12d$$

$$d = \underline{\underline{9}}$$

$$14. \quad ap^2 + bp = c$$

$$15. \quad (x - 4) (x + 9) = 0$$

$$x - 4 = 0; \quad x + 9 = 0$$

$$x = 4 \quad x = -9$$

$$16. \quad d^2 - 5d + \text{the square of half of the coefficient of } d$$

$$d^2 - 5d + \underline{(-2.5)^2}$$

$$17. \quad x^2 - 8x + 3 = 0 \quad a=1, \quad b = -8, c = 3$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(1)(3)}}{2(1)}$$

$$= \frac{8 \pm \sqrt{64 - 12}}{2}$$

$$= \frac{8 \pm \sqrt{52}}{2}$$

$$= \frac{8 \pm 2\sqrt{13}}{2}$$

$$= 4 \pm \sqrt{13}$$

18. Let the boys' age be x and y where $y > x$ and $y = x + 5$

$$x(x+5) = 266$$

factors of 266:

$$\begin{array}{r|l} 2 & 266 \end{array}$$

$$x^2 + 5x = 266$$

$$\begin{array}{r|l} 7 & 133 \end{array}$$

$$x^2 + 5x - 266 = 0$$

$$\begin{array}{r|l} 19 & 19 \end{array}$$

$$x^2 - 14x + 19(x - 14) = 0$$

$$1$$

$$(x + 19)(x - 14) = 0$$

1,266; 2,133; 19,14; 7,38

$$x = -19 \text{ or } 14$$

Age is only positive $x = 14$ years

and $y = 19$ years

19. Let the woman's age be $4x$ while her son's age be x

5 years ago, the woman was $(4x-5)$ while her son $(x-5)$

$$(4x-5)(x-5) = 175$$

$$4x^2 - 5x - 20x + 25 = 175$$

$$4x^2 - 25x + 25 = 175$$

$$4x^2 - 25x - 150 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(-25) \pm \sqrt{(-25)^2 - 4(4)(-150)}}{2(4)}$$

$$= \frac{8 \pm \sqrt{625 + 2400}}{8}$$

$$= \frac{8 \pm \sqrt{3025}}{8}$$

$$= \frac{80}{8} \pm \frac{-30}{8}$$

$$= 10 \text{ years} \implies \text{The Woman's age is } (4 \times 10) = 40 \text{ years}$$

20. $2x + 5y = 1$ ----- (1) $\times 3$

$3x - 2y = 30$ ----- (2) $\times 2$

$$6x + 15y = 3$$
 ----- (1)

$$6x - 4y = 60$$
 ----- (2)

$$(1) - (2) \implies 0 + 19y = -57$$

$$y = \frac{-57}{19}$$

$$19$$

$$y = \underline{\underline{-3}}$$

Put $y = -3$ into (1)

$$2x + 5(-3) = 1$$

$$2x + (-15) = 1$$

$$2x = 16$$

$$x = \underline{\underline{8}}$$

21. $3^{2x-y} = 1$

$$\frac{16x}{4} = 8^{3x-y}$$

$$3^{2x-y} = 3^0$$

$$\implies 2x - y = 0$$
 ----- (1)

$$\underline{\underline{2^{4x}}} = 2^{3(3x-y)}$$

$$2^2$$

$$2^{4x-2} = 2^{9x-3y}$$

$$\Rightarrow 4x - 2 = 9x - 3y$$

$$5x - 3y = -2 \text{ ----- (2)}$$

From (1) $y = 2x$

Substitute $y = 2x$ into equation (2)

$$5x - 3(2x) = -2$$

$$-x = -2$$

$$\Rightarrow x = \underline{\underline{2}}$$

$$y = \underline{\underline{4}}$$

$$22. \quad 3x + y = 10 \text{ ----- (1)}$$

$$2x^2 + y^2 = 19 \text{ ----- (2)}$$

From (1), $y = 10 - 3x$

Put $10 - 3x$ for y into equation (2)

$$2x^2 + (10 - 3x)^2 = 19$$

$$2x^2 + 100 - 60x + 9x^2 = 19$$

$$11x^2 - 60x + 81 = 0$$

$$(x - 3)(11x - 27) = 0$$

$$x = 3 \text{ or } \frac{27}{11}$$

When $x = 3$, $y = 10 - 3 \times 3$

$$y = 1$$

When $x = \frac{27}{11} = 2\frac{5}{11}$, $y = 10 - 3 \times \frac{27}{11}$

$$y = 2\frac{7}{11}$$

Solutions are $x = 3$, $y = 1$

$$\text{or/and } \underline{\underline{x = 2\frac{5}{11} \quad y = 2\frac{7}{11}}}$$

23. $3x + 4y = 11$ ----- (1)

$xy = 2$ ----- (2)

