

# Fostering Mathematics Achievement: The impact of age, gender and self-esteem using the Rosenberg Self-Esteem Scale on Secondary School Students in South West, Nigeria.

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Submitted February 23, 2020; Revised March 16, 2020; Accepted May 27, 2020

# Abstract

The study investigated the impact of age, gender and self-esteem on students' mathematics achievement in south west, Nigeria. The study adopted the descriptive survey research design. The multistage sampling procedure was used to select two thousand (2000) senior secondary school two (SS2) students; of which five hundred (500) were randomly selected from the sampled states of Ekiti, Lagos, Osun and Oyo. Two instruments; the Rosenberg self-esteem scale (RSES) and a Mathematics achievement test (r = 0.82; r = 0.81, respectively) was adopted for data collection. Data were analysed using descriptive statistics and correlation coefficient at p<0.05. Findings revealed that the sampled students possess a high self-esteem; self-esteem does affect the academic achievement of students in mathematics; female students have a higher self-esteem than the males and students' age affects their self-esteem. It is recommended therefore, that stakeholders especially parents and teachers, should build up the self-esteem of their wards at home and school by letting them see the virtue and value they possess; guidance and counseling unit in schools should be established, as this could enhance students' self-esteem and their achievement in the subject.

Keywords: Rosenberg self-esteem scale, Age, Gender, Self-esteem, Mathematics achievement.

# Introduction

Mathematics achievement is a fundamental indicator of the extent to which students' learning and understanding of mathematics concepts, principles and logic as taught by the teacher is measured. It represents the performance outcomes that indicate the extent to which students have accomplished specific mathematics goals as prescribed by the curriculum. It is a multifaceted construct that comprises different domains of learning.

Because the field of academic achievement covers a broad variety of educational outcomes, the definitions one could give mathematics achievement should depend on the indicators used to measure it at any point in time (Ricarda Steinmayr, Anja Meißner, Anne F. Weidinger and Linda Wirthwein, 2017). In attempting to decipher the factors that could play a role or the other in determining what, how and why students' mathematics achievement vary over time, many researchers (Adegoke, 2002; Adeleke, 2007; Akinlua, 1996; Ifamuyiwa, 1999; Awofala, 2002; Alieme and Odinko, 2015) have investigated and are still investigating these factors perceived to be fostering or hampering the achievement of learners in mathematics.

Several variables may be affecting the academic achievement of learners, including but not limited to cultural familiarity with the educational system (Deyhle and Swisher, 1997), linguistic proficiency (Lansford, Deater-Deckard and Bornstein, 2007), socioeconomic resources (Fuligni and Fuligni, 2007), parental involvement in education (Fuligni, 1997), parental aspirations (Taylor and Krahn, 2005), family obligation (Fuligni, 2001), academic self-concept (Cokley and Patel, 2007), academic motivation (Fuligni, 2001) and self-esteem (Mohammad, 2010); to mention but a few.

Self-esteem refers to an individual's sense of his or her values/worth or the extent, to which a person sees, values, approves of, appreciates, likes or dislikes him or herself (Rahanami, 2011). According to Swenson (2003), Self-esteem is important as it can enhance students' academic performance and overall behavior and mental health. Students possessing high self-esteem are likely to lead a successful life as it provides them valuable perception about life, experiences, social-emotional competence and prepare them to be able to deal with problem/challenges in their present and future encounters. Thus, the development of self-esteem is considered as one of the most important developmental processes of young learners (Sirin and Rogers-Sirin, 2004). Mohammad (2010) study revealed that there exist a positive relationship between self-esteem and academic achievement but there was no significant difference found in self-esteem between males and females. The results suggested that high self-esteem is an important factor that can strengthen the prediction of academic achievement in students, the same is in concordance with the findings of Rubie, Townsend and Moore (2004); Fathi-Ashtiani, Ejei, Khodapanahi and Tarkhorani (2007); and Bray (2001).

A person's self-esteem is created based on abstract information related to him and mental evaluation about this information (Pezhman and Abbas, 2018). Persons with low self- esteem may have more probability to suffer from depression, academic failure, anxiety and addiction rather than those with high self-esteem. In contrast, it could be that self- esteem has a weak relation with academic achievement, because if a person does not have a good feeling about him or herself, it is unlikely to affect his or her academic achievement. These may be the factors for measuring Self-Esteem as: values individuals receives from others; experiences gained with success through what an individual has undergone; ones definition of success and failure and individual attitudes to criticism.

