

Emotional intelligence and self-concept as predictors of academic achievement among secondary school chemistry students in South-East Nigeria

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Abstract

This study investigated the predictive power of Emotional Intelligence (EI) and Self-concept (SC) on the academic achievement of secondary school chemistry students. A predictive research design was employed with a sample of 300 SS3 students (150 female, 150 male) selected from 10 co-education public schools in South-East, Nigeria. Data was collected using a 33-item EI inventory adapted from Shuttle (1998) and a 60-item SC scale adapted from Rastogi (1979), and analysed using standardized multiple linear regression and hierarchical/stepwise regression methods. Results showed that both EI and SC significantly predicted academic achievement, both individually and jointly, while gender had no significant moderating effect. The findings suggest that classroom practices should focus on enhancing emotional intelligence and self-concept to boost academic outcomes in chemistry.

Keywords: Emotional Intelligence, Self-concept, Academic Achievement, Secondary School, Chemistry.

Introduction

Researchers and scholars are continually investigating ways of improving human knowledge and development and this is fuelled by the desire to achieve the main purposes of education among which is human development. Chemistry occupies a pivotal position in science, allied disciplines, sustainable technological/ economic growth and in overall development of a nation. Sadly, the performance of Nigerian candidates in school certificate Chemistry has been reported to be consistently unimpressive (George, Obiekezie & Abumchukwu 2021, Okonkwo 2014, Okonkwo & Samuel 2020). The analysis of students' performance at the Senior School Certificate Examination (SSCE) in Chemistry conducted by West African Examination Council (WAEC) showed that the achievement of Chemistry candidates in grade C6 – A1 from 2017 to 2022 revealed that in 2017, students' achievement was 64.48%, 2018=50.42%,

2019=61.98%, 2020=59%, 2021=61.5% and 2022 = 55.34%. Between 2018, 2020 and 2022 (50.42%, 59% and 55.34%), the performance was not too good, between 2017, 2019 and 2021 (64.48%, 61.98% and 61.5%), there was plateaued performance in 60% range. Low enrolment of students as well as students dropping the subject along the line has also been reported as not all student who opted for chemistry in senior secondary two ((SS 2) registered for chemistry in senior secondary three (SS 3) (Okonkwo & Samuel,2020; Okonkwo,2014). Study habits, lack of teaching & learning facilities in the lab, poor funding, and low acquisition of science process skills are some of the factors identified as being responsible for the ugly developments. Similarly, reported student perception of chemistry as difficult and abstract (Daniel et al, 2016; Samuel,2018) have also contributed to of negative attitude towards and lack of interest in the subject. Research show that these perceptions have significantly contributed to plateaued performance and dwindling enrolment in the subject (Ibiyengibo & Nenalebari, 2022). The pattern of underachievement and lack of progress beyond the plateaued performance has continuously fuelled an increase in examination malpractice (Gidado *et al.*, 2024), and the situation becomes more worrisome when viewed from the angle of the nation's aspiration for scientific and technological advancement. While some students attribute academic success to hard work, others see it as a function of luck and other external influences. These feelings and the attendant ability judgement held by students impacts on their academic achievement. It then follows that academic achievement is not solely an indication of students' abilities but also an expression of their perception of their ability. The poor student achievement in chemistry in Nigeria is an indication that the products of our education system have little or no ability to spur technological and economic development, and this is very worrisome. In addition, academic achievement/performance score is so significant in educational measurement, policy making, certification, placement for further studies, and for employment that stakeholders have extensively examined this variable, the factors that influence it, and how it can be enhanced (Muiga 2020). However, these studies have largely focused on cognition with little consideration of the affective/psychological domain and its relationship with academic achievement (Fortus & Vedder – Weiss 2014, Adigwe 2015, Okwuduba, Okigbo, & Samuel. 2019; Okonkwo & Samuel 2020).

Intelligent Quotient (IQ) which is domiciled in the cognitive domain has for long been used as a sole determinant of academic success. However, recent studies are reporting that IQ alone is not a sufficiently reliable predictor of academic success. (Okwuduba et al, 2019; Samuel& Okonkwo,2021). Goleman (1995) earlier claimed that only 20% of a person's success can be attributed to IQ. This claim prompted many researchers to investigate and

identify other factors that contribute the remaining 80% to a person's success (Osenweugwor 2018; Koc 2019; Monica & Ramanalah 2019). They reported Emotional Intelligence, Self-Efficacy, Self-concept, Motivation, Locus of control among others as some of the contributing factors to an individual's success in life. Ability to reason critically and logically to know which science process skill, principle or concept to apply in a given situation requires a high level of emotional stability. By implication, solving problems-by making wise decisions, using both thoughts and feelings or logic and intuition is part of what is referred to as Emotional Intelligence (EI) (Mayor & Salovey 1990, 1997). The need to investigate the predictive effect of EI levels on academic achievement of students is the reason for this study. On the other hand, activity oriented, student centred approach to teaching and learning have been advocated by researchers (Okonkwo, 2014, Samuel, 2017). These approaches emphasize active involvement of students in the learning process implying that students take independent responsibility of their learning while the teacher only anchors as a guide to ensure desired goals are achieved. In taking this responsibility, they need to set some goals, as guide, and make conscious efforts to achieve these goals. Mahila (2019) stated that the most important goal of a student is a good academic performance Academic performance can be significantly influenced by various factors, including the value students place on their belief in their ability to achieve good grades and succeed academically. This belief in their capacity to get good grades or successfully carry out a given task may influence their attitudes and performance, Carl Rogers (1959) called this individual's image and beliefs in their capacity to accomplish a specific task 'Self Concept'. It is the capability-based judgement that an individual brings to a specific task performance or goal attainment.

Statement of the Problem

The development of a nation is strongly hinged on the quality/standard of education offered to the citizens as this determines the ability of the recipients to handle life situations and make some positive impacts. The three major domains of learning in education are the cognitive, affective and psychomotor, but unfortunately, the affective domain has been marginalised while the cognitive and psychomotor domains are over emphasized and given too much attention as evidenced by the examination and evaluation modalities of our educational system. Literature is replete with empirical evidence that academic achievement can equally be predicted by demographic and psychosocial constructs thus nullifying the undue sole attention being paid to the cognitive aspects of learning (George et al 2021; McCann et al, 2020; Ugwuanyi et al, 2020; Herrera et al 2020; Okwuduba, Okigbo, & Samuel,2019; Okafor,

Obialor & Osuafor, 2020; & Adigwe, 2015). Some of these psychosocial constructs as identified by these researchers are Emotional Intelligence (EI), Self-Concept (SC), Self-efficacy, Motivation, Personality among others. Extensive literature reviewed revealed that very few studies have been done on EI and SC and mostly done outside Nigeria, few worked on only one of the constructs, for instance, Okwuduba et al (2019) worked on EI alone, Okafor et al (2020) used SC alone, no study was found to have investigated EI and SC to assess their independent, as well as, joint predictive effects on the academic achievement of students in Chemistry in South East, Nigeria, the present study filled this gap.