From (2), $x = \frac{2}{y}$

Put $\frac{2}{y}$ for x into (1)

$$3\left(\frac{2}{y}\right) + 4y = 11$$

$$6 + 4y^2 = 11y$$

$$4y^2 - 11y + 6 = 0$$

$$(y - 2)(4y - 3) = 0$$

$$y = 2 \text{ or } \frac{3}{4}$$

$$\Rightarrow \underline{\underline{x = 1 \text{ or } \frac{2}{3}}}$$

24. Gradient, $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3 - 5}{-1 - 7}$

$$m = \underline{\underline{-8}}$$

25. $5x - 2y = 5$

$$2y = -5 + 5x$$

$$y = \frac{5}{2}x - \frac{5}{2}$$

$$y = mx + c$$

$$m = \frac{5}{2} = 2\frac{1}{2}$$

26. $\square$ S = Teachers are not kind

27. True

28. No driver is careful and patient

29. $-2x < -6$

$$x > \frac{-6}{-2}$$

$$x > 3$$

The smallest value of x is 4

30. $0 > x > 4$

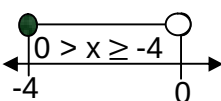
31. $\frac{2}{3} - 3x \leq 2(1 - x)$

$$\frac{2}{3} - 3x \leq 2 - 2x$$

$$\frac{2}{3} - 2 \leq 3x - 2x$$

$$-1\frac{1}{3} \leq x$$

$$\underline{\underline{x \geq -1\frac{1}{3}}}$$

32. 

33. $\frac{a^2 - b^2}{b^2 - ab} = \frac{(a-b)(a+b)}{b(b-a)} = \frac{(a-b)\cancel{(a+b)}}{-b\cancel{(a-b)}} = -\frac{1}{b}(a+b)$

34. $\frac{m^2 - a^2}{m^2 + bm + am + ab} \div \frac{m^2 - 2am + a^2}{cm + bc}$

$$= \frac{\cancel{(m-a)}\cancel{(m+a)}}{\cancel{(m+a)}\cancel{(m+b)}} \times \frac{c\cancel{(m+b)}}{\cancel{(m-a)}(m-a)} = \underline{\underline{\frac{c}{m-a}}}$$

35. $\frac{1}{a-2m} - \frac{2}{a+3m} = \frac{1(a+3m) - 2(a-2m)}{(a-2m)(a+3m)} = \frac{1+3m-2a+4m}{(a-2m)(a+3m)}$

$$= \frac{-a+7m}{(a+2m)(a+3m)} = \frac{7m-a}{(a-2m)(a+3m)}$$

36. $\frac{x-1}{2x+1} = \frac{2a+3}{3a-2} - 1 = \frac{2a+3-3a+2}{3a-2}$

$$\frac{2(2a+3)}{3a-2} + 1 = \frac{4a+6+3a-2}{3a-2}$$

$$= \frac{-a+5}{3a-2} \times \frac{3a-2}{7a+4} = \frac{5-a}{7a+4}$$

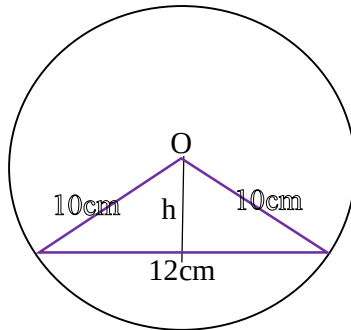
37. $\frac{x^2 - 2x + 3}{(x+3)(x-8)}$ is undefined when the denominator is zero

$$(x+3)(x-8) = 0$$

$$X = -3 \text{ or } x = 8$$

38. Chord

39.



In ODB, by Pythagoras's theorem,

$$10^2 + 6^2 = h^2$$

$$h = \sqrt{100 - 36} = \sqrt{64}$$

$$= \underline{\underline{8\text{cm}}}$$

40. $w = 180 - (90 + 21)$

angles in a triangle

$$= 69^\circ$$

$$x = 2 \times 69$$

angles at center of a circle

$$= 138^\circ$$

$$y = 360 - 138$$

angles at a point

$$= 222^\circ$$

$$z = \frac{1}{2} \cdot 222^\circ$$

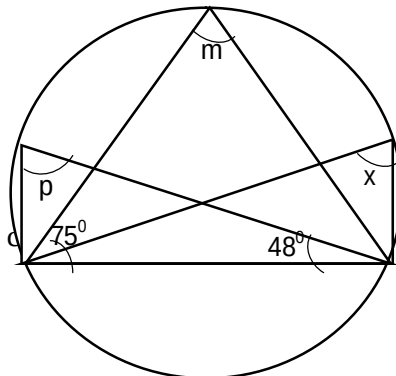
angles at center of a circle

$$= \underline{\underline{111^\circ}}$$

41. $y = 180 - (90 - 63)$

diameter makes 90° at any point on the circumference

42.