Baumeister, Campbell, Krueger and Vohs, (2003), conducted an investigation on self-esteem; the study findings has helped teachers, parents, counselors, psychologist, therapists in ways and efforts at improving and boosting self-esteem of individuals, on the premise that high self-esteem will cause positive outcomes and benefits to the society. It was reported from same study that self-esteem and school academic performance are correlated, stressing that high self-esteem results of good school academic performance. The study also revealed that several efforts to boost the self-esteem of students have not been shown to improve academic performance and may sometimes be counter-productive. Mohammad (2010) in his study on the relationship between self-esteem and academic achievement in the Pre-university students used Coppersmith questionnaire was to measure the students' grade in their current and previous semesters. The results from the study revealed that there was a significant positive relationship between self-esteem and academic achievement and there was significant difference in academic achievement between boys and girls from the study. However, no significant difference was found in self-esteem between males and females. Thus, to him, high self-esteem is an important factor that can strengthen the prediction of academic achievement in students.

Similarly, Akinleke (2012) conducted a study to discover how test anxiety and self-esteem affect academic performance while Sadaat, Ghasemzadeh and Soleimani (2012), conducted a study, with the purpose to study self-esteem and its determined link to academic achievement of university students. It was reported from the study that, male students had higher scores than female students. Abdullah (2000) conducted a study to examine the relationship among achievement motivation, self-esteem, and locus of control as well as academic performance of university students in a Nigerian University. The purpose of the study was to determine the extent at which university student's academic performance was influenced by these criterion variables. Results from multiple regression analysis revealed that the subjective independent variables did not predict objective measure of the students' academic performance.

In this vein, it became important to have an instrument that could measure or assess self-esteem; this led Rosenberg to develop a scale termed the Rosenberg Self-Esteem scale in 1965. According to Rosenberg 1995, cited by Martin-Albo, Nurez, Navarro and Grijalvo (2007). self-esteem is regarded as a component of self-concept. Rosenberg later defines it as an individual set of thought and feeling about him or her own worth and importance that has to do with positive or negative attitude towards oneself. The Rosenberg scale is regarded as a uni-dimensional instrument created from a phenomenological conjuncture of self-esteem that involves items that are globally identified with individual worth by means of 10-items scale, 5 positively worded items and 5 negatively worded items; answered on a four point scale ranging from strongly agree, agree, disagree and strongly disagree. According to Arshad, Zaidi and Mahmood (2015) the original sample for which the scale developed consist of 5,024 High school

Junior and Senior School students from 10 randomly selected school in New York, USA. The study revealed that personality characteristics are the most affecting factor on students" academic achievement; and reemphasized that self-esteem is one of the very important factors that can bring about academic excellent, creativity, identification of talent and this has made many researchers to be interested in it. Orth and Robins (2014) regarded self-esteem as an internal belief system of an individual about him/herself.

According to Rahamani (2011), the relationship between self-esteem and academic achievement has been well documented in the literature. Different studies have researched and concluded that academic achievement and self-esteem are positively correlated (Bankston and Zhou 2002,). However, the influence that self-esteem has on academic achievement remains diverse and unclear, thus further research is needed to assist with the understanding the relationship existing between them. The reason for the present study was to revealed students response pattern to the Rosenberg Self-Esteem Scale; the import of self-esteem on students' academic achievement in connection with gender. Hence, the study aims at providing the necessary information for educators, counselors, parents and teachers on the need to encourage and foster students' self-esteem in order to prevent the imbalance in their academic achievement in their classes even across gender.

### **Objectives of the study**

- i. To administer the Rosenberg self-esteem scale to a large population (the southwest student population in Nigeria; Ekiti, Lagos, Osun and Oyo state).
- ii. To ascertain the response pattern of the said student population to the RSEC
- iii. To ascertain the relationship between self-esteem and age
- iv. To ascertain the relationship between self-esteem and gender
- v. To ascertain the relationship between self-esteem and students' academic achievement in mathematics.

### Statement of the problem

There exists a disconnection in literature on the significance of learners' self-esteem on their academic outcomes especially in core subjects like mathematics. Students need to achieve more in this subject as it is a major pre-requisite for their future academic pursuits. For this to be attained, the factors considered to be affecting these students (such as their self-esteem, age, gender) should be put into perspective. The researchers therefore, investigated the response pattern of secondary school students in south west, Nigeria, to the Rosenberg self-esteem scale in relation to their age, gender and mathematics achievement.