Samuel and Okonkwo (2021) emphasized that education should embrace and facilitate student feelings, emotions and self-esteem, widen the choices available to them, acknowledge their uniqueness, collective identity, individual personality and cultural specificities. All these encompass emotional, social, physical and academic dimensions. According to Oluwatosin and Bamidele (2014), many of the successes and failures that people experience in life generally and specifically in academic achievements are closely related to the ways they learned to view themselves and their relationships with others. Since emotions are believed to influence thought processes of an individual, it could be that significant achievement of students in Chemistry will depend on their emotional intelligence and self-concept indices. In the light of the foregoing, the present study examined the predictive effects of emotional intelligence and self-concept (separately and jointly) on the academic achievement of secondary school chemistry students in south east Nigeria. The moderating influence of gender was also examined.

Purpose of the Study

The purpose of this study therefore is to determine the predictive effects of Emotional Intelligence and Self-Concept on academic achievement of students in Chemistry, Identify the joint predictive effect of EI and SC and the moderating influence of gender on students' Emotional Intelligence and Self-Concept.

Research Questions

1. Will Self-concept significantly predict academic achievement among Secondary school Chemistry students in south east Nigeria?
2. Will Emotional intelligence significantly predict academic achievement among secondary school chemistry students in south east Nigeria?
3. Will Self-concept and Emotional intelligence significantly and jointly predict academic achievement among secondary school chemistry students in south east Nigeria?

4. Will there be gender differences among secondary school chemistry students on their level of emotional intelligence?
5. Will there be gender differences among secondary school chemistry students on their level of self-concept?
6. Will there be gender differences among secondary school chemistry students on their Academic performance?

Theoretical and Conceptual Framework/Background

Emotional Intelligence

Emotional Intelligence (EI) is rooted in Goleman's theory that individuals are born with a general EI that determines their potential for learning competencies. Goleman (2006) stated that emotional competencies are learned capabilities that must be worked on to achieve outstanding performances rather than being innate. This theory posits that a student with a high EI will most likely have greater academic achievement, better job performance and leadership skills. The study, therefore sought to validate the theory by embarking on this investigation. So many definitions of EI have been submitted and by extension, several theories and measuring scales have also been tendered. According to Odukoya, Omonijo and Oraetue (2020), the proliferation of definitions, theories, models and constructs for emotional intelligence is almost engendering intellectual confusion which is clearly not healthy for the academia. Emotional Intelligence (EI) can be defined as the ability to recognize, understand, and manage one's own emotions, while also effectively interpreting and responding to the emotions of others, to foster positive interactions, make informed decisions, and adapt to life's challenges. Mayor and Salovey (1990) defined Emotional Intelligence as the subset of Social Intelligence that involves the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions. The authors further stated that EI is also a part of Social Intelligence referred to as Personal Intelligence. Bar-On (1997) defined EI as an array of non-cognitive capabilities, competencies and skills that influence one's ability to succeed in coping with environmental demands and pressures. Both authors have common understanding that EI focus on emotional awareness, connects to success and is non-cognitive in nature. Mayer and Salovey (1990) and Bar-On (1997) emphasize the importance of recognizing and managing emotions. Mayer and Salovey focus on monitoring and discriminating emotions, while Bar-On highlights capabilities that help individuals cope emotionally. These authors linked EI to achieving goals or success. Mayer and Salovey suggest

EI guides thinking and actions, while Bar-On emphasizes success in coping with environmental demands. Both agree that EI is separate from traditional cognitive intelligence. Bar-On explicitly refers to it as "non-cognitive capabilities," while Mayer and Salovey frame it as part of Social Intelligence, distinct from general intelligence. Though they have these thoughts on EI, their opinions show some differences in their thoughts. Mayer and Salovey view EI as a subset of Social Intelligence with a focus on emotional monitoring, discrimination, and usage for guiding thoughts and actions, rooting their definition in the theoretical construct of Social Intelligence, viewing EI as a specific mechanism within this broader concept, also emphasizing the theoretical understanding of EI as a process involving monitoring and guiding emotions. Bar-On in his opinion broadens the scope to include an array of competencies, capabilities, and skills beyond emotional monitoring, emphasizing coping with environmental pressures, takes a more practical, skill-based approach, suggesting that EI consists of specific attributes that can be developed and measured. Bar-On provides a framework that leans towards measurable traits and skills, making it more suited to applied contexts like workplace assessments. These definitions point towards mastery of one's own emotions, and that of others.

In this study, Emotional Intelligence (EI) can be defined as the ability to recognize, understand, and manage one's own emotions, while also effectively interpreting and responding to the emotions of others, to foster positive interactions, make informed decisions, and adapt to life's challenges. The varied definitions of EI have been applied to build three models of EI namely: *Ability Based EI*, *Trait Based EI* and *Mixed EI* (Adigwe 2015). These different models view EI differently. The ability-based EI model describes four separate but interrelated abilities – ability to perceive emotions, use emotions, understand emotions and manage emotions and hence defines EI as the ability to perceive, use, understand, manage and handle emotions, thus highlighting the ability of an individual to process emotional information and relate the process to cognitive abilities like thinking and solving problems. The trait EI theory was introduced by Petrides in 2001 and describes peoples' perception of their emotional world. The trait EI concerns itself with what the individuals' emotional disposition are and how competent people feel in terms of perceiving, understanding and utilizing their own and other people's emotions (Petrides et al, 2020), while the mixed model of Goleman (1990), is a combination of the components of both traits and ability theory. It includes the ability to recognize one's impact on others and also using a certain level of intuition to guide their decisions regarding how they alter the emotions of others. In other words, the mixed model theorist views EI as a range of competency and skill levels which motivates one's performance (Adigwe 2015). Mixed model of Goleman (1990) emphasizes (a) Self-awareness: one's ability

to understand his/her emotion and its impact on his physical and mental actions, and rationalization to guide situations, (b) Social-awareness: which is sensing, understanding and reacting to other's emotions while recognising the social relations (c) self-management which involves one's ability to control one's emotions, the corresponding impulses and adjusting to variations in the environmental situations and then, (d) managing relations as the ability to manage psychosocial conflicts, mentor, influence and foster the growth and development of others. Relative to reviewed literature, Emotional intelligence (EI) is defined in this study also as the capacity to recognize, make use of, and regulate one's own emotions in order to reduce stress, communicate clearly, sympathize with others, overcome obstacles, and resolve conflict.