$m = p = x$ angles in the same segment of a

$$p = 180 (48 + 75)$$

$$m, p, x = \underline{\underline{57^\circ}}$$

43. $\cos x$ where $x = 288^\circ$ is positive since cosine is positive in the third quadrant

44. $\frac{a}{\sin A} = \frac{c}{\sin C}$

$$\frac{12.5}{\sin A} = \frac{17.7}{\sin 116}$$

$$A = \sin^{-1} \left(\frac{12.5 \sin 116}{17.7} \right)$$

$$= \underline{\underline{39.4^\circ}}$$

45. $\frac{a}{\sin A} = \frac{b}{\sin B}$

$$\frac{7.1}{\sin A} = \frac{9.5}{\sin 63.3^\circ}$$

Note: $60^\circ = 1^\circ$
 $18^\circ = 0.3^\circ$

$$A = \sin^{-1} \left(\frac{7.1 \sin 63.3}{9.5} \right)$$

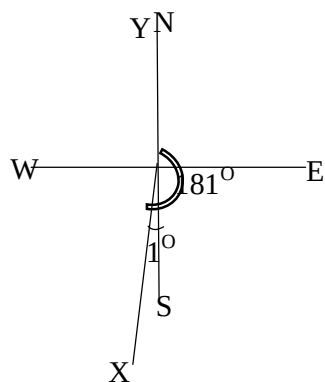
$$= 41.9$$

$$C = 180 - (63.3 + 41.9)$$

$$= \underline{\underline{74.8^\circ}}$$

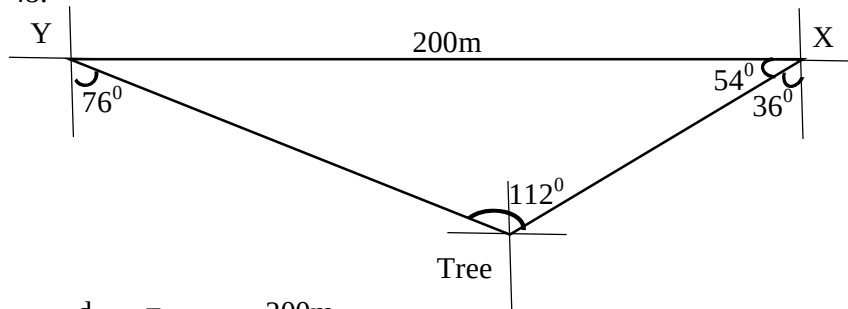
46. The bearing of A from B

47.



X is $S1^\circ W$ of Y

48.

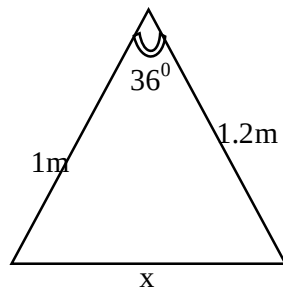


$$\frac{d}{\sin 54^\circ} = \frac{200m}{\sin 112^\circ}$$

$$d = \frac{200 \sin 54}{\sin 112}$$

$$= 174.5 \approx \underline{\underline{175\text{m}}}$$

49.



$$a^2 = b^2 + c^2 - 2bc\cos A$$

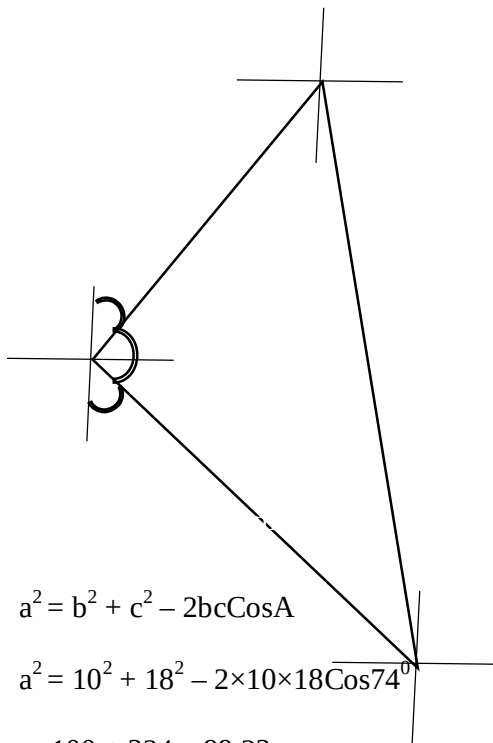
$$x^2 = 1^2 + 1.2^2 - 2 \times 1 \times 1.2 \cos 36^\circ$$

$$= 1 + 1.44 - 1.94$$

$$= 0.5$$

$$x = \sqrt{0.5} = \underline{\underline{0.706\text{m}}}$$

50.



$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$x^2 = 10^2 + 18^2 - 2 \times 10 \times 18 \cos 74^\circ$$

$$= 100 + 324 - 99.23$$

$$= 324.77$$

$$x = \sqrt{324.77} = \underline{\underline{18.02\text{km}}}$$

APPENDIX E

Cronbach's Alpha Reliability for EQ-i2.0 performed with SPSS version 22.