### **Research Questions**

1. What is the response pattern of secondary school students to the Rosenberg selfesteem scale in south west, Nigeria?

- 2. Is there a relationship between self-esteem and mathematics achievement among senior secondary school students in south west, Nigeria?
- 3. Is there a relationship between students' self-esteem scores and their gender?
- 4. Is there a relationship between students' self-esteem scores and their ages?

### Methodology

The study used the descriptive survey research design. The target population comprised all senior secondary school two students (SSS 2) in south west, Nigeria. Multistage sampling procedure was adopted in this study. First, purposive sampling was used to select the south western Nigeria. Systematic sampling was employed to select four states (Ekiti, Lagos, Osun and Oyo) from the south west. Simple random sampling technique was used to select 120 schools for the study. In all, a total sample of two thousand (2000) SS2 students; of which five hundred (500) of them were randomly selected from each sampled states.

The instruments for data collection were the Rosenberg self-esteem scale (RSES) and a Mathematics achievement test. The RSES consisted of two sections: A and B. Section (A) is on respondents personal bio-data which consists of: school name, students' gender, students' class and students' age. Section (B) consisted of ten (10) items measuring students' self-esteem. The participants responded along a 4-point likert scale response options, which are: (SA= Strongly agree, A= Agree, D= Disagree, SD= Strongly Disagree). The test-retest reliability coefficient of the instrument as obtained and stated by Rosenberg (1965) ranged from 0.82 to 0.85 while the internal consistency ranged from 0.77 to 0.88.

The second instrument was a mathematics test that was curbed from the senior secondary school two General Mathematics textbook. The test items were developed from the first term scheme of work as the data was collected during first term of the academic year. The mathematics test was validated (both for construct and content) by two professors in the department of mathematics, university of Ibadan, Nigeria. The test items were fifty (50) in number.

## Results

**Research Questions 1:** What is the response pattern of secondary school students to the Rosenberg self-esteem scale in south west, Nigeria?

<b>S</b> /	Items	Strongly	Agree	Disagree	Strongly	Mea	Std.
No		Agree Freq (%)	Freq (%)	Freq (%)	Disagree Freq (%)	n	Dev
1	On the whole, I am satisfied with myself	144 (7.2)	100 (5)	683 (34.2)	1073 (53.7)*	3.34	0.90
2	At times I think I am no good at all	479 (24.0)*	565 (28.3)	669 (33.5)	287 (14.4)	2.38	1.01
3	I feel that I have a number of good qualities	57 (2.9)	147 (7.4)	767 (38.4)	1029 (51.5)*	3.38	0.76
4	I am able to do things as well as most other people	51 (2.6)	159 (8.0)	848 (42.4)	942 (47.1)*	3.34	0.74
5	I feel I do not have much to be proud of.	410 (20.5)*	471 (23.6)	743 (37.2)	376 (18.8)	2.54	1.03
6	I certainly feel useless at times	781 (39.1)*	537 (26.9)	480 (24.0)	232 (11.6)	2.06	1.04
7	I feel that I'm a person of worth, at least on an equal plane with others	129 (6.5)	171 (8.6)	761 (38.1)	939 (45.0)*	3.25	0.87
8	I wish I could have more respect for myself	990 (43.7)*	764 (38.2)	146 (7.3)	100 (5.0)	3.32	8.85
9	All in all, I am inclined to feel that I am a failure	1165 (58.3)*	433 (21.7)	228 (11.4)	174 (8.7)	1.70	0.99
10	I take a positive attitude towards myself	133 (6.7)	123 (6.2)	577 (28.9)	1167 (58.4)*	3.39	0.87
V	Veighted Mean	2.87					

Table 1: Students	Response	Pattern	to the	Rosenberg	Self-esteem	Scale

NB: \* = High Self-esteem, Mean Score < 1.7 = Low Self-esteem, Mean score 1 70 = High self esteem

Table 1 shows the response pattern of the students to the RSES; it is evident that the students in south west Nigeria, possesses a high self-esteem from the weighted mean score of 2.87 obtained.

**Research Questions 2:** Is there a relationship between Self-Esteem and mathematics achievement among senior secondary school students in south west, Nigeria?