The following dimensions of perceptions of emotions are hereby further clarified- emotion perception, utilizing emotion, managing self-relevant emotions and managing others' emotions. Emotion perception is a fundamental aspect of emotional intelligence, involving the ability to identify and interpret emotional cues in oneself and others. This process enables individuals to navigate social interactions effectively and make informed decisions based on emotional information (Mayer, Salovey, & Caruso, 2004). It is a core component of emotional intelligence and plays a critical role in fostering empathy and effective interpersonal communication (Brackett, Rivers, & Salovey, 2011). Recognizing emotions in oneself, termed self-relevant emotion, aids in emotional regulation and self-awareness, while understanding others' emotions enhances social interactions (Gross, 2015). Emotion perception also contributes to decision-making and problem-solving by integrating emotional and cognitive processes (Fernández-Berrocal, Cabello, Castillo, & Extremera, 2012). Proficiency in emotion perception is essential for personal and social well-being.

Utilizing Emotion refers to the ability to harness and apply emotional information to enhance thinking, decision-making, and problem-solving. This skill involves using emotions to prioritize tasks, motivate action, and generate creative solutions (Mayer, Salovey, & Caruso, 2004). By understanding how emotions influence cognitive processes, individuals can align their emotional state to optimize performance, such as using positive emotions to foster creativity or channelling frustration into constructive problem-solving (Brackett, Rivers, & Salovey, 2011). Moreover, utilizing emotions allows individuals to navigate social and professional challenges effectively by adapting their responses based on emotional insight. This capacity is vital for personal development, resilience, and interpersonal success (Gross, 2015).

Self-Relevant Emotion refers to the ability to recognize and understand one's own emotions and their impact on thoughts, behaviours, and decision-making. This self-awareness is a foundational component of emotional intelligence, enabling individuals to regulate their emotions effectively and respond adaptively to challenges (Mayer, Salovey, & Caruso, 2004). Understanding self-relevant emotions allows individuals to identify the root causes of their feelings, fostering personal growth and resilience (Gross, 2015). Moreover, it plays a critical role in emotional regulation, helping to mitigate the effects of stress and enhance well-being (Brackett, Rivers, & Salovey, 2011). Developing self-awareness of emotions is essential for achieving a balanced emotional state, improving interpersonal relationships, and maintaining psychological health (Fernández-Berrocal et al., 2012).

Managing Others' Emotions refers to the ability to accurately perceive, interpret, and respond to the emotions of others. This skill involves understanding emotional cues such as facial expressions, tone of voice, and body language, which are critical for empathy and effective social interactions (Mayer, Salovey, & Caruso, 2004). By accurately interpreting others' emotions, individuals can build stronger relationships, resolve conflicts, and collaborate effectively in group settings (Brackett, Rivers, & Salovey, 2011). This ability also supports emotional attunement, enabling individuals to respond appropriately to others' needs and foster trust and connection (Gross, 2015). Proficiency in recognizing and managing others' emotions is essential for both personal and professional success in socially dynamic environments. Managing others' emotions is a vital aspect of interpersonal relationships, leadership, and collaborative environments. It involves understanding, influencing, and guiding the emotional states of others in a constructive and ethical manner. This process requires a blend of emotional intelligence (EI), empathy, and effective communication skills.

Exploring and attending to students' emotional competencies may likely result in the school environment being friendly, students respect and are equally respected, cared for and bonded with the authority, teachers and classmates. According to Rivers and Salovey (2011), individuals with high EI show more positive social functioning in interpersonal relationships and are less antagonistic and conflictual. Similarly, Petrides, Fredrickson, & Furnham (2004) considers trait EI more relevant to scholastic achievement and deviant behaviour at school especially in the case of disadvantaged and vulnerable adolescents due to its implications for low IQ students. In corroboration to Petrides et al views, McCann, Jiang, Broun, Bucich, Double, & Minbashian, (2020) posits that students with emotion management skills are better able to regulate and deal more easily with negative emotions elicited by academic settings like,

test anxiety, disappointments like lower-than-expected test scores or negative feedback or the boredom involved in learning concepts and subject matter that are not of intrinsic interest or boring. Furthermore, social demands present in all stages of education such as resisting peer pressure, adjusting to moving out of home when starting university, managing group projects etc all require some emotion management skills, to be able to manage the social world around them. This Social Competence may have the potentials to facilitate cognitive and intellectual development resulting in enhanced achievement. This is one of the purposes of the present study.

Self-Concept

Carl Rogers (1959) introduced the term self- concept and gave two broad categories of self: real self and the ideal self. The real self (who am I) being the awareness of the persons own ability to grow which can be referred to as the actual nature of the individual and this includes attributes like physical characteristics, personality traits and social role, while the ideal self is what the person wants to become or what one desires to be. Rogers (1959) therefore defined Self-Concept as a collection of beliefs one holds about oneself and the responses of others. It is the answer to the question ‘who am I?’. Self-esteem is the affective side of self-concept and refers to how much you like, accept or value yourself which can be impacted by a number of factors including how others see you, how you think you compare to others and your role in society (Ajmal & Rafique, 2018). Sarah and Sioncera (2012) defined self-concept as the totality of our beliefs, preferences, opinions and attitudes organised in a systematic manner towards our personal existence – how we think and should think of ourselves and act our various life goals.

Other theorists equally proposed varied ideas of self-concept. According to Tajfels Social Identity theory, Self-Concept comprises two key parts, namely Personal Identity that is the traits and other characteristics that make one unique; and Social Identity which is who you are based on your membership in social groups, such as, sports teams, religion, politics, clubs or social class. Both identities involve how a person perceives themselves in relation to others and their environment. Bruce Bracken (1992) believe self-concept is multidimensional and further broke it down to six independent traits; academic (success or failure in school), affective (awareness of emotional states), competence (ability to meet basic needs), family (how well one works in one’s family unit), physical (one’s feelings about one’s physical looks and conduct, health and overall appearances) and social (ability to interact with others). Although

self-concept has been explained differently, they all imply an evaluation of overall self. The definitions by Rogers, Tajfel, and Bracken emphasize self-concept as a comprehensive construct influenced by internal perceptions, social interactions, and contextual factors. The common denominator lies in their recognition of the dynamic, relational, and multidimensional nature of self-concept, which integrates personal, social, and emotional domains. This shared understanding underscores its central role in human psychology and behaviour.