Reliability for Cluster A

```
RELIABILITY
  /VARIABLES=Item1 Item2 Item3 Item4 Item5 Item6 Item7 Item8 Item9 Item10
Item11 Item12
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA.
```

Reliability

[DataSet5] C:\Users\DAVID\Desktop\Dave - Research\Chapter 1 - 5\New\DaveEQ-i2.0 Reliability.sav

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	40	100.0
	Excluded ^a	0	.0
	Total	40	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.832	12

Reliability for Cluster B

RELIABILITY

```

/VARIABLES=Item13 Item14 Item15 Item16 Item17 Item18 Item19 Item20 Item21
Item22 Item23 Item24
/SCALE('ALL VARIABLES') ALL
/MODEL=ALPHA.

```

Reliability

[DataSet5] C:\Users\DAVID\Desktop\Dave - Research\Chapter 1 - 5\New\DaveEQ-i2.0 Reliability.sav

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	40	100.0
	Excluded ^a	0	.0
	Total	40	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.755	12

Reliability for Cluster C

RELIABILITY

```

/VARIABLES=Item25 Item26 Item27 Item28 Item29 Item30 Item31 Item32 Item33
Item34 Item35 Item36
/SCALE('ALL VARIABLES') ALL
/MODEL=ALPHA.

```

Reliability

[DataSet5] C:\Users\DAVID\Desktop\Dave - Research\Chapter 1 - 5\New\DaveEQ-i2.0 Reliability.sav

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	40	100.0
	Excluded ^a	0	.0
	Total	40	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.804	12

Reliability for Cluster D

RELIABILITY

```

/VARIABLES=Item37 Item38 Item39 Item40 Item41 Item42 Item43 Item44 Item45
Item46 Item47 Item48
/SCALE('ALL VARIABLES') ALL
/MODEL=ALPHA.

```

Reliability

[DataSet5] C:\Users\DAVID\Desktop\Dave - Research\Chapter 1 - 5\New\DaveEQ-i2.0 Reliability.sav

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	40	100.0
	Excluded ^a	0	.0
	Total	40	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.711	12

Reliability for Cluster E

RELIABILITY

```

/VARIABLES=Item49 Item50 Item51 Item52 Item53 Item54 Item55 Item56 Item57
Item58 Item59 Item60
/SCALE('ALL VARIABLES') ALL
/MODEL=ALPHA.

```

Reliability

[DataSet5] C:\Users\DAVID\Desktop\Dave - Research\Chapter 1 - 5\New\DaveEQ-i2.0 Reliability.sav

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	40	100.0
	Excluded ^a	0	.0
	Total	40	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.874	12

EQ-i2.0 Total Reliability

RELIABILITY

```

/VARIABLES=Item1 Item2 Item3 Item4 Item5 Item6 Item7 Item8 Item9 Item10
Item11 Item12 Item13 Item14 Item15 Item16 Item17 Item18 Item19 Item20
Item21 Item22 Item23 Item24 Item25 Item26 Item27 Item28 Item29 Item30
Item31 Item32 Item33 Item34 Item35 Item36
Item37 Item38 Item39 Item40 Item41 Item42 Item43 Item44 Item45 Item46
Item47 Item48 Item49 Item50 Item51 Item52 Item53 Item54 Item55 Item56
Item57 Item58 Item59 Item60
/SCALE('ALL VARIABLES') ALL
/MODEL=ALPHA
/STATISTICS=CORR
/SUMMARY=MEANS VARIANCE.

```

Reliability

[DataSet5] C:\Users\DAVID\Desktop\Dave - Research\Chapter 1 - 5\New\DaveEQ-i2.0 Reliability.sav

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	40	100.0
	Excluded ^a	0	.0
	Total	40	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.925	.931	60

APPENDIX F

Reliability of Mathematics Achievement Test, MAT

SN	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12
1	0	1	1	1	0	1	1	0	0	1	1	1
2	1	0	0	1	0	0	1	0	1	0	1	0
3	1	0	0	1	0	1	1	1	1	0	0	1
4	1	1	1	1	1	1	1	1	1	1	1	1
5	1	0	1	1	1	1	1	1	1	1	1	1
6	0	0	1	1	1	0	0	1	0	1	1	0
7	1	1	1	1	1	1	1	1	0	1	1	1
8	0	0	0	1	0	0	0	0	1	1	1	0
9	1	0	0	0	0	1	1	0	0	1	0	1
10	1	1	1	0	1	0	1	1	1	1	1	1
11	0	0	0	0	1	0	1	0	1	0	1	1
12	1	1	1	0	1	1	1	1	0	1	1	1
13	0	0	1	0	1	0	1	1	1	0	1	1
14	1	1	0	0	1	0	1	1	0	1	0	0
15	1	1	0	1	1	1	1	1	1	0	1	1
16	0	1	1	1	1	1	1	1	0	1	1	1
17	1	1	1	0	1	1	0	0	1	1	0	0
18	1	1	1	1	0	1	0	0	1	1	1	1
19	0	0	1	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1	1	1	1
21	1	1	1	1	1	0	1	1	1	1	1	1
22	0	1	1	1	1	1	0	0	0	1	1	1
23	1	1	1	0	1	1	1	1	1	1	1	1
24	1	1	0	0	1	1	1	0	1	1	1	1
25	1	0	1	1	1	0	1	1	1	0	0	1
26	1	1	1	1	1	1	1	1	1	1	0	0
27	1	1	1	1	1	0	1	0	0	1	1	1
28	1	1	1	1	1	1	0	1	1	1	1	1
29	1	1	0	1	0	1	0	1	1	1	1	0
30	1	0	1	1	0	1	0	0	1	1	1	0
31	1	1	1	1	1	0	1	0	0	1	0	0
32	0	1	1	1	0	1	1	1	1	0	1	0
33	0	1	0	1	0	0	0	1	1	0	0	1
34	0	0	1	0	1	0	1	0	1	1	0	1
35	1	1	1	1	1	1	1	0	1	1	0	1
36	1	1	1	0	1	0	1	1	1	0	1	1
37	1	1	0	1	0	1	0	1	0	0	1	0
38	1	1	1	1	1	1	1	0	1	1	0	0