Variables	Mean	Std.	D.F.	R	Р	Remark
		Dev				
Self-Esteem Scores	28.70	3.13				
Academic	32.37	4.59	1998	0.03	0.05	Significant
Achievement						

\*Significant at 0.05

Table 2 shows the relationship between self-esteem and academic achievement. The result as evident from the table indicates that students' academic achievement has higher mean score of 32.37 as compared to self-Esteem mean score of 28.70. The mean difference is 3.67. There is a significant relationship between self-esteem and academic achievement (r = 0.03, p < 0.05). This is an indication that self-esteem of students do affect their academic achievement in mathematics.

**Research Questions 3:** Is there a relationship between students' self-esteem scores and their gender?

Variables	Gender	No. of	Mean	Std.	D.F.	R	Р	Remark
		Students		Dev				
Self-Esteem	Male	960	28.59	3.248				
Scores	Female	1040	28.80	3.013	1998	.007	0.05	Significant

### Table 3: Relationship between Self-Esteem and Gender.

Significant at 0.05

Table 3 shows the relationship between self-esteem and gender. The table indicates that the females mean scores of 28.80 is slightly higher than the males mean score of 28.59. The mean difference is 0.21. Although the values of the mean scores do not reveal appreciable difference. The result indicates that there is a significant relationship between students' self-esteem and gender (r = 0.007, p < 0.05). It is depicted from the result that the female students have a little higher self-esteem than their male counterpart.

**Research Questions 4:** Is there a relationship between students' self-esteem scores and their ages?

Variables	Mean	Std.	No of	D.F.	R	Р	Remark
		Dev	Students				
Self-Esteem	28.70	3.13					
Scores			2000	1998	.046	0.05	Significant
Age	1.86	.988					

Table 4: Relationship between Students' Self-Esteem and Age

\*Significant at 0.05

Table 4 shows the relationship between students' self-esteem and their ages. The table indicates that the students' self-esteem score has a mean of 28.70 and standard deviation of 3.13 while the students' Ages have a mean Score 1.86 and standard deviation of 0.988. The mean difference is 26.84. Similarly, the table shows that there is a significant relationship between students' self-esteem and their ages (r = 0.046, p < 0.05). Thus, the ages of students do determine how high or low their self-esteem could be.

### Discussion

The result of the study as evident from the response pattern of students in south western Nigeria, to the Rosenberg self-esteem scale did reveal that students in the sampled states; possesses a high self-esteem as shown from the weighted mean score value. This could in no small measure have a positive and significant effect their self-image and general academic performance.

The result of the study does indicate that there exist a significant correlation between students' self-esteem scores and their academic achievement in mathematics. This means that students who possesses high self-esteem are likely to perform better in their academic endeavours than their counterparts especially in subjects such as mathematics. The finding corroborates with the findings of Mohammad (2010), Rubie *et al* (2004); Walter (2003); Fathi-Ashtiani *et al.* (2007); Bray (2001); Doodman, Zadeh and Changizi (2017), which stated that self-esteem was positively correlated with Performance.

The study has also revealed that here is a significant relationship between students' self-esteem and gender; that females have a little higher self-esteem than their male counterpart. Thus, gender has a role to play in determining the nature and levels of self-esteem student can possess overtime. The finding contrasts with the findings of Arshad, Zaidi and Mahmood (2015), Kearney (1999); McMullin and Cairney (2004) that showed that male students had higher self-esteem than the female students; Patton, Bartrum and Creed (2004) and Mohammad (2010) which revealed that there were no significant differences between males and females on self-esteem.

Another interesting aspect of the study is the fact that there is a significant relationship between students' self-esteem and their ages. Students of higher ages possessed a higher self-esteem that those of lower Ages. The finding of the study agrees with those of Robins et al. (2005); Giarrusso, Mabry and Bengtson (2001) which stated that self-esteem levels are high in childhood, drops during adolescence, rises gradually throughout adulthood, and declines sharply in elderly.

### Conclusion

In view of the findings of this study, the researchers conclude that the students in south west Nigeria, possesses a high self-esteem. Students' self-esteem do affect their academic achievement in mathematics. There is a relationship between students' self-esteem and their gender as female students have a higher self-esteem than the males. The ages of students do determine their self-esteem

#### Recommendations

In view of the foregoing, it is recommended that stakeholders especially parents and teachers, should build up the self-esteem of their wards at home and school by letting them see the virtue and value they possess and set up guidance and counseling unit in schools as this could enhance students' self-esteem and their achievement in mathematics.

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