Rastogi (1979) and also Bracken (1992), both, developed self-concept assessment scales that comprehensively evaluate the six elements of self-concept in adolescent. Rastogi's model of self-concept and assessment scale was adopted in this study because the sample used in the study are adolescents while the scale measures traits boarding on academics, emotions, competence and social interactions which also features in EI which is one of the independent variables being compared with self-concept in terms of their strengths in predicting academic achievement. In essence, both theories agree that self-concept is a dynamic and layered construct influenced by both personal characteristics and external social factors. According to Herrera, Al-Lal, & Mohamed, (2020), self-concept theory irrespective of the theorists holds the following assumptions among others;

1. Self-concept is learned – Our perceptions towards ourselves can be shaped, altered and affected by environmental factors. Implying that self-concept is a product of socialization and development.
2. Self-concept is organised –Self-concept is organized as a structured and dynamic system of beliefs, perceptions, and evaluations about oneself. It is not random but follows a coherent structure that allows individuals to maintain a stable sense of identity while accommodating new experiences. People structure and integrate their self-knowledge, including their beliefs, attitude and experiences.
3. Self-concept is dynamic – it is a continuous development wherein we tend to let go of things and ideas that are not congruent to our self-concept and hold on to those we think are helpful in building a more favourable perception of our personal existence.

Herrera et al, (2020) asserts that Self-concept tends to be more malleable at younger ages, when one is still going through the process of self -discovery and identity formation, and as one increases in age and learns what is important to him/her, these self-perceptions become much more detailed and organised. According to Rogers (1959), Self-concept is not always perfectly aligned with reality, but when it is, the individual's self-concept is said to be

congruent but when there is a mismatch between the ideal self and the real self, the individual's self-concept is said to be incongruent, and this negatively impacts on self-esteem (Melead 2008). Low self-concept leads to lack of confidence, anxiety, wanting to be like someone else and pessimism, while the opposite is the case with the high self-concept.

Literature review

Emotional Intelligence and Academic Achievement

There is a growing consensus among educators/researchers that psychological competencies like EI are an important skill for students to develop for their academic achievement, future wellbeing as well as their workplace success (Mc Cann et al 2020). Studies have been carried out to examine the extent to which EI correlates with academic performance. Results of the studies are still debatably inconclusive, this study contributes to the debate studies outside Nigeria (Berenson, Boyle & Weave 2008; Downey, Mountstephen, Lloyd, Hanson & Stough 2008; Malila 2011; Muyiga 2020; kumar 2020; Ahmed, Asim, & Pelliteri 2019; Mc Cann et al 2020; Cicei, Stanesea, & Mohora, 2012; reported that EI has a significant positive correlation with academic achievement. Students with high EI were more successful in academic achievement than those with less than average EI, and in addition, they were equally more successful in adjusting to environmental demands and pressure. The studies collectively employ diverse and complementary methodologies, enhancing overall reliability. Despite contextual variations, all studies point to a positive relationship between EI and academic achievement. Those that are quantitative studies use robust statistical tools, while those that used mixed-methods research and meta-analyses provide depth and triangulation. The studies explore cultural, socio-economic, and disciplinary nuances, making their conclusions more comprehensive. Interventions and longitudinal designs demonstrate actionable outcomes, making these findings relevant to educators and policymakers. However, despite their strengths, self-report biases and limited causal evidence in some studies necessitate cautious interpretation and further research. Some studies, (Belenger. Lewis, Kasper, Smith & Harringer (2007); Shipley, Jackson, & Segrest, 2017) reported a weak or insignificant correlation between academic achievement and EI.

Gender differences in emotional intelligence were equally inconclusive. Fernandez – Berrocal, Cabello, Castillo & Extremera (2012), Brokens (2018), found no gender difference and concluded that gender differences in EI were not based on women's greater sensitivity to emotional cues as originally assumed but rather to men's perception of non-target emotions on

the tasks. This means that these findings encourage a more nuanced understanding of EI, moving away from gender-based assumptions and recognizing individual differences instead. However, Bibi, Saqlain & Mussawar (2016) reported women to be significantly higher than men in EI. On the contrast, Meshkat and Najati (2017), Nasir and Masur (2010) reported no gender differences. Ahmed, et al (2019), reported some significant sub component variations between gender. These conflicting results of gender differences Ahmed et al (2019) suggested could have resulted from gender intersection with cultural frameworks that facilitate differing socialization processes with regard to emotions or as a result of the type of EI measure used and the instrument's sensitivities to gender specific factors.

In Nigeria, studies by Adigwe 2015, Ogundu (2010), Aremu (2006), Adeoye, Agbaninga, Oyerinde, Anwanane, & Olaoye, (2018), Amalu (2018), Okwuduba et al (2019) & Ugwanyi et al (2020), found positive and significant relationships between EI and academic achievement. Adeoye et al (2018) also reported that gender was not significant. Adigwe (2015) therefore opined that, it appears that students operate at two different levels namely; cognitive and emotive in learning situations and pointing out that this synergy makes EI appear to be the missing link in the equation of factors that determine students' academic achievement. This view is worth investigating considering that various programme (workshops, seminars and conferences) on teaching strategies, learning difficulties, among others, did not significantly translate to enhanced achievement in chemistry (Okonkwo 2014; Okonkwo & Adigwe 2014; Adigwe 2015). There is need for a paradigm shift, to point the search light on some of these psychosocial constructs that may interfere with achievements like EI & SC.

Self-Concept and Academic Achievement.

Research findings on the relationship between Self-concept and academic achievement have also been inconclusive, for instance, Okafor, Obialor & Osuafor (2020), Oluwatosin & Barridele (2014), Olatoye (2009), George, Obikezie & Abumchukwu (2021); Nielsen & Yezierskio (2015), Pegalajor Palomino (2017), Pieffer, Ellwart & Preckel (2020); Herrera, Mohammed (2020); reported that self-concept and academic performance are significantly correlated, while Afuwape (2011) reported no significant correlation between academic achievement and self-concept. On the influence of gender, Herrera & Mohammed (2020), reported gender differences in the students' self-concept in favour of females while Afuwape (2011) and Oluwatosun (2014), reported no moderating influence of gender on the students Self-Concept.