39	1	1	1	0	0	1	0	1	0	1	0	0
40	1	1	1	1	1	0	1	1	1	1	1	1
Total	29	28	29	28	28	25	29	25	28	30	28	27
p_i	0.725	0.700	0.725	0.700	0.700	0.625	0.725	0.625	0.700	0.750	0.700	0.675
q_j	0.275	0.300	0.275	0.300	0.300	0.375	0.275	0.375	0.300	0.250	0.300	0.325
p_q	0.199	0.210	0.199	0.210	0.210	0.234	0.199	0.234	0.210	0.188	0.210	0.219
Item 13	Item 14	Item 15	Item 16	Item 17	Item 18	Item 19	Item 20	Item 21	Item 22	Item 23	Item 24	Item 25
1	0	1	1	1	0	1	0	1	1	1	1	1
1	0	0	0	0	0	0	0	0	1	0	1	0
0	1	1	0	1	1	0	1	1	0	1	1	0
1	1	1	1	1	1	1	1	1	1	1	0	1
1	1	1	1	1	0	1	1	1	1	1	1	1
1	0	1	0	1	0	0	1	0	0	1	0	1
0	1	1	1	1	1	1	0	1	1	1	0	1
0	1	0	0	0	1	0	0	0	1	1	0	0
0	0	0	0	1	0	0	1	0	0	0	1	0
1	1	1	1	1	1	1	1	1	1	1	1	1
0	1	1	0	1	1	0	1	1	0	1	0	0
1	1	1	1	1	1	1	1	1	1	1	1	1
1	0	1	1	1	1	1	1	1	0	1	1	1
0	0	0	0	0	0	1	0	0	0	0	0	1
0	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	0	1	1	1	1
1	1	1	0	1	1	0	1	0	1	0	0	0
0	1	1	1	1	1	1	1	0	1	1	1	1
0	1	1	1	0	0	1	1	1	1	1	1	1
1	1	1	1	1	1	1	0	1	1	1	0	0
1	1	1	1	0	0	1	1	0	1	1	1	1
0	0	0	0	0	0	1	0	1	1	0	0	1
1	1	0	1	1	1	1	1	0	1	1	0	1
1	1	0	1	0	1	1	0	1	1	1	1	1
1	0	0	1	1	1	0	1	1	1	0	1	1
1	1	0	1	1	1	1	1	1	1	1	1	1
1	1	0	0	1	1	0	1	0	0	0	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1
0	0	1	0	0	1	0	1	1	1	1	1	1
1	0	1	1	0	0	1	1	1	1	0	1	0
1	1	1	1	1	1	1	0	0	0	0	1	0
1	1	1	0	1	1	1	1	1	1	1	1	1
0	0	0	0	1	0	1	0	1	0	1	1	0
0	1	1	1	0	0	0	0	1	1	0	1	1
1	1	1	0	1	1	0	0	1	1	1	1	0