Method

Research design

The study adopted a predictive design. The design was considered appropriate because the study examined the predictive effect of Emotional Intelligence and Self -concept on academic achievement of students in Chemistry. The independent variables investigated are emotional intelligence (Emotion perception, utilising emotion, managing self-relevant emotion and Managing others emotion) and self-concept, while the dependent variable is the students' academic achievement in the form of combined continuous assessment and WAEC Mock exam scores named Cumulative Continuous Assessment and Mock Exam Score (CCAMES). The population of the study comprised all the SS3 students in all the public secondary schools in South East, Nigeria. A multistage sampling technique was used to draw 2 coeducational schools, from each of the 5 states making up South East, Nigeria. A criterion for inclusion in the study is that the school must have existed for more than 20 years and have up to 30 chemistry students (15female, 15male) registered for West African Senior School Certificate Examination (WASSCE) at the time of this study. A total of 10 schools and 300 students participated. The sample size was the best the researchers could get considering the COVID-19 pandemic ravaging the whole world with its attendant coping measures.

Instrument for Data Collection

Questionnaire was used for data collection as it was considered more convenient in this COVID-19 era to limit physical contact with persons. The questionnaire consists of three sections. Section A sought information on such demographic background as gender, age. Section B is the Emotional Intelligence (EI) inventory comprising 33 items adapted from Shuttle et al (1998,). The scale has been used more than 3000 times (O'Connor, Hill, Kaya, & Brett, 2019), is easily accessible, has good psychometric indices. It is a multidimensional scale measuring four distinct factors including perceiving emotions. Reliability coefficient was established at .78 using Cronbach alpha. Section C is a 60item standardized self-concept (SC) scale adapted from Rastogi M.R (1979) and its reliability coefficient was also established using Cronbach alpha to be .83. Both scales; EI & SC were on a five-point Likert type response format, from strongly disagree (1) to strongly agree (5). The questionnaire was distributed through the State Secondary School Education Boards (SSSEB) in each of the states to the principals of the participating schools for the chemistry teachers concerned who issued it to the SS3 chemistry students as a brief from the Head of Science Unit in their respective State Secondary School Education Boards (SSSEB). This yielded 100% return of completed

questionnaires. Achievement scores was Cumulative Continuous Assessment and Mock Exam Score (CCAMES) of Chemistry students collected from the chemistry teachers with the consent of each school principal through the head of science unit of SSSEB. The achievement scores range from 42-90. 42 was the least score and 90 was the highest score. Data collected were subjected to analysis using SPSS. The researchers used the standardized multiple linear regression and hierarchical/stepwise linear regression statistical method to analyse the data collected.

RESULTS

Below is the Findings of the Study Analysis on Self-concept and Emotional Intelligence as predictors of Academic Achievement among Secondary School Chemistry Students in South East Nigeria.

Table 1: Summary table of the mean and standard deviation: A descriptive Statistics.

VARIABLES	MEAN	SD	N
Achievement	50.99	12.059	300
Self-concept	109.79	21.639	300
Emotion perception	24.04	4.525	300
Utilizing emotions	34.87	7.585	300
Managing self-relevant emotions	31.19	7.872	300
Managing others' emotions	29.38	8.899	300

Table 1 shows mean and standard deviation (SD), of the students' scores in achievement, self-concept and emotional intelligence. The variance in achievement was much with SD of 12.059. Self -concept has high spread from the mean also. This means that the students hold high self-concepts about their abilities. From the SD of the dimensions of EI, its seen that all has high SD though not as wide spread as seen in achievement and self-concept. The individual difference, cultural and social environment and other factors may be contributing to the variance and spread from the mean.

Table 2: Standardised Multiple Linear Regression Table Showing the Independent Prediction of Self-concept and Dimensions of Emotional Intelligence on Academic Achievement among Secondary School Chemistry Students in South East Nigeria

Model	Unstandardized Coefficients	Standardized Coefficients	T	Sig.
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	B	Std. Error	Beta		
(Constant)	-10.801	2.835		-3.811	.000
Self-concept	.238	.020	.427	11.677	.000
Emotion perception	.531	.183	.199	2.903	.004
Utilizing emotions	-.356	.169	-.224	-2.108	.036
Managing self-relevant emotions	.589	.147	.385	4.014	.000
Managing others' behaviour	.579	.125	.427	4.628	.000

Dependent Variable: Achievement

Research Question 1: Does Self-concept significantly predict academic achievement among Secondary school Chemistry students in south east Nigeria?

Based on findings, result in table 2 shows that Self-concept significantly predicts academic achievement among secondary school chemistry students in South East Nigeria at ($\beta = .427$, $p < .05$).

Research Question 2: Will Emotional intelligence significantly predict academic achievement among secondary school chemistry students in south east Nigeria?

Findings in table 2 show that Emotion perception as a subscale of emotional intelligence significantly predicts academic achievement among Secondary school Chemistry students in south east Nigeria at ($\beta = .199$, $p < .05$).

Similarly, utilizing emotions as a subscale of emotional intelligence significantly and inversely predicts academic achievement among secondary school Chemistry students in south east Nigeria at ($\beta = -.224$, $p < .05$). This implies that the prediction is in a negative direction.

Managing self-relevant emotions as a subscale of emotional intelligence significantly predicts academic achievement among secondary school Chemistry students in south east Nigeria at ($\beta = .385$, $p < .05$).

Managing others' emotions as a subscale of emotional intelligence significantly predicts academic achievement among Secondary school Chemistry students in south east Nigeria at ($\beta = .427$, $p < .05$).

Research Question 3: Will Self-concept and Emotional intelligence significantly and jointly predict academic achievement among secondary school chemistry students in south east Nigeria?

Table 3: Hierarchical multiple linear regression table showing the joint prediction of self-concept and emotional intelligence on academic achievement among secondary school chemistry students in south east Nigeria.