0	0	1	1	1	1	1	0	1	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1	1
0	1	0	0	1	0	1	0	1	0	0	1	0
0	0	1	1	0	0	1	0	1	1	0	0	1
0	1	1	1	1	1	1	0	1	1	1	1	1
1	1	0	0	1	1	1	1	1	0	1	1	1
0	1	1	1	1	1	1	0	1	0	0	1	1
0	0	0	1	1	0	1	0	1	1	1	1	1
0	0	0	0	0	0	0	1	0	1	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1	1
27	27	28	28	28	26	29	30	25	30	27	28	29
0.675	0.675	0.700	0.700	0.700	0.650	0.725	0.750	0.625	0.750	0.675	0.700	0.725
0.325	0.325	0.300	0.300	0.300	0.350	0.275	0.250	0.375	0.250	0.325	0.300	0.275
0.219	0.219	0.210	0.210	0.210	0.228	0.199	0.188	0.234	0.188	0.219	0.210	0.199
Item 39	Item 40	Item 41	Item 42	Item 43	Item 44	Item 45	Item 46	Item 47	Item 48	Item 49	Item 50	Total Score
1	1	0	1	1	1	0	1	1	1	1	1	39
1	0	1	0	1	1	1	0	0	0	0	0	19
1	1	1	0	1	1	1	0	1	1	0	1	32
0	1	1	1	1	1	1	1	1	1	0	1	45
1	1	1	1	1	1	1	1	1	1	0	1	47
1	1	0	1	0	1	0	1	0	1	0	1	23
1	1	1	1	0	1	1	1	1	1	1	1	44
0	1	1	1	1	1	1	1	1	1	0	1	24
0	1	0	1	0	1	1	1	0	0	1	1	22
1	1	1	1	1	1	1	1	1	1	1	1	46
0	1	0	0	1	1	0	1	1	0	1	0	27
1	1	1	1	1	1	1	1	1	1	1	1	46
1	0	1	1	1	0	1	1	0	0	1	1	36
0	0	0	0	0	1	0	1	1	0	0	0	13
1	1	1	1	1	1	1	1	1	0	1	1	43
1	1	1	1	1	1	1	1	1	1	0	1	45
0	0	1	1	0	1	0	1	0	0	1	0	25
1	1	1	1	1	1	1	1	1	1	1	1	44
0	0	0	1	1	1	0	0	1	0	1	1	35
1	1	1	1	0	0	1	1	0	1	1	0	38
1	0	1	1	1	0	1	1	1	1	1	1	41
1	1	1	0	1	0	1	0	1	0	1	1	28
1	1	1	1	1	1	1	1	1	1	0	0	40
1	1	0	1	1	1	1	1	1	1	1	1	41
1	1	1	0	0	1	1	1	0	1	1	1	38

1	1	1	1	0	0	0	0	1	1	0	1	39
1	1	1	0	1	0	1	1	1	0	1	0	32
0	0	1	1	1	1	0	1	1	1	1	1	44
0	1	1	1	1	1	0	1	1	1	1	1	37
0	0	1	1	1	1	1	1	1	1	1	1	36
1	1	1	0	0	1	0	0	1	1	1	0	28
0	1	1	1	1	1	1	1	0	0	1	1	42
0	1	0	1	1	0	1	0	1	1	0	1	22
1	1	0	1	0	1	1	0	1	1	1	1	28
0	1	1	1	0	1	1	1	1	1	1	0	39
1	0	1	1	1	0	1	1	1	0	1	1	39
1	1	0	1	0	0	0	1	0	1	1	0	30
0	1	1	0	1	1	1	0	0	1	1	0	30
1	0	0	1	0	0	0	0	1	0	0	1	16
1	0	1	0	1	1	1	1	1	1	1	1	45
26	29	29	30	27	30	28	30	30	27	28	29	1388
0.650	0.725	0.725	0.750	0.675	0.750	0.700	0.750	0.750	0.675	0.700	0.725	
0.350	0.275	0.275	0.250	0.325	0.250	0.300	0.250	0.250	0.325	0.300	0.275	
0.228	0.199	0.199	0.188	0.219	0.188	0.210	0.188	0.188	0.219	0.210	0.199	
K-R 20 Reliability Coefficient Analysis for MAT												
k =		50										
$\sum p_i q_i =$		10.546										
σ^2		82.660										
K-R 20; ρ		0.890										

Reliability analysis done using Microsoft Excel

Kunda-Richardson 20

$$\text{K-R 20, } \rho = \frac{k}{k-1} \left[1 - \frac{\sum p_i q_i}{\sigma^2} \right]$$

$$= \frac{50}{50-1} \left[1 - \frac{10.546}{82.660} \right]$$

$$= \frac{50}{49} [0.8724]$$

$$= \underline{\underline{0.8902}}$$

Note:

Total = Number of respondents who answered the i th item correctly

Total Score = A respondent's total/cumulative score on the test

p_i = Proportion of respondents who answered the i th item correctly

q_i = Proportion of respondents who answered the i th item incorrectly

$$pq = p_i \times q_i$$

k = Number of items

$\sum p_i q_i$ = The sum of all pq

σ^2 = Total variance of the instrument

ρ = Kunda-Richardson 20 reliability coefficient

APPENDIX G

Output for Analysis of Data

Multiple Linear Regression Analysis

Regression

[DataSet2] C:\Users\Dr. Francis\Documents\Nnaji David.sav

Descriptive Statistics

	Mean	Std.Deviation	N
Achievement	25.2319	7.42599	483
SelfPerception	3.0597	.37166	483

Variables Entered/Removed^b

Model	Variables Entered	Variables Removed	Method
1	Self Perception ^a	.	Enter

a. All requested variables entered.

b. Dependent Variable: Achievement

Model Summary

Model	R	RSquare	Adjusted R Square	Std. Error of the Estimate
1	.061 ^a	.604	.602	7.41997

a. Predictors: (Constant), SelfPerception

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	98.095	1	98.095	14.782	.000 ^a
	Residual	26481.934	481	55.056		
	Total	26580.029	482			

a. Predictors: (Constant), SelfPerception

b. Dependent Variable: Achievement

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Beta
		B	Std. Error	Beta			
1	(Constant)	21.518	2.803		7.678	.000	
	SelfPerception	1.214	.909	.061	1.335	.000	

a. Dependent Variable: Achievement

Regression

[DataSet2] C:\Users\Dr. Francis\Documents\Nnaji David.sav

Descriptive Statistics

	Mean	Std.Deviation	N
Achievement	25.2319	7.42599	483
SelfExpression	3.1099	.42298	483

Variables Entered/Removed^b

Model	Variables Entered	Variables Removed	Method
1	Self Expression ^a	.	Enter

a. All requested variables entered.

b. Dependent Variable: Achievement

Model Summary

Model	R	RSquare	Adjusted R Square	Std. Error of the Estimate
1	.064 ^a	.607	.592	7.43365

a. Predictors: (Constant), SelfExpression

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	73.391	1	73.391	11.347	.001 ^a
	Residual	26579.638	481	55.259		
	Total	26580.029	482			

a. Predictors: (Constant), SelfExpression

b. Dependent Variable: Achievement

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Beta
		B	Std. Error	Beta			
1	(Constant)	25.441	2.512		10.127	.000	
	SelfExpression	.064	.800	.064	1.284	.001	

a. Dependent Variable: Achievement

Regression

[DataSet2] C:\Users\Dr. Francis\Documents\Nnaji David.sav

Descriptive Statistics

	Mean	Std.Deviation	N
Achievement	25.2319	7.42599	483
InterpersonalSkills	3.1015	.40790	483

Variables Entered/Removed^b

Model	Variables Entered	Variables Removed	Method
1	InterpersonalSkills ^a	.	Enter

a. All requested variables entered.

b. Dependent Variable: Achievement

Model Summary

Model	R	RSquare	Adjusted R Square	Std. Error of the Estimate
1	.058 ^a	.056	.056	7.43370

a. Predictors: (Constant), InterpersonalSkills

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58.932	1	58.932	14.074	.000 ^a
	Residual	26580.028	481	55.260		
	Total	26580.029	482			

a. Predictors: (Constant), InterpersonalSkills

b. Dependent Variable: Achievement

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Beta
		B	Std. Error	Beta			
1	(Constant)	25.240	2.597		9.720	.000	
	InterpersonalSkills	.058	.830	.000	1.580	.000	

a. Dependent Variable: Achievement

Regression

[DataSet2] C:\Users\Dr. Francis\Documents\Nnaji David.sav

Descriptive Statistics

	Mean	Std. Deviation	N
Achievement	25.2319	7.42599	483
Problem Solving	3.0791	.43168	483

Variables Entered/Removed^b

Model	Variables Entered	Variables Removed	Method
1	Problem Solving ^a	.	Enter

a. All requested variables entered.

b. Dependent Variable: Achievement

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.051 ^a	.048	.049	7.43370

a. Predictors: (Constant), Problem Solving

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	62.034	1	62.034	21.114	.028 ^a
	Residual	26579.995	481	55.260		
	Total	26580.029	482			

a. Predictors: (Constant), Problem Solving

b. Dependent Variable: Achievement

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Beta
		B	Std. Error	Beta			
1	(Constant)	25.172	2.439		10.322	.000	
	Problem Solving	.051	.784	.051	1.025	.028	

a. Dependent Variable: Achievement

Regression

[DataSet2] C:\Users\Dr. Francis\Documents\Nnaji David.sav

Descriptive Statistics

	Mean	Std. Deviation	N
Achievement	25.2319	7.42599	483
StressManagement	3.0778	.42327	483

Variables Entered/Removed^b

Model	Variables Entered	Variables Removed	Method
1	StressManagement ^a		Enter

a. All requested variables entered.

b. Dependent Variable: Achievement

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.072 ^a	.066	.628	7.39780

a. Predictors: (Constant), StressManagement

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	56.127	1	56.127	14.680	.000 ^a
	Residual	26323.902	481	54.727		
	Total	26580.029	482			

a. Predictors: (Constant), StressManagement

b. Dependent Variable: Achievement

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Beta
		B	Std. Error	Beta			
1	(Constant)	30.533	2.473		12.345	.000	
	StressManagement	.072	.796	.072	2.163	.000	

a. Dependent Variable: Achievement

Regression

[DataSet2] C:\Users\Dr. Francis\Documents\Nnaji David.sav

DescriptiveStatistics

	Mean	Std.Deviation	N
Achievement	25.2319	7.42599	483
SelfPerception	3.0597	.37166	483
SelfExpression	3.1099	.42298	483
InterpersonalSkills	3.1015	.40790	483
ProblemSolving	3.0791	.43168	483
StressManagement	3.0778	.42327	483

VariablesEntered/Removed^b

Model	Variables Entered	Variables Removed	Method
1	Stress Management, Problem Solving, Self Perception, Interpersonal Skills, Self Expression ^a	.	Enter

a. All requested variables entered.

b. Dependent Variable: Achievement

Model Summary

Model	R	RSquare	Adjusted R Square	the Estimate
1	.781 ^a	.641	.624	7.40987 Std.