Variables	B	SE B	t	β
Step 1				
Constant	16.513	2.984	5.533	
Self-concept	.314	.027	11.774	.563**
<i>R</i>	.563 ^a			
<i>R</i> ² Adjusted	.315			
ΔR^2	.318			
<i>F</i>	138.631**			
<i>Df</i>	1,298			
Step 2				
Constant	-10.844	2.862	-3.788	
Self-concept	.250	.020	12.241	.448**
Emotional Intelligence	.288	.019	15.302	.560**
<i>R</i>	.786 ^b			
<i>R</i> ² Adjusted	.616			
ΔR^2	.301			
<i>F</i>	240.615**			
<i>Df</i>	1,297			
<i>Durbin Watson</i>	1.661			

Note: ** = $P < .01$; * = $P < .05$.

The result on table 3 showed that self-concept independently predicted academic achievement among secondary school chemistry students in South East Nigeria, $F = 138.631^{**}$; $R = .563^a$; R^2 Adjusted = .315; $\beta = .563^{**}$; $t = 11.774^{**}$. In the second block when Emotional intelligence (with independent predicting influence of, $\beta = .560^{**}$; $t = 15.302^{**}$) was added to the regression, Self-concept ($\beta = .448^{**}$; $t = 12.241^{**}$) showed a slight significant decrease in its independent prediction of academic achievement among secondary school chemistry students in South East Nigeria. This showed that Emotional intelligence also influences academic achievement among secondary school chemistry students in South East Nigeria. Self-concept accounted for 31.5% of the variations on academic achievement among secondary school chemistry students in South East Nigeria. However, there was a significant joint prediction of self-concept and emotional intelligence on academic achievement among secondary school chemistry students in South East Nigeria. $R = .786^b$; R^2 Adjusted = .616; $\Delta R^2 = .301$; $F =$

240.615**. This result showed that the joint prediction of Self-concept and Emotional intelligence accounted for 61.6% of the variation on academic achievement among secondary school chemistry students in South East Nigeria. The change in the variation as a result of the addition of emotional intelligence was 30.1%.

Research Question 4: Will there be gender differences among secondary school chemistry students on their level of emotional intelligence?

Table 4: Independent sample t-test for mean difference of Gender on emotional intelligence.

			t-test for equality of means				
			T	Df	Sig. (2-tailed)	Mean difference	Std. error difference
Emotional intelligence	Equal variance assumed		.647	298	.501	1.827	2.711
	Equal variance not assumed		.647	290.064	.501	1.827	2.711

In table 4 above, results show no significant difference of gender on their level of emotional intelligence with p. level (2-tailed) greater than .05.

Research Question 5: Will there be gender differences among secondary school chemistry students on their Academic performance.

Table 5: Independent sample t-test table for mean difference of Gender on achievement.

			t-test for equality of means				
			T	Df	Sig. (2-tailed)	Mean difference	Std. error difference
Achievement	Equal variance assumed		-.684	298	.495	-.953	1.394
	Equal variance not assumed		-.684	296.961	.495	-.953	1.394

In table 5 above, results show no significant difference of gender on their academic performance with p. level (2-tailed) greater than .05

Discussion and conclusion

Results reveal that EI significantly predict Academic achievement of students in Chemistry. This finding gives credence to previous studies that reported that emotional intelligence is a significant predictor of academic achievement (Berenson et al, 2008; Adigwe, 2015; Ahmed et al, 2019; Okwuduba et al, 2019; Kamar, 2020; Muyiga, 2020; Ugwuanyi, 2020). It was further observed that significant predictive relations exist among the EI dimensions and students' academic achievement in chemistry and this may be responsible for the observed significant predictive effects of EI generally on academic achievement. Adigwe (2015) found that problem solving skills in stoichiometry which is a cognitive process was correlated positively with EI, implying that the skill has emotional component, and consequently when students bring their emotional characteristics to bear on the intellectual process of solving the problems, enhanced academic achievement resulted. Adigwe (2015) went further by saying that the above scenario tends to suggest that there tends to be emotional components of a cognitive ability as well as cognitive components of emotional ability and both interwoven to influence the academic achievement of students. The students' capacities to perceive emotions, and emotional adaptability to learning environment significantly affect their success because they relate to teaching, learning, and classroom interactions emotionally thus their emotions seemingly bear on their degree of learning, scope and depth of understanding, retention and general educational attainment. This study has shown that people with high emotional intelligence have high academic achievement in Chemistry, than those with lower EI. Problem solving skills in chemistry are tainted with emotional reactions. Therefore, chemistry teachers must take into considerations this relationship between EI and academic achievement.

Gender was not significant and this finding is in line with Fernandez – Berroe et al (2012), Adigwe (2015) and Brokens (2018), but differs from Bibi, Saqlain & Mussaawar (2016). The conflicting results on gender influence (Ahmed et al 2019), attributed to gender intersection with cultural frameworks that facilitate differing socialization processes with regard to emotion, the type of EI measure used and the instruments sensitivities to gender specific factors. According to (Adigwe, 2015) girls receive more education on emotions than boys from their parents and are therefore more emotionally stable than their male counterparts. Boys exhibit stronger personality traits than girls, and as such their emotional needs are often neglected while attention is given to those of the girls.

Similarly, Self-Concept also significantly predicted academic achievement in chemistry and this finding is in line with Okafor et al, 2020; George et al ,2021; Pagalajar, 2017. that students with positive Self-Concept achieved higher in chemistry than those with

negative self-concept. A positive Self-Concept is important for good mental health and improved academic achievement because they are more likely to remain focused. When students know themselves, they are much able to maximize outcomes because they know their capabilities and the high value placed on academic achievement by society. The finding is not surprising because Self-Concept has been reported to positively correlate with personal, social and overall adjustment. Several studies support the belief that self-concept tends to produce a commensurable change in academic achievement in science (Yara, 2010; Adeyemo, 2005; Largea, Sanni & Brew, 2014; Lashawn & Bacon, 2011) which the findings of this study support.

Recommendations

1. The emotions and feelings of students in terms of stress, mood, adaptability, capabilities and other psychosocial reactions in the chemistry classroom setting should be explored, understood and professionally attended to by the teachers.
2. Classroom practices that aid students understanding and management of their emotions, boost their self-concept should be initiated and sustained by chemistry teachers. ‘
3. Chemistry teachers should endeavour to create learning environments during lessons, tests and examination putting into considerations the understanding, skills and capabilities of the students.
4. The emotional reactions of students to instructional materials and the entire classroom environment should be understood by the teachers as well as identify where interventions are required.