Error of

a. Predictors: (Constant), StressManagement, ProblemSolving, SelfPerception, InterpersonalSkills,

SelfExpression

ANOVA^b

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	389.793	5	77.959	41.420	.002 ^a
Residual	26190.236	477	54.906		
Total	26580.029	482			

a. Predictors: (Constant), StressManagement, ProblemSolving, SelfPerception, InterpersonalSkills,

SelfExpression

b. Dependent Variable: Achievement

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Beta
		B	Std. Error	Beta			
1	(Constant)	28.592	4.314		6.627	.000	
	SelfPerception	.422	.047	.311	1.335	.000	
	SelfExpression	.442	.040	.338	1.284	.001	
	InterpersonalSkills	.393	.986	.224	1.580	.000	
	ProblemSolving	.339	.001	.192	1.025	.028	
	StressManagement	.530	.798	.499	2.167	.000	

a. Dependent Variable: Achievement

Regression

[DataSet2] C:\Users\Dr. Francis\Documents\Nnaji David.sav

Variables Entered/Removed^{b,c}

Model	Variables Entered	Variables Removed	Method
1	Stress Management, Problem Solving, Interpersonal Skills, Self Expression, Self Perception ^a		Enter

a. All requested variables entered.

b. Dependent Variable: Achievement

c. Models are based only on cases for which Gender = Male

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	Gender= Male (Selected)			
1	.760 ^a	.691	.624	7.69983

a. Predictors: (Constant), StressManagement, ProblemSolving, InterpersonalSkills, SelfExpression, SelfPerception

ANOVA^{b,c}

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	701.834	5	140.367	21.368	.040 ^a
Residual	16363.304	276	59.287		
Total	17065.138	281			

a. Predictors: (Constant), StressManagement, ProblemSolving, InterpersonalSkills, SelfExpression, SelfPerception

b. Dependent Variable: Achievement

c. Selecting only cases for which Gender = Male

Coefficients^{a,b}

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Beta
		B	Std. Error	Beta			
1	(Constant)	38.361	6.502		5.900	.000	
	SelfPerception	1.235	1.593	.056	.775	.439	
	SelfExpression	-1.671	1.257	-.089	-1.330	.185	
	InterpersonalSkills	-1.674	1.336	-.086	-1.253	.211	
	ProblemSolving	1.258	1.251	.067	1.005	.316	
	StressManagement	-3.088	1.115	-.165	-2.769	.006	

a. Dependent Variable: Achievement

b. Selecting only cases for which Gender = Male

Regression

[DataSet2] C:\Users\Dr. Francis\Documents\Nnaji David.sav

Variables Entered/Removed^{b,c}

Model	Variables Entered	Variables Removed	Method
1	Stress Management, Interpersonal Skills, Self Perception, Problem Solving, Self Expression	.	Enter

a. All requested variables entered.

b. Dependent Variable: Achievement

c. Models are based only on cases for which Gender = Female

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	Gender = Female (Selected)			
1	.721 ^a	.749	.625	6.61905

a. Predictors: (Constant), StressManagement, InterpersonalSkills, SelfPerception, ProblemSolving, SelfExpression

ANOVA^{b,c}

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	440.682	5	88.136	2.012	.079 ^a
	Residual	8543.298	195	43.812		
	Total	8983.980	200			

a. Predictors: (Constant), StressManagement, InterpersonalSkills, SelfPerception, ProblemSolving, SelfExpression
 b. Dependent Variable: Achievement
 c. Selecting only cases for which Gender = Female

Coefficients^{a,b}

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Beta
		B	Std. Error	Beta			
1	(Constant)	17.636	5.356		3.293	.001	
	SelfPerception	1.705	1.317	.101	1.294	.197	
	SelfExpression	4.258	2.118	.277	2.011	.046	
	InterpersonalSkills	1.134	1.476	.071	.768	.443	
	ProblemSolving	5.080	1.927	.343	2.636	.009	
	StressManagement	.068	1.093	.004	.063	.950	

a. Dependent Variable: Achievement
 b. Selecting only cases for which Gender = Female

T-Test

[DataSet2] C:\Users\Dr. Francis\Documents\Nnaji David.sav

Group Statistics

Gender	N	Mean	Std. Deviation	Std. Error Mean
EmotionalIntelligenceMale	282	3.0887	.39924	.02377
Female	201	3.1194	.42009	.02963

Independent Samples Test

	Levene's Test for Equality of Variances	
	F	Sig.
Emotional Intelligence	1.440	.231
Equal variances assumed		
Equal variances not assumed		

Independent Samples Test

	t-test for Equality of Means			
	t	df	Sig. (2-tailed)	Mean Difference
Emotional Intelligence	.814	481	.416	-.03066
Equal variances assumed				
Equal variances not assumed	.807	417.307	.420	-.03066

Independent Samples Test

	t-test for Equality of Means		
	Std. Error Difference	95% Confidence Interval of the Difference	
		Lower	Upper
Emotional Intelligence	.03767	-.10467	.04335
Equal variances assumed			
Equal variances not assumed	.03799	-.10534	.04401