Author Contribution

Dr Nkiru Naomi Samuel contributed article structure, the introduction, and the literature review, and executed the revisions suggested by reviewers. Dr Okonkwo Ifeoma G. A. provided the instrument for data collection and contributed to the writing of the paper, and Okonkwo Onyekachi Osmond contributed data analysis and result interpretation.

References

Abdul Rashid Abdul Aziz, Shahirah Suleiman, Nor Hamizah Ab Kazak (2020). Students' Emotional Intelligence and Self-Efficacy towards their Academic Performance: A survey study on Public Higher Learning Institution. University. *Journal of Educational Research*, 8(11C), 129-135, DOI:10.13189/ujer.2020.082315

- Adeoye, A.O., Agbaniga, J., Oyerinde, O.O., Awanane, B.B., Olaoy, T. (2018). The Interactive Influence of gender on SE, EI and Achievement Motivation as predictors of Impulse behaviour among Secondary School students in Nigeria. *European Journal of Social Sciences* 57(1)375-382.
- Adeyemo, B.J. (2005). Effect of study habit modification and test taking strategies on academic performance. Unpublished PhD thesis, Ekiti State University.
- Adeyemo, D.A. (2007). Moderating influence of EI in the link between Academic Self-Efficacy and Achievement of University Students. *Psychology Developing Societies* 19(2), 199-213.
- Afuwape, M.O. (2011). Students' Self-Concept and their academic achievement in Basic Science. *African Research Review (An International Multidisciplinary Journal of Ethiopia)* 5(4) 21.191-200.
- Ahmed, Z., Asim, M., and Pellitteri, J. (2019) titled "Emotional Intelligence Predicts Academic Achievement in Pakistani Management Students" *The International Journal of Management Education*. 17, (1) 286-293.
- Amalu, N.M. (2018). Emotional Intelligence as predictor of Academic performance among secondary school students in Makurdi Metropolis of Benue State, Nigeria. *International Journal of Scientific Research in Education*, 11(1), 63-70.
- Bandura A (1997). *Self-efficacy; The Exercise of control*. New York, W,H. Freeman and Company.
- Bandura, A. (1989). Human Agency in social cognitive theory. *American Psychologist* 44(9), 1175-1184.
- Berenson, F., Lewis, T., Kasper, G.M., Smith, W.J. & Harrington, K.V. (2007). Are computing students different? An Analysis of coping strategies and EI. *EEE Transactions*, 50, 186-196.
- Berenson, R., Boyles, G., & Weaver, A. (2008). Emotional Intelligence as a predictor for success in online learning. *International Review of Research in open and distance learning*. 9(2) 1-16.

- Brackett, M. A., Rivers, S. E., & Salovey, P. (2011). Emotional intelligence: Implications for personal, social, academic, and workplace success. *Social and Personality Psychology Compass*, 5(1), 88-103.
- Brackett, M. A., Rivers, S. E., & Salovey, P. (2011). Emotional intelligence: Implications for personal, social, academic, and workplace success. *Social and Personality Psychology Compass*, 5(1), 88-103.
- Cicli Catalina, Dan Stanesca & Laura Mohorea (2012). Academic Self-Efficacy, Emotional Intelligence and Academic Achievement of Romanian Students: Results from an exploratory Study. *Journal of Educational Sciences and Psychology II (LXIV) No 1/2010*, 41-51.
- Devomsh, D. (2016). EI and job preference: The role of psychological well-being. *International Journal of workplace health management*. 9(4)428-442
[doi.org/10.1108.IJWHM-04-2016.0031](https://doi.org/10.1108/IJWHM-04-2016.0031)
- Downey, L.A., Mount Stephen, J., Lloyd, J., Hawson, K. and Stough (2008). Emotional Intelligence and Scholastic Achievement in Australian adolescents. *Australian Journal of Psychology* 60(1), 10-17
- Fernández-Berrocal, P., Cabello, R., Castillo, R., & Extremera, N. (2012). Gender differences in emotional intelligence: The mediating effect of age. *Behavioural Psychology*, 20(1), 77-89.
- George, P.C., Obikezie, M.C. & Abumchukwu, A.A. (2021). Impact of Generative Learning Model in Academic Self-Concept and Achievement of Secondary School Students in Chemistry in Onitsha Education Zone, Anambra State, Nigeria. *International Journal of Research in Education and Sustainable Development*. 1(4). Doi: www.doi.org/10.46654/IJRES.D.1401
- Gidado, B. K., Apeh, H. A., & Odili C. A (2024). Prevalence, forms and factors responsible for examination malpractice and its control among secondary school students in North-Central Nigeria. *Journal of Education in Developing Areas (JEDA) Special Edition*, 32(1), 73 – 87 .
- Gross, J. J. (2015). Emotion regulation: Conceptual and empirical foundations. In J. J. Gross (Ed.), *Handbook of emotion regulation* (2nd ed., pp. 3-20). Guilford Press.

- Herrera L, Al-Lac M & Mohamed L (2020). Academic Achievement, Self-Concept Personality and Emotional Intelligence in Primary Education. Analysis by Gender and Cultural Group. *Frontiers in Psychology* 10:3075. Doi:10.3389/fpsyg.2019.03075
- Hikmet Vazier, Sevada Seyis & Fatma Altun (2011). Emotional Intelligence and Self-Efficacy beliefs as predictors of academic achievement among high school students. *Procedia social and behavioural sciences* 15(2011) 2319-2323.
- Ibinyegibo, A. K & Nenalebari, N. J (2022) Factors responsible for low enrolment in chemistry as perceived by chemistry education students in Ignatius Ajuru University of Education, Port Harcourt, Rivers State, Nigeria. *GSC Advanced Research and Reviews*, 12(03), 123–130.
- Koc, S.E (2019). The relationship between emotional intelligence, self-directed learning readiness and achievement. *International Online Journal of Education and Teaching (IOJET)*,6(3),72-88672-688 <http://iojet.org/index.php/IOJET/article/view/568>
- Kumar, M. (2020). A study on the Emotional Intelligence of Higher Secondary School Students. *Shanlax International Journal of Education* 8 (3) 114-119 <https://doi.org/10.34293/education.V8i.2395>.
- Largea, J.E., Sanni, A.I. & Brew, E.D. (2014). Influence of students' self-concept on their academic performance in the Elmna township. *European Journal of Research and Reflection in Educational Science* 2(4).
- Lashawn, C. B. (2011). Academic Self-concept and academic achievement of African American student transitioning from urban to rural schools. PhD dissertation submitted to University of Iowa.
- Mac Cann, C., Jiang, Y., Brown, L.E.R., Bucich, M., Dounle, K.S., & Minbashian, A. (2020). Emotional Intelligence predicts Academic Performance: A meta-analysis analysis. *Psychological Bulletin of APA*, 146, (2), 150-186. <http://doi.org/10.1037/bul0000219>
- Mayer, J. D., Salovey, P., & Caruso, D. R. (2004). Emotional intelligence: Theory, findings, and implications. *Psychological Inquiry*, 15(3), 197-215.
- McLead,S.A.(2008).Self-Concept. Simply Psychology.
<https://www.simplypsychology.org/self-concept,gtml>

- Mendo-Lazaro S., Polo-del-Rio, M.I., Amado-Alonso, D., Iglesias-Gallego, D. & Leon-del-Barco (2017). Self-Confidence in childhood. The Role of Body Image and Sports practice. *Frontiers in Psychology* 8:853, Doi: 10.3389/fpsyg.2017.00853
- Mohamed, A., Mal & Miriam Rafique (2018). Relationship between Academic Self-Concept and Academic Achievement of Distance Learners. *Pakistan Journal of Distance and Online Learning*. IV, Issue II,2018,225-244.
- Monica, M. & Ramanaih, G. (2019). Relationship between emotional intelligence and self-efficacy: A gender Comparison. *International Journal of Engineering Sciences and Management – A multidisciplinary publication of VTU*, 1(2), 65-70
- Muyiga J.W (2020). Emotional Intelligence and Academic Self-Efficacy as Predictors of Academic Achievement among form four students in Kaimbu county Kenya. Unpublished master's theses. Kenyatta university.
- Neilson, S.E. & Yeziarski (2015). Exploring the structure and function of the chemistry Self-Concept Inventory with High School Chemistry Students Retrieved from pubs.acs.org/jchemeduc on 10/8/2021. Doi: 10.1021/acs.jchemeduc.5b00302.
- Nik Ahmad & Mustafa Tekke (2015). Rediscovering Roger's Self Theory. *Journal of Education Health and Community Psychology* 4(3), 28-36.
- O'Cononor, P.J., Hill Andrew, Kaya, M. & Martin Breh (2019). The Measurement of EI: A critical review of the literature and recommendations for researchers and practioners. *Frontiers in Psychology*. <https://doi.org/10.3389/fpsyg>. 2019.01116.
- Okafor, E.O., Obialor, C.O. & Osuafor, A.M. (2020). Secondary school students' Self-Concept and Gender as correlates of Academic Achievement in Biology in Imo State. *Journal of CUDIMAC (J-CUDIMAC)* 8(1) 156-162.
- Okwuduba, E.N., Okigbo, E.C., Samuel, N.N.C. (2019). Emotional Abilities of Emotional Intelligence (EI), and Academic Performance. Examining their relationship using Nigerian University Undergraduate Chemistry Students. *Bulgarian Journal of Science and Education Policy (BJSEP)* 13 (2) 2019, 263-285.
- Olatoye, R.A (2009). Study habit, Self-concept and science achievement of public and private junior secondary school students in Ogun State Nigeria. *African Research Review – An International Multidisciplinary Journal of Ethiopia* 3(4) 492-506

- Oluwatosin, S.A. & Bamidele, E.F. (2014). Self-Concept and Academic Performance of Secondary School Students in Chemistry. *International Journal of Social Science and Education* 4 (4) 946-952
- Osenweugwor, N.A (2018). Self-efficacy and emotional intelligence among Nigerian Adolescents in single sex and co-educational secondary schools. *Journal of Education and Practice*, 9(11). www.iiste.org
- Pegalajar Palomino, M. (2017). An Analysis of Self-Concept in Students with Compensatory Education Needs for Developing a Mindfulness-Based Psychoeducational Program SAGE Doi:10.1177/2158244017708818 *Journals. sage pub*
- Pegalajar Palomino, M.C. (2017). An Analysis of Self-Concept in students with Compensatory Education Needs for Developing a mindfulness-Based Psychoeducational Program. SAGE Open. Doi: 10.1177/2158244017708818 *Journals.sagepub.com/home/sgo*
- Peiffer, H., Ellwart, T., Preckel (2020). Ability Self-Concept and Self-Efficacy in higher education: An empirical differentiation based on their functional structure. *PLOS ONE* 15(7) e0234604. <https://doi.org/10.1371/journal.pone.0234604>.
- Peiffer, H., Ellwart, T., Preckel, F. (2020). Ability of Self-Concept and Self-Efficacy in higher education: An empirical differentiation based on their fractional structure. *PLOS ONE* 15(7): e 0234604, <https://doi.org/10.1371/journal.pone.0234604>
- Petrides, K.V. (2011). Ability and trait emotional intelligence in T. Chamorro Premuzic, A., Furnham & S.Von Stumm (Eds) *The Blackwell-Wiley Handbook of Individual Differences* (pp 656-677), New York; Wiley.
- Petrides, K.V., Fredrickson, N & Furnham, A. (2004). The role of trait emotional intelligence in academic performance and deviant behaviours at school personality and individual differences. *Personality and Individual Differences* 36, 277-293.
- Rogers, C.R. (1959). *A theory of therapy, personality and interpersonal relationships as developed in the client-centred framework*. NY: McGraw Hill.
- Salovey, P. & Mayer, J.D. (1990). *Emotional Intelligence*. Baywood Publishing Co. Inc
- Sarah Mae Sincero (2012). *Self-Concept Theory* Retrieved Aug 14 2021 from Explorable.com: <https://explorable.com/self-concept-theory>

Shiple, N.L., Jackson, M.J. & Segrest, L.S. (2017). The Effects of Emotional Intelligence, Age, Workplace, and academic performance. *Research in High Education Journal* 3,1-18.

Ugwuanyi, C.S., Okeke, C.I.O. & Asomugha, C.G. (2020). Prediction of learners' mathematics performance by their emotional intelligence, self-esteem, and self-efficacy. *Cypriot Journal of Education Science* 15(3), 492-501. D01:10:18844.

Yara, P.O. (2010). Students' self-concept and Mathematics achievement in some secondary schools in South-Western Nigeria. *European Journal of Social Science* 13(1) 127-132

Zamira Hyseni Duraku & Linda Hoxha (2018) Self -esteem, Study skill, Self-concept, Social support, psychological distress on test anxiety and academic performance. *Health Psychologu*;5(2) Doi:10.1177?2055102918799